

Carrying Capacity: Nitrogen and the Intensification of Irish Pasture Systems,
1945-2007

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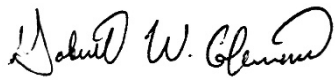
Gabriel Coleman

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Abstract

In the second half of the twentieth century, Ireland's pasture-dominated agricultural sector intensified rapidly, causing significant changes to the nation's economy, politics, environment, and rural communities. This thesis takes an environmental history approach to this intensification, examining its relationship to Ireland's postwar policy of economic expansion and the scientific research institutions that translated this policy into agricultural practice. The thesis focuses on the introduction of synthetic nitrogen fertiliser to the Irish pasture, connecting this new source of abundant agricultural energy with the development of Ireland's natural gas network, intensive practices associated with ryegrass and silage-making, the polluting effects of intensive farm operations and creamery waste, and Ireland's place within the global narrative of the Green Revolution. This narrative is contextualised within the larger political and economic history of European integration as well as the development of Irish and European environmental movements and policy in relation to the increasingly severe environmental impacts of the agricultural sector. The thesis takes a ground-up approach to these narratives, combining a material semiotic framing with eco-Marxist and decolonial theory in order to weave the environmental, social, political, and economic elements of Ireland's postwar agricultural intensification into a single narrative.

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Terminology

As this thesis focuses primarily on agricultural policy and research within the Republic of Ireland, the use of “Ireland” and “Irish” within the text of the thesis refers to the Republic of Ireland. “The island” or “the island of Ireland” is used to refer collectively to the Republic of Ireland and Northern Ireland in discussions of environmental impacts or joint initiatives between the two governments, while “the North” is used to indicate Northern Ireland on its own.

Irish spellings are used throughout except within direct quotations. The Irish word ‘Teilifís’, meaning television, is spelled multiple ways by different sources. ‘Telefís’ is used in the title of the show *Telefís Feirme*, while the RTÉ, Ireland’s state broadcaster, uses ‘Teilifís’.

List of Abbreviations

ACC - Agricultural Credit Corporation
ACOT - An Chomhairle Oiliúna Talmhaíochta
ACRES - Agri-Climate Rural Environment Scheme
AFF - An Foras Forbartha
AFT - An Foras Talúntais
AGO - Office of the Attorney General
AGMET - Joint Working Group on Applied Agricultural Meteorology
ANC - Areas of Natural Constraint
ANT - Actor Network Theory
BGE - Bord Gáis Éireann
BOD - Biological Oxygen Demand
BRICS - Brazil, Russia, India, China, and South Africa
CAN - Calcium Ammonium Nitrate
CDB - Congested Districts Board
CFP - Control of Farmyard Pollution Scheme
CHP - Combined Heat and Power
CMP - Colonial Matrix of Power
CRC CL - Corrosion Reaction Consultants Chemicals Ltd
CSO - Central Statistics Office
DAF - Department of Agriculture and Forestry
DFA - Department of Foreign Affairs
DONG - Danish Oil and Natural Gas
DP - Direct Payments
EEC - European Economic Community
EC - European Commission
EFMA - European Fertiliser Manufacturers Association
EPA - Environmental Protection Agency
ERP - European Recovery Programme
ESB - Electrical Supply Board
FAI - Fertiliser Association of Ireland
FIN - Department of Finance
FAO - Food and Agriculture Organisation of the United Nations
GLAS - Green Low-Carbon Agri-Environment Scheme

ICI - Imperial Chemical Industries
ICMSA - Irish Creamery Milk Suppliers Association
IE - Ireland
IFA - Irish Farmers Association
IFI - Irish Fertiliser Industries
IIRS - Institute for Industrial Research and Standards
IRBV - International Resources Besloten Vennootschap
LFA - Less-Favoured Areas
LU - Livestock Unit
MS - Member States
N - Nitrogen
NET - Nítrigin Éireann Teoranta
NKMP - North Kerry Milk Products
NL - The Netherlands
NSS - National Soil Survey
NVZ - Nitrate Vulnerable Zones
OECD - Organisation for Economic Co-operation and Development
OEEC - Organisation for European Economic Co-operation
P - Phosphorus
REPS - Rural Environment Protection Scheme
RTÉ - Raidió Teilifís Éireann
TAMS - Targeted Agricultural Modernisation Scheme
TAOIS - Department of the Taoiseach
TD - Teachta Dála
UCD - University College Dublin
US - United States
USDA - United States Department of Agriculture

Introduction

Rolling green pasture is one of the ubiquitous images of both the Irish landscape and the Irish state itself. Promotional videos and images from the Irish Tourism Board of castles and coastlines are swaddled in a lush green carpet dotted with sheep and cattle.¹ The globally recognised golden wrapper of Kerrygold butter proudly proclaims the grass diet of the cows that produced it, the brand name emblazoned on an emblem of bright green grass that glows from within.² Despite the dominance of the pasture as a quintessential image of Ireland, the economic, cultural, and environmental impacts of pasture-based agriculture on the development of the modern Irish state have been largely passed over in both historical study and popular conversation. In his book *Postwar*, historian Tony Judt claims that Ireland, along with France, Italy, and parts of Scandinavia “moved directly from an agricultural to a service-based economy in a single generation, virtually bypassing the industrial stage in which Britain or Belgium had been caught for nearly a century.”³ While this would appear to be true when focusing, as Judt does, on labour distribution, the idea that Ireland and other parts of Europe simply skipped over the industrial ‘stage’ of economic development carries with it a very narrow image of what an industrial economy is: one that takes iron, coal, and the hard hat as its emblems. Grass, in contrast, is an emblem of agriculture, specifically the “backward” agriculture of “peasants” in Judt’s telling.⁴ As the share of Ireland’s labour devoted to agriculture has shrunk over the second half of the twentieth century, grass has seemingly also dematerialised, becoming less and less associated with the material realities of agricultural production. Instead, the Irish pasture has taken on a more symbolic association with both the ancient beauty of the Irish landscape promoted by the tourism sector and the naturalness of its agricultural products promoted by Irish agribusiness.

This thesis argues that Ireland did indeed industrialise through the postwar period, and that the nation’s industrialisation came through an explicit reimagining of Ireland’s pastures. This reimagining did not initially associate grass with ancient heritage or natural healthy foods but, in the words of the government’s 1958 *Programme for Economic Expansion*, as the “raw material” supporting Ireland’s industrialisation.⁵ As this thesis shows, the use of fertiliser nitrogen in pasture systems was central to the industrialising shifts within Ireland’s agricultural ecology and rural economy since the postwar period. This industrialisation of Ireland’s pasture has resulted in

¹ *Discover Ireland’s Wild Atlantic Way*, produced by Discover Ireland, 2018, 00:02:23.

² Siobhán Brett, ‘How Kerrygold Butter Became a Cult Favorite in America’, *Eater*, 17 April 2018.

³ Tony Judt, *Postwar: A History of Europe since 1945* (Heinemann, 2005), 327.

⁴ *Ibid.*, 13-15.

⁵ T. K. Whitaker, *Programme for Economic Expansion* (Stationery Office, 1958), 12.

corresponding industrial impacts on the Irish and global environment that continue from the period examined through this thesis to the present day, including deterioration of water quality, contribution to climate change, and loss of biodiversity.

Contrary to this bucolic image of a green-swaddled island, this industrial reimagining of Ireland's pastures has had an acute impact on the island's environment and people. According to Ireland's Environmental Protection Agency (EPA), the nation's rivers, lakes and estuaries have steadily decreased in quality since monitoring began in the 1980s, with only 17.7 per cent of river monitoring sites and sixteen per cent of lakes categorised as "high biological quality" as of 2023.⁶ This decline, along with pollution of groundwater and estuaries, is primarily the result of nitrate and phosphorus pollution by agricultural runoff.⁷ The distribution of native plants across the island of Ireland has more than halved since 1987 according to the Botanical Society of Britain and Ireland, due primarily to increased soil nitrogen, mechanisation, drainage, reseeding and other aspects of agricultural industrialisation.⁸ In addition to impacting the biodiversity of the island's land and water, the industrialisation of Irish agriculture has significantly impacted global biogeochemical cycling. Ireland's farms alone contribute thirty-eight per cent of Ireland's carbon emissions and nitrate runoff from Irish agriculture contributes significantly to the eutrophication of global marine systems.⁹ This thesis interrogates the political, economic, and scientific contexts that led to and continue to spur on agriculture's outsized contribution to these the ongoing crises of biodiversity, climate, and water quality in Ireland.

A multidisciplinary approach to environmental history allows this thesis to look beyond the 1980s origins of quantitative reports of Irish environmental quality to examine broader postwar cultural and political trends in the relationship between agriculture and environment. The thesis intends to show how Ireland's productivist agricultural regime shaped both political and popular responses to its environmental toll and to add nuance to the baseline quality of Ireland's environmental health. More than simply providing historical context for environmental policy makers in Ireland, Europe, and beyond, the thesis represents an attempt to disentangle the rhetorical and ontological underpinnings that connect agricultural production to the biodiversity and climate crisis. The ultimate goal of this thesis is to inspire policy makers, researchers and, more importantly, ordinary growers and eaters to imagine different land relations where agriculture,

⁶ *Water Quality in 2023*, Indicators Report (Environmental Protection Agency, 2024), 6-7.

⁷ *Ibid*, 9-20.

⁸ John Faulkner, *Ireland's Changing Flora: A Summary of the Results of Plant Atlas 2020* (Botanical Society of Britain and Ireland, 2023), 11-20.

⁹ 'Greenhouse Gas Emissions: Agriculture', Environmental Protection Agency, May 2025.; *Water Quality in 2023*, 13-15.

people, and environment can flourish collectively.

I. Literature Review

This thesis pulls from several strands of the environmental humanities but benefits most directly from the existing body of environmental history focusing on the modernisation of agriculture and its environmental impacts. These histories of western agriculture from the second half of the nineteenth century to the present day depict a common trajectory. Jonathan Harwood's work on plant breeding in Europe and around the globe, Deborah Kay Fitzgerald's research into agricultural mechanisation in the United States and Kendra Smith-Howard's study of bovine bodies all depict, in one way or another, the modernist separation of agricultural practices and systems from the more-than-human dynamics on which these systems of growing and eating relied.¹⁰ These and other authors have answered Donald Worster's 1990 call for an explicit focus on agroecological historical research that exploits the agricultural interface between human farmers and their environment to understand how capitalism in the nineteenth century and beyond unseated subsistence as the primary goal of agriculture and reduced "the complex forces and interactions, beings and processes" on which agriculture relied to the abstract commodity of 'land.'¹¹ While much research has been devoted to the role of mechanisation and modernisation in arable farming, whether in Worster's *Dust Bowl* or Harwood's work on the Green Revolution(s), this thesis uses twentieth-century Ireland as a case study to examine the mechanisation and modernisation of the relatively understudied and often greenwashed pasture systems.

Environmental historians and historians of science have highlighted the paired importance of scientific research and fossil energy in twentieth-century modern agriculture through both the well-trodden Green Revolution in Mexico, South America, and Asia and other less examined green revolutions and agricultural modernisations. Frank Uekötter's chapter *Know Your Soil* shows the important role of the laboratory in establishing soil science and state agricultural advisers as key partners for German farmers to properly operate their land.¹² Others like Meredith McKittrick, Andrew Watson, and Germán Vergara have pointed out how this scientific operation of agriculture

¹⁰ Jonathan Harwood, *Europe's Green Revolution and Others Since: The Rise and Fall of Peasant-Friendly Plant Breeding* (Routledge, 2012); Deborah Kay Fitzgerald, *Every Farm a Factory: The Industrial Ideal in American Agriculture*, Yale Agrarian Studies Series (Yale University Press, 2003); Kendra Smith-Howard, *Pure and Modern Milk: An Environmental History Since 1900* (Oxford University Press, 2017).

¹¹ Donald Worster, 'Transformations of the Earth: Toward an Agroecological Perspective in History', *The Journal of American History* 76, no. 4 (1990), 1110; Donald Worster, *Dust Bowl: The Southern Plains in the 1930s* (Oxford University Press, 1979), 95.

¹² Frank Uekötter, 'Know Your Soil: Transitions in Farmers' and Scientists Knowledge in Germany', in *Soils and Societies: Perspectives from Environmental History*, ed. John Robert McNeill and Verena Winiwarter (White Horse Press, 2006).

both resulted from and depended upon the abundance of inexpensive and accessible fossil energy for machinery, irrigation, and fertilisers.¹³ The specific focus throughout this thesis on the political contingency of agricultural scientific research in Ireland and its interrelated social and ecological impacts represents a significant contribution to this body of work.

Artificial nitrogen fertilizer, including ammonia, nitrate, urea and other compounds manufactured using fossil energy from coal and natural gas has been a primary driver in this twentieth-century scientific modernisation of agriculture, especially in the postwar period. Though many of the environmental histories of agriculture mentioned above list artificial nitrogen alongside pesticides, tractors, and other nineteenth and twentieth-century modernising technologies, artificial nitrogen has, until recently, rarely been examined in its own right. The only environmental history monograph on nitrogen fertiliser is Hugh Gorman's *The Story of N*, which primarily uses nitrogen's role in the long history of agriculture as "a powerful organising device" for the book's larger argument about the innovative capacity of market capitalism to avert ecological collapse.¹⁴ Mined nitrogen fertiliser from deposits of guano in Peru and fossilised bacteria in Chile to support British and American agriculture, has received more critical attention, with Gregory T. Cushman's book *Guano and the Opening of the Pacific World* and Edward D. Melillo's paper 'The First Green Revolution', connecting the devaluation and exploitation of both labour and land in its extraction.¹⁵ The eco-Marxist argument of the metabolic rift used as a framework for much of this thesis emerges from this mining of nitrates from guano and bacterial deposits. John Bellamy Foster and Brett Clark show how Marx's idea of the metabolic rift emerged from his reading of Justus von Liebig's critique of Britain's fertiliser-dependent intensive agricultural practices while Eamonn Slater and Eoin Flaherty highlight the explicit Irish context of the idea, emphasising how Marx saw the metabolic rift as depleting the reproductive capacity of both the soil and society of colonial Ireland.¹⁶

¹³ Meredith McKittrick, 'Industrial Agriculture', in *A Companion to Global Environmental History*, ed. John Robert McNeill and Erin Stewart Mauldin (Wiley-Blackwell, 2012); Andrew Watson, "'The Single Most Important Factor": Fossil Fuel Energy, Groundwater, and Irrigation on the High Plains, 1955-1985', *Agricultural History* 94, no. 4 (2020): 629–63; Germán Vergara, *Fueling Mexico: Energy and Environment, 1850-1950*, Studies in Environment and History (Cambridge University Press, 2021).

¹⁴ Hugh S. Gorman, *The Story of N: A Social History of the Nitrogen Cycle and the Challenge of Sustainability* (Rutgers University Press, 2013), 164.

¹⁵ Gregory T. Cushman, *Guano and the Opening of the Pacific World: A Global Ecological History*, Studies in Environment and History (Cambridge University Press, 2013); Edward D. Melillo, 'The First Green Revolution: Debt Peonage and the Making of the Nitrogen Fertilizer Trade, 1840–1930', *The American Historical Review* 117, no. 4 (2012): 1028–60.

¹⁶ John Bellamy Foster and Brett Clark, *The Robbery of Nature: Capitalism and the Ecological Rift* (New York : Monthly Review Press, 2018); Eamonn Slater and Eoin Flaherty, 'Marx on the Reciprocal Interconnections between the Soil and the Human Body: Ireland and Its Colonialised Metabolic Rifts', *Antipode* 55, no. 2 (2023): 620–42.

The argument made across historical research on mined fertiliser is that the abundance of cheap imported nutrients produced by exploited labour on seized land created a feedback loop of intensification that has continued to spiral away from any purposeful recycling of soil nutrients. Though this characterisation of the metabolic rift is still useful to discussions of intensive agriculture today, the role of artificial fossil-based nitrogen fertilisers in sustaining and widening the metabolic rift has received comparatively little attention. Michael Staub's examination of collaborations between the fertiliser and fossil industries in the context of the Green Revolution and Arnaud Page's research into the build-up of nitrate manufacturing capacity in interwar Britain display the promise of further research into the fossil-fertiliser connection from an environmental humanities perspective.¹⁷ Frank Uekötter has contributed to this body of work, devoting a chapter each to guano and artificial nitrogen in his volume *The Vortex*.¹⁸ Nathalie Jas's analysis of agricultural chemicals like fertilisers and pesticides additionally shows the influence of these technologies on political frameworks of environmental governance throughout the nineteenth and twentieth centuries.¹⁹ Given that artificial nitrogen fertilisers have come to almost entirely displace mined fertilisers since the mid-twentieth century, this thesis uses the Irish case study to conceptually connect the mined fertiliser origins of the metabolic rift to the fossil-dependent artificial fertiliser regime of the postwar period.

¹⁷ Michael E Staub, 'Farming with Petroleum: The Nitrogen Fertilizer Industry's Malthusian Bargain', *Agricultural History* 98, no. 3 (2024): 349–75; Arnaud Page, "'The Greatest Victory Which the Chemist Has Won in the Fight (...) against Nature": Nitrogenous Fertilizers in Great Britain and the British Empire, 1910s-1950s', *History of Science* 54, no. 4 (2016): 383–98.

¹⁸ Frank Uekötter, *The Vortex: An Environmental History of the Modern World* (University of Pittsburgh Press, 2023).

¹⁹ Nathalie Jas, 'Public Health and Pesticide Regulation in France Before and After Silent Spring', *History and Technology* 23, no. 4 (2007): 369–88.

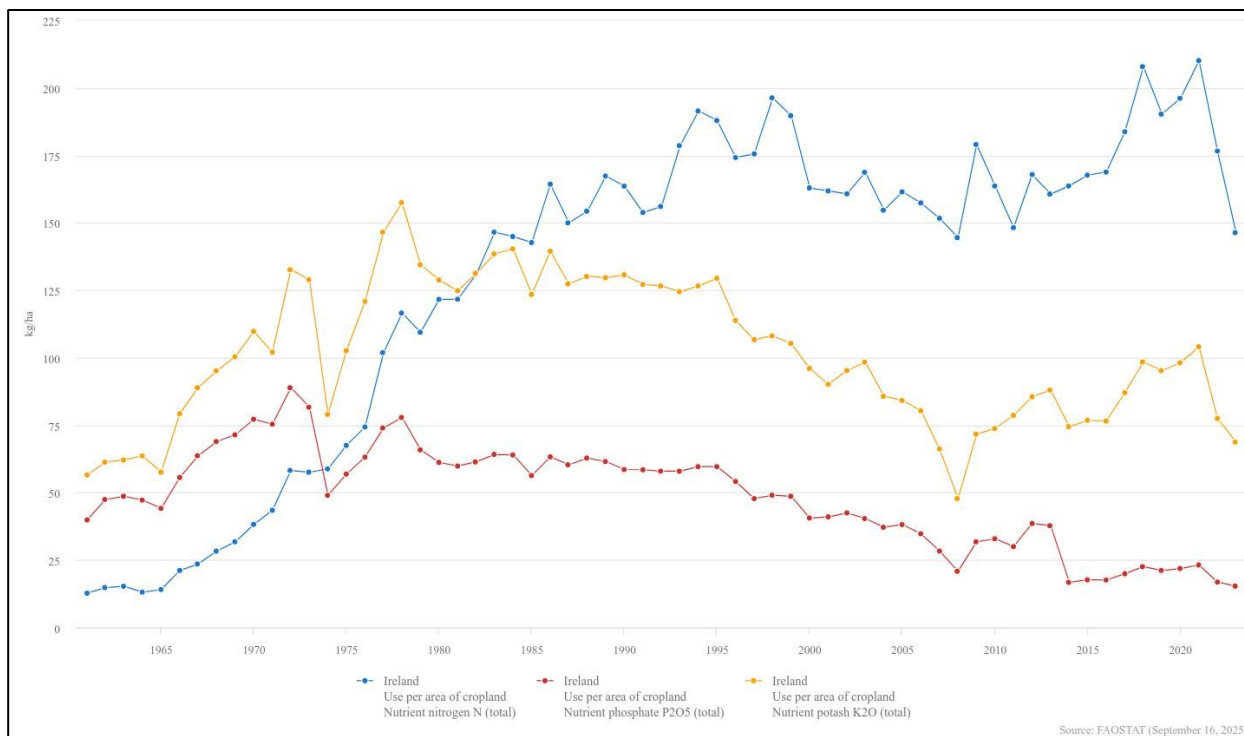


Figure 0.1: United Nations Food and Agriculture Organisation graph showing the comparative use of nitrogen, phosphorus, and potassium fertiliser per hectare of land in Ireland from 1961 to 2023. Source: FAOSTAT. ‘Fertilizers by Nutrient - Ireland’. 2025.

The rapid increase in nitrogen fertiliser use in Ireland after World War II corresponds with the period John McNeill and Peter Engelke have come to call “The Great Acceleration” and what economic historian Christian Pfister refers to as “1950s Syndrome,” an unprecedented period of economic growth paired with steadily declining fossil fuel prices which resulted in exponential and excessive growth in consumption of energy and raw materials.²⁰ Pfister, McNeill, Engelke, and others show the increased use of artificial nitrate to be a primary symptom of this 1950s Syndrome, with agricultural landscapes like those involved in the Green Revolution becoming reliant on consistently high inputs of fossil energy in the form of fertilisers and fuel used to grow crops.²¹ As shown in the graph above, Ireland is no exception and continues to use massive amounts of fertiliser, ranking ninth in the global use of nitrogen fertiliser per hectare in 2022 (Fig 0.1).²² This thesis is an exploration of the Great Acceleration of Ireland’s pasture systems and combines

²⁰ John Robert McNeill and Peter Engelke, *The Great Acceleration: An Environmental History of the Anthropocene since 1945* (The Belknap Press of Harvard University Press, 2014); Christian Pfister, ‘The “1950s Syndrome” and the Transition from a Slow-Going to a Rapid Loss of Global Sustainability’, in *The Turning Points of Environmental History*, ed. Frank Uekoetter (Pittsburgh, 2010), 92.

²¹ Pfister, ‘1950s Syndrome’. 109; Will Steffen et al., ‘The Trajectory of the Anthropocene: The Great Acceleration’, *The Anthropocene Review* 2, no. 1 (2015): 81–98.

²² Food and Agriculture Organization of the United Nations with major processing by Our World in Data, ‘Fertilizers by Nutrient - Ireland’, FAOSTAT, 2025

agricultural and energy history methods to explore how the relationship between artificial nitrogen and its fossil-feedstocks enabled the present carbon-intensive agricultural regime. One of its primary contributions is in bridging ideas from energy history like fossil extractivism and agricultural industrialisation with critical work on pollution and environmental degradation like Max Liboiron's work connecting plastic pollution and colonialism.²³ By uniting these disparate bodies of work, this thesis endeavours to trace fossil energy within agriculture from its role as a feedstock for artificial fertiliser, through its influence on agricultural practice and ecological rationalisation, and ultimately to its environmental and social impacts on marine and freshwater pollution.

In addition to environmental history, this thesis draws significantly from Irish historical and social science literature. Agricultural trade has held a longstanding importance to Ireland's economy both under British colonisation and in the century since the Republic of Ireland's independence. Irish economic historians like Andy Bielenberg, Raymond Ryan, and Cormac Ó Gráda devote significant energy to agricultural production and policy in their histories of the Irish economy following independence and partition.²⁴ Along with Paul Rouse's book on Irish agricultural policy through 1965, this thesis benefits from the robust body of Irish institutional histories related to agriculture including Mary Daly's books on the Department of Agriculture and the Department of Local Government and Mícheál Ó Fathartaigh's books on the Dairy Disposal Company and the Agricultural Advisory Service.²⁵ Mark Cooper and John Davis's book *The Irish Fertiliser Industry* provides a similarly detailed institutional and economic account of fertiliser use in twentieth-century Ireland.²⁶ Though the volumes listed above provide a detailed portrait of agricultural industrialisation since the foundation of the Republic of Ireland, their focus on Irish agriculture through the lens of economic and political history leads to a necessarily top-down view of the history they explore. This thesis relays a complementary history from the ground up. Though each chapter has one or several institutional focuses, the narratives focus on how these institutions interacted with agricultural labourers and rural communities as well as the non-human actors within

²³ Max Liboiron, *Pollution Is Colonialism* (Duke University Press, 2021).

²⁴ Andy Bielenberg and Raymond Ryan, *An Economic History of Ireland since Independence* (Routledge, 2016), 49-70; Cormac Ó Gráda and Kevin Hjortshøj O'Rourke, 'The Irish Economy During the Century after Partition', *The Economic History Review*, 16 August 2021.

²⁵ Paul Rouse, *Ireland's Own Soil* (Irish Farmers' Journal, 2000); Mary E. Daly, *The First Department: A History of the Department of Agriculture* (Institute of Public Administration, 2002); Mary E. Daly, *The Buffer State: The Historical Roots of the Department of the Environment* (Institute of Public Administration, 1997); Mícheál Ó Fathartaigh, *Irish Agriculture Nationalised: The Dairy Disposal Company and the Making of the Modern Irish Dairy Industry* (Institute of Public Administration, 2014); Mícheál Ó Fathartaigh, *Developing Rural Ireland: A History of the Irish Agricultural Advisory Service* (Wordwell, 2021).

²⁶ Mark Cooper and John Davis, *The Irish Fertiliser Industry: A History* (Irish Academic Press, 2004).

the agri-environmental assemblage, including the soil, animals, plants, and fungi who shape and are shaped by the actions of farm communities, policy, and market influences.

The work of Irish sociologists Hilary Tovey and Ethel Crowley show one way into these bottom-up perspectives and provide key insights into the social impacts of agricultural and environmental policy from the 1970s forward. Both Tovey and Crowley's research points to a bifurcation of farm operations resulting from the Common Agricultural Policy (CAP), with a minority of farmers contributing the majority of production through intensive fertiliser-dependent methods while the majority of smaller farms are able to sustain smaller and less intensive operations through payments from the EU's agri-environmental schemes.²⁷ In her article 'Developing Agribusiness', Tovey depicts "less developed" or "marginalised" Irish farmers not as simply disadvantaged compared to their more intensive peers, but as actively resistant to certain forms of agricultural commoditisation such as the augmenting or replacement of soil fertility by use of artificial fertilisers or the introduction of concentrate feeds to supplement livestock diets.²⁸ Venus Bivar's history of postwar French agriculture *Organic Resistance* provides a similar model for writing the agency of rural communities to build, participate in, and resist state programmes of agricultural productivism prominently into environmental histories of postwar agriculture.²⁹

The incorporation of more-than-human actors within this thesis is similarly supported by an interdisciplinary perspective. The thesis benefits significantly from the idea of more-than-human assemblages of action within agricultural systems explored by John Law and Annemarie Mol in their book chapter 'The Actor-Enacted: Cumbrian Sheep in 2001'.³⁰ Seeing sheep, cows, grass, and other non-human actors as active participants in the development and maintenance of and resistance to particular agricultural paradigms allows the thesis to challenge the commoditisation of these landscapes at a conceptual level. *The Mushroom at the End of the World* by anthropologist Anna Lowenhaupt Tsing similarly reads both human and nonhuman agency into the salvage landscapes of matsutake pickers and cutover forests in the northwestern United States and Japan.³¹ In the Irish context, botanist and geologist John Feehan's book *Farming in Ireland* depicts the history of Irish agricultural from the neolithic to the postwar "ryegrass revolution" from

²⁷ Hilary Tovey, *Developing Agribusiness: Some Implications for Irish Farming* (Department of Sociology, U.C.C., 1992); Ethel Crowley, 'The Evolution of the Common Agricultural Policy and Social Differentiation in Rural Ireland', *The Economic and Social Review* 34, no. 1 (2003): 65–85.

²⁸ Tovey, *Developing Agribusiness: Some Implications for Irish Farming*, 15.

²⁹ Venus Bivar, *Organic Resistance: The Struggle of Industrial Farming in Postwar France*, Flows, Migrations, and Exchanges (University of North Carolina Press, 2018).

³⁰ John Law and Annemarie Mol, 'The Actor-Enacted: Cumbrian Sheep in 2001', in *Material Agency: Towards a Non-Anthropocentric Approach*, ed. Carl Knappett and Lambros Malafouris (Springer Science, 2008).

³¹ Anna Lowenhaupt Tsing, *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins* (Princeton University Press, 2015).

an ecological perspective.³² This thesis uses the multispecies frameworks of Law, Mol, and Tsing to develop ecological narratives that provide ground-up histories of more-than-human action in order to complement the existing body of Irish agricultural histories.

The final two bodies of work this thesis relates to are twentieth-century histories of the development of governance frameworks around the environment and the geographic and legal expansion of the European Union. Hilary Tovey has again contributed significant research to environmentalism in Ireland, analysing emergent ideas movements from the sociological perspective.³³ In particular, Tovey's article 'Environmentalism in Ireland: Two Versions of Development and Modernity', describes a bifurcation of Irish environmental thought that developed in parallel with the postwar bifurcation in agricultural production, contrasting heritage and development-focused institutions like An Taisce, An Foras Forbartha, and the Georgian Preservation Society with popular environmental movements focused on the mitigation of pollution and improvements to daily quality-of-life.³⁴ Texts like *The Environment: A History of The Idea* by Warde et al. and *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuation* by Joan Martinez-Alier allow the specifics of the Irish case to resonate within a global historical contexts.³⁵ Warde et al. characterises this bifurcation within the simultaneous development of earth system science and environmental justice as global concepts of the environment while Martinez-Alier characterises the divide as two "currents of environmentalism," the "gospel of eco-efficiency" and the "environmentalism of the poor" that emerge from particular economic and social conditions.³⁶ Exploring the historical connections between the bifurcation of agricultural production and environmental attitudes in Ireland allows this thesis to show how agricultural and environmental policy informed one another. The particular examination of Irish environmentalism in relation to frameworks like environmental justice and environmentalism of the poor attempts to respond to Stefania Barca's call for European environmental histories that properly address environmental and human suffering and deconstruct conventional ways of thinking about ecological crisis.³⁷

³² John Feehan, *Farming in Ireland: History, Heritage and Environment* (University College Dublin, Faculty of Agriculture, 2003).

³³ Hilary Tovey, *Environmentalism in Ireland: Movement and Activists* (Institute of Public Administration, 2007).

³⁴ Hilary Tovey, 'Environmentalism in Ireland: Two Versions of Development and Modernity', *International Sociology* 8, no. 4 (1993): 413–30.

³⁵ Paul Warde et al., *The Environment: A History of the Idea* (Johns Hopkins University Press, 2018); Joan Martinez-Alier, *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuation* (Edward Elgar Publishing, 2002).

³⁶ Warde et al., *The Environment: A History of the Idea*, 151-70; Martinez-Alier, *The Environmentalism of the Poor*, 5-15.

³⁷ Stefania Barca, 'Telling the Right Story: Environmental Violence and Liberation Narratives', *Environment and History* 20, no. 4 (2014): 542.

The development of Irish environmental thought and agricultural policy are tied up in Ireland's relationship with Europe since joining the European Economic Community (EEC) in 1973. Significant literature has been devoted to the historical development and impact of European policy on the environment and agriculture: *The Unfinished History of European Integration* by van Meurs et al. compiles several texts on the enlargement of Europe, as *Living with the Land* by van de Grift et al. has done with rural policy, Högselius et al. with technological developments, and Ritson and Harvey through their volume on the Common Agricultural Policy.³⁸ Jan-Henrik Meyer's article 'Pushing for a Greener Europe' and Musacchio et al.'s article on the Nitrates Directive provide additional background on the development of European ideas the environment from the 1970s forward.³⁹ Irish political science researchers have extensively explored the implications of European policy for Ireland's agricultural sector and environment, notably Bernadette Connaughton and Bríd Quinn's chapters in *Europeanisation and New Patterns of Governance in Ireland* and Jane O'Mahony's article 'Europeanisation as Implementation'.⁴⁰ Within the field of history, however, Ireland's environmental and agricultural relationship with Europe has largely remained a footnote. By focusing specifically on how Europe has shaped Ireland's agricultural and environmental policy, and vice versa, this thesis contributes a new perspective to Ireland's national history as well as the larger history of an unfinished Europe.

II. Conceptual Framework

This thesis attempts to read the environmental history of Ireland's agricultural intensification in the latter half of the twentieth century through a decolonial lens. There is a significant body of historical research devoted to exploring Ireland's colonial relationship with the British Empire, including the volume *Ireland and Postcolonial Theory* edited by Clare Carrol and Patricia King, Jane Ohlmeyer's *Making Empire*, and significant contributions from beyond the

³⁸ Wim van Meurs et al., *The Unfinished History of European Integration* (Amsterdam University Press, 2013); Liesbeth van de Grift et al., eds., *Living with the Land: Rural and Agricultural Actors in Twentieth-Century Europe - A Handbook*, Contemporary European History 3 (De Gruyter Oldenbourg, 2023); Per Högselius et al., *Europe's Infrastructure Transition*, Making Europe: Technology and Transformations, 1850-2000 (Palgrave Macmillan, 2016); Christopher Ritson and David Harvey, eds., *The Common Agricultural Policy*, 2nd ed (CAB International, 1997).

³⁹ Jan-Henrik Meyer, 'Pushing for a Greener Europe: The European Parliament and Environmental Policy in the 1970s and 1980s', *Journal of European Integration History* 27, no. 1 (2021); Arianna Musacchio et al., 'EU Nitrates Directive, from Theory to Practice: Environmental Effectiveness and Influence of Regional Governance on Its Performance', *Ambio* 49 (May 2019).

⁴⁰ Nicholas Rees et al., *Europeanisation and New Patterns of Governance in Ireland* (Manchester University Press, 2009); Jane O'Mahony, "'Europeanisation as Implementation': The Impact of the European Union on Environmental Policy-making in Ireland", *Irish Political Studies* 22, no. 3 (2007): 265–85.

discipline of history.⁴¹ These texts primarily look at colonialism as a political relationship between a peripheral colony and an imperial centre, with Ireland serving in different instances as England's first and longest held colonial asset as well as a training ground and active participant in the colonisation of other lands and peoples.⁴² This focus on the political relationship between states has been fruitful in exploring Ireland's colonial period but makes it tricky, though not impossible, to discuss colonialism in an independent Ireland.

By searching out the material traces of this colonial history in Ireland, as many researchers have, it is possible to uncover colonial relations wherever one looks in contemporary Ireland, the most prominent example being the foundational tenant of Irish Republicanism that Northern Ireland remains to this day in a colonial relationship with the United Kingdom. Geographers Patrick Bresnihan and Patrick Brodie read these material traces to argue that the historical trajectory of colonial "improvement" of rural Ireland extends from the state-extraction of Ireland's peatlands to the practice of foreign direct investment in Ireland by multinational pharmaceutical and tech companies.⁴³ Conor McCabe similarly points to the Irish government's current tax relationship with Apple as a kind of neocolonial comprador capitalism.⁴⁴ Analysis of the material traces of colonial relations in independent Ireland has also benefited from works on internal colonisation, like Liesbeth van der Grift work on the draining of Italy's Pontine marshes and the Dutch Zuiderzee.⁴⁵ Lily Toomey's research outlines a similar pattern of internal colonisation in the Irish midlands in the development of workers villages by Bord na Móna (BNM) as part of their postwar drainage and extraction of previously uninhabitable peatlands for fuel.⁴⁶ While these material explorations of colonialism in the context of an independent Ireland can be both analytically fruitful and politically compelling, the material traces of Ireland's colonial history they rely on are ultimately open to any number of interpretations. The relationships listed above are too materially complex to be labelled as colonialism alone. They are at once coercive, beneficial, and extractive

⁴¹ Clare Carrol and Patricia King, eds., *Ireland and Postcolonial Theory* (Cork University Press, 2003); Jane Ohlmeyer, *Making Empire: Ireland, Imperialism, and The Early Modern World* (Oxford University Press, 2024); Joe Cleary, 'Irish Postcolonial Studies, 1980–2021', *Radical History Review* 2022, no. 143 (2022): 15–31.

⁴² Carrol and King, *Ireland and Postcolonial Theory*, 3.

⁴³ Patrick Bresnihan and Patrick Brodie, 'From Toxic Industries to Green Extractivism: Rural Environmental Struggles, Multinational Corporations and Ireland's Postcolonial Ecological Regime', *Irish Studies Review* 32, no. 1 (2024): 96–102.

⁴⁴ Conor McCabe, 'Apple and Ireland, 1980–2020: A Case Study of the Irish Comprador Capitalist System', *Radical History Review* 2022, no. 143 (2022): 141–48.

⁴⁵ Liesbeth van de Grift, 'Cultivating Land and People: Internal Colonization in Interwar Europe', in *Governing the Rural in Interwar Europe*, ed. Liesbeth Van de Grift and Amalia Ribi Forclaz (Routledge, 2018).

⁴⁶ Lily Toomey, "'A National Resource of Primary Importance: Transforming Ireland's Peatlands in the Twentieth Century.'" (Trinity College Dublin. School of Histories & Humanities. Discipline of History, 2025), 189–92.

to different groups of actors within different Irelands: The North and the South, the island as an environment, as a political concept, and as a cultural entity.

As this thesis is concerned with how productivist ideas of Irish agriculture and environment are imposed on the land, its focus on colonialism is of an ontological rather than a strictly material nature. The thesis therefore develops its analysis of ontological coloniality around the “colonial matrix of power” (CMP) framework developed by Walter Mignolo in the book *On Decoloniality*, co-authored with Catherine Walsh.⁴⁷ Mignolo sees the material approach to colonialism as too limiting on its own, arguing for an additional focus on ‘coloniality’ as “a pattern of cultural behaviour” at the root of both colonial projects and the traces and patterns that persist in postcolonial states.⁴⁸ The idea of coloniality, articulated in Mignolo’s reading of Aníbal Quijano, is as the invisible half of modernity.⁴⁹ While modernity is “a discourse that promises happiness and salvation through conversion, progress, civilisation, modernisation, development, and market democracy,” its shadow hides the enforcement of hierarchical binaries, specifically those of gender (man/other), race (white/other), and nature (human/other), what Mignolo collectively refers to as the colonial matrix of power.⁵⁰ This ontological coloniality is the understanding of the world through these power hierarchies, creating unequal and extractive relationships foundational to both nineteenth-century European imperialism, contemporary neocolonialism, and capitalist accumulation. Coloniality manifests as material colonialism when an imperial state maps these hierarchies of nature, race, and gender onto preexisting relations and enforces those hierarchies within its jurisdiction. But the colonial matrix of power does not only manifest within imperial state relations, instead it appears in any domestic or international relationship shaped by the same underlying ontology.

Conspicuous absences in the archives are one of the ways in which the colonial matrix of power makes itself known as the shadow of Irish agricultural modernisation. As sociologist Patricia O’Hara argues in *Partners in Production*, women have always played a significant role in modern Irish agriculture, through labour and decision making on farms, as well as in creameries and the larger food system that brings Irish agricultural products to the global dinner table.⁵¹ But women are not represented among the modernising researchers of the National Soil Survey (NSS) and An Foras Talúntais (AFT), nor are they represented in the Irish policymakers concerned with

⁴⁷ Walter D. Mignolo and Catherine E. Walsh, *On Decoloniality: Concepts, Analytics, Praxis* (Duke University Press, 2018), 157-59.

⁴⁸ Ibid, 143.

⁴⁹ Ibid, 142.

⁵⁰ Ibid, 157-59.

⁵¹ Patricia O’Hara, *Partners in Production: Women, Farm and Family in Ireland* (Berghan Books, 1998).

agricultural development. Women only enter into this negotiation between state and land in the 1980s through environmental institutions, with Angela Nugent reporting on environmental issues and schemes for the *Irish Farmers Journal*, and women represented among the environmental researchers and decisions makers at An Taisce, An Foras Forbartha (AFF), and the European Commission (EC). The exclusion of women from formative Irish agricultural research and governance as well as the erasure of women's agricultural labour from these archives can be read as a manifestation of the colonial matrix of power's gendered aspect. Today this enforcement is largely one of cultural behaviour, though Article 41.2 of Ireland's constitution which "recognises that by her life within the home, woman gives to the State a support without which the common good cannot be achieved" remains an especially high-profile instance of its legal manifestation.⁵²

In regard to the racial aspect of the CMP, changes to the relationship between settled and traveller communities played an important role in the modernisation of Irish agriculture that is similarly absent from the institutional archives explored in this thesis. Traveller communities have long been interwoven into the cultural and economic dynamics of rural Ireland. As dramatized in a 1978 episode of state broadcaster Raidió Teilifís Éireann's (RTÉ) agricultural serial *The Riordans*, the interaction between settled farmers and travelling horse breeders at annual fairs was an integral part of rural livelihoods through much of the twentieth century.⁵³ Aoife Bhreatnach's book *Becoming Conspicuous* argues that the introduction of tractors, along with the growing prominence of silage fodder explored in Chapter Two of this thesis, drastically reduced the prominence of farm horses, severing one of the primary links between settled and travelling communities.⁵⁴ Despite this dramatic shift in rural communities, travellers are not acknowledged in any of the archival material on Irish agricultural modernisation explored in this thesis. Following Mignolo, one could argue that these absences exist precisely because modernism's underlying coloniality necessitates the exclusion of gendered and racialised actors from the reshaping of modern social and environmental relations.⁵⁵

The final hierarchy within Mignolo's colonial matrix of power, that of nature as the division between human and other, is the primary focus of this thesis and one of the largest gaps within histories of modern Ireland. The conception of nature and humanity's division from it manifests consistently in this thesis as an attempt to control and manage more-than-human aspects of the

⁵² *Article 41.2 of the Constitution of Ireland* (Coimisún na hÉireann um Chearta an Duine agus Comhionannas, 2018), 4.

⁵³ 'Dirty Spit and Luck-Penny', *The Riordans*, directed by Patrick Gilligan, RTÉ, 1978, 00:56:29.

⁵⁴ Aoife Bhreatnach, *Becoming Conspicuous: Irish Travellers, Society and the State, 1922-70* (Dublin: University College Dublin Press, 2006), 24-28.

⁵⁵ Mignolo and Walsh, *On Decoloniality*, 144.

world, from the animal and the botanical to the chemical and the geophysical. The idea of carrying capacity running through each chapter of the thesis shows the different ways this control manifests: how many cows can a hectare support, how much fertiliser can a ryegrass pasture incorporate, how much organic matter can a river assimilate, how many humans can Ireland, the Western counties, or the planet support. These political and scientific rationalisations of the Irish landscape construct nature as limiting factor to a multispecies systems and then attempt to control that constructed nature by pushing those limits outward. By examining the success and failure of efforts to define and control nature through the idea of carrying capacity limits, this thesis seeks to more deeply understand the underlying colonial assumptions of modern Ireland's relationship with the environment.

In *We Have Never Been Modern*, Bruno Latour articulates a similar concept to the CMP, the Western world's modern crusade to create a "great divide," separating humanity from nature. Latour shows that these efforts to define and control nature never actually succeed, but result instead in the proliferation of "hybrids," networks where human agency becomes even more densely woven into the functioning of ecological and planetary systems.⁵⁶ This thesis catalogues the proliferation of these hybrids across Ireland: the interaction of artificial fertiliser with the carbon and nitrogen cycles, the modification of pasture biodiversity through silage making, and the turnover of the island's river and lake systems from oligotrophic to eutrophic through agricultural runoff. Latour's argument about the illusion of modernity mirrors Mignolo's argument about coloniality as modernity's invisible half. Latour's argument in *We Have Never Been Modern* also echoes the white/other hierarchy of coloniality, arguing that the divide between humans and nature is accompanied by a "second great divide" between the modern West and the nonmodern rest who fail to transcend nature.⁵⁷ Latour refers to gendered hierarchy as well, as "fuzzy areas" like women's bodies, which are perceived as eluding the supposed liberation of the human from nature.⁵⁸

Together, Mignolo and Latour add different nuances to the idea of modernisation. Mignolo shows that these modern distinctions of race, gender, and nature as colonial hierarchies of power and control, allowing this thesis to link efforts to manipulate Ireland's agricultural landscape with histories of class stratification and related postcolonial histories from the Global South. Latour's concept of hybrids additionally underpins efforts in the thesis to look at changes in Ireland's

⁵⁶ Bruno Latour, *We Have Never Been Modern*, trans. Catherine Porter (1993), 12.

⁵⁷ Ibid, 97.

⁵⁸ Ibid, 100.

agricultural landscape not only as sites of human control but as dense networks of more-than-human action that are reassembled, complicated, and hybridised through efforts to modernise them.

Following Mignolo, the thesis explores the pattern of extraction and pollution that accompanied Ireland's postwar project of agricultural modernisation as emerging from an underlying coloniality in the relationship between the state and its people with the land. While the thesis connects these colonial relations to the material traces of Ireland colonisation under the British Empire when they are apparent, the framework of coloniality allows for the inclusion of other influences on Ireland's relationship with land, namely the emergence of postwar capitalist globalisation and the modernising efforts of scientific rationality. Mignolo argues that a decolonial lens is a complementary theory not an exclusionary one, meaning a colonial critique of Ireland's agricultural modernisation is not meant to contradict Ireland's independence and sovereignty, nor does it discount the importance of Ireland's colonial history and the material traces it leaves behind. Likewise, the decolonial lens of this thesis seeks to complement, not displace, other critiques of agricultural intensification organised around anticapitalism, sociometabolism, slow violence, and petroculture.

One complementary framework applied throughout this thesis is that of the metabolic rift. As introduced in the above literature review, Marx's articulation of the metabolic rift emerged from his reading of agricultural scientist Justus von Liebig's idea of "robbery farming" in the context of artificial fertilisers used to support arable agriculture in nineteenth-century Ireland.⁵⁹ Liebig's critique was specifically of "high farming," the novel system of intensive agriculture that rotated fields annually between wheat, turnips, barley, and pasture without allowing the land to recover and rest fallow for any point in the year. Instead, this intensive system relied on the constant import of soil nutrients from guano, oil cakes, and human and animal bones to replenish lost soil nutrients.⁶⁰ This "robbery farming" system led Marx to develop the concept of the metabolic rift, a gap in the capacity of the soil and of rural populations to support themselves, requiring the constant accumulation of external nutrients.⁶¹ This rift opened with the "alienating" of crops in monoculture fields and the extraction of nutrients from the soil, both actions reflecting colonial efforts to construct and control the 'nature' of Ireland's fields.⁶² The metabolic rift's focus on efforts to manipulate the metabolic processes of soil ecology in order to increase production adds a complementary sociometabolic lens to Mignolo's colonial critique.

⁵⁹ Slater and Flaherty, 'Marx on the Reciprocal Interconnections between the Soil and the Human Body' 623-7; Foster and Clark, *The Robbery of Nature*, 1-2.

⁶⁰ Foster and Clark, *The Robbery of Nature: Capitalism and the Ecological Rift*, 3.

⁶¹ Ibid, 4-5.

⁶² Ibid, 2.

Following the Great Famine and falling prices for grain in the latter half of the nineteenth century, Irish agriculture shifted away from this intensive system of arable production to an extensive pasture-based livestock regime that required significantly less labour and virtually no nutrient inputs.⁶³ While arable agriculture in Europe and the United States continued to rely on external fertiliser inputs characteristic of the metabolic rift, Ireland's pasture systems remained largely extensive through the first half of the twentieth century. This thesis looks at the modernisation of Ireland's pasture systems as an inclusion of the pasture into the input-dependent regime of the metabolic rift, beginning with the depletion of soil phosphorus during the Emergency, as the period of the Second World War is called in the Irish context, and the promotion of artificial nitrogen fertiliser for pasture systems beginning in the 1960s. The sociometabolic lens of the metabolic rift allows the thesis to connect this metabolic energy with changes to Ireland's energy sector during the oil crisis and the 1980s pollution crisis caused by a spillover of agricultural energy into Ireland's freshwater systems. By reading the history of Ireland's agricultural modernisation through the complementary lenses of sociometabolism and coloniality, this thesis intends to show the connections between the social, political, economic, and ecological changes that accompanied Ireland's agricultural modernisation.

In order to animate the more-than-human actors in this history, the thesis relies throughout on terminology from various scholars who work with Actor-Network Theory (ANT). The use of the term "assemblage" to refer to the collections of plants, animals, and abiotic factors in a permanent pasture or a river comes from Anna Lowenhaupt Tsing's book *The Mushroom at the End of the World*.⁶⁴ Similar to an actor-network, Tsing uses the idea of assemblages to contradict a deterministic or mechanical view of ecology, instead showing these relations as emergent and shifting, "multispecies lifeworlds" where different actors act independently, but create something new and more complex through their interactions with other actors.⁶⁵

Tsing's articulation of "entanglement" of a particular actor within an assemblage and the monocultural "alienation" from an assemblage allows the ANT theory applied in this thesis to interact with the use of Marx's metabolic rift in which human and nonhuman communities become alienated from metabolic exchanges.⁶⁶ In order to discuss dynamics within assemblages, the thesis also uses the distinction between "act" and "enact" articulated by Law and Mol in their study of

⁶³ Cathal Smith, 'Ireland's Commodity Frontiers: Rural Economy and Society in Global Perspective', *Radical History Review* 2022, no. 143 (2022): 153.

⁶⁴ Tsing, *The Mushroom at the End of the World*.

⁶⁵ Ibid, 22-5.

⁶⁶ Ibid, 5-6.

Cumbrian sheep from the volume *Material Agency*.⁶⁷ Where *action* denotes some material change taking place between actors in an assemblage, *enactment* refers to the meanings assigned by one actor to another. In Law and Mol's framework, the agency of a sheep to *act* exists independently from their *enactment* by humans as a representation of financial value, a vector for disease, or an ecosystem engineer.⁶⁸ Incorporation of these concepts from ANT is intended to disrupt the colonial hierarchy of human/other through the writing itself, painting more-than-human actors as agentic withing the trajectory of Ireland's agricultural modernisation.

III. Sources

This thesis argues that the intensification of Ireland's pasture systems was a massive undertaking that involved the researchers, politicians, farmers, educators, alongside pasture plants and animals themselves in reshaping Irish agriculture as an engine for the nation's economy. The productivist regime that saw grass as the "raw material" of this industry not only reshaped Irish agricultural production, but the very idea of Ireland's rural heritage and history as well as Irish and European environmental policy.

The intention to write a ground-up history of Ireland's agricultural modernisation required pulling from a variety of sources to represent the voices and intentions of the diverse range of actors this theory implicates. Traditional archival sources from the National Archives of Ireland, the Historical Archives of the European Commission, and debates within the Dáil and Seanad were examined to understand the motivations of and disagreements between politicians and civil servants in putting into place agricultural policies, regulations, and funding programmes. Official publications, primarily from the collections of the National Library of Ireland, were used to show how ideas of the Irish environment moved through the network of institutions that shaped Ireland's postwar agricultural landscape, from the proceedings of the Fertiliser Association of Ireland's annual science seminar to An Foras Forbartha's reports on fish kills.

News media archives, particularly from newspapers like the *Irish Farmers Journal*, the *Kerryman*, and national broadcaster RTÉ allowed for an understanding of both top-down and bottom-up perspectives. These media not only broadcast institutional perspectives to the public, like that of An Foras Talúntais researchers or Irish Farmers Association lobbyists, but recorded the impressions of members of the public, farmers, anglers and young people, on the changes to their homes, livelihoods, and the land. The ground-up perspective of the thesis is further strengthened by two oral history interviews recorded with farm families in Co. Carlow and Co. Galway. These

⁶⁷ Law and Mol, 'The Actor-Enacted'.

⁶⁸ Ibid, 72-4.

involved a formal interview discussing the history of the farm's operations and the interaction of farmers with various government schemes followed by a tour around the land itself. Situating the oral history interview in the landscape resulted in a broader picture of farm operations, not only as a relationship between the farm and the government or the market but as a relationship between the farmer, their family and community, and the land, plants, and animals as active participants in their history. Oral history interviews also led back into more traditional archival research in order to corroborate and deepen the interviewees' stories. Full transcripts of oral history interviews and related forms are included in the appendix.

The central body of archival literature within this thesis is the wealth of scientific literature generated to aid the modernisation of Ireland's farms and study its impacts on the landscapes. Primarily coming from the National Soil Survey, An Foras Talúntais, and An Foras Forbartha and held in the collections of the National Library of Ireland, these scientific publications are able to bring human and nonhuman actors into the history explored by this thesis. Analysis of scientific literature within this thesis benefits greatly from science and technology studies research, like Bruno Latour's photographic study of soil scientists and botanists in the Brazilian Amazon, which shows how the methodologies behind scientific ways of knowing carry particular assumptions with them about how to understand the world.⁶⁹ Following this model, scientific sources are used in this thesis to put the research in a larger historical context, reading them against their purpose in order to assess the motivations of the researchers, the assumptions of their methods, relationship with policymakers and other research bodies, and their impact on actual farming practices. But this scientific research is also assessed on its own terms as scientific research, a practice developed to observe something about the material world. In this way, scientific literature is used to introduce more-than-human actors of the agricultural landscape into the historical narrative.

Taken together, the diverse collection of sources examined across this thesis allowed for a more polyvocal ground-up history, complementing official publications and government archives with the voices of laypeople, farmers, and the nonhuman world.

⁶⁹ Bruno Latour, *Pandora's Hope: Essays on the Reality of Science Studies* (Harvard University Press, 1999), 47-51.

IV. Outline of Chapters

The chapters of this thesis are arranged chronologically from the establishment of the National Soil Survey in 1945 to the full implementation of the EU Nitrates Directive and derogation in Ireland in 2007. Though the chapters all build on one another conceptually, they are written as standalone histories in themselves, each built around a central material and institutional focus.

The first two chapters look at the development of a farmland imaginary within Ireland and its translation into practice across Ireland. Chapter One focuses on Ireland's National Soil Survey and the building of Ireland's agricultural research institute, An Foras Talúntais, around it. The chapter looks at how Irish soil was reimagined under the lens of international soil science and within the expansionist frame of the postwar Lemass government and introduces the bifurcation of Ireland's agricultural sector into the large productivist farms in the East and South and the extensive small farms of the West. Chapter Two looks at how this new body of agricultural research was translated onto farm operations through a focus on the transition from hay to silage as the dominant practice of preserving winter fodder for animals. Through a close reading of documents surrounding the RTÉ programme *Telefis Feirme*, which first aired in 1965, the chapter assesses the ways in which farmers were coached into adopting best practices in comparison with the economic reality of agricultural modernisation.

Chapter Three focuses specifically on the relationship between state fertiliser manufacturer Nitrigin Éireann Teoranta (NET) and the nation's gas board Bord Gáis (BGE) during and after the 1973 oil crisis. The chapter links the energy history of European natural gas development to Ireland's agricultural modernisation, supported by the introduction of fossil-generated synthetic nitrogen fertiliser. The chapter contextualises both NET and the Irish industrial agriculture regime within the global context of the Green Revolution and its support by fossil capitalism.

The final two chapters deal with the environmental fallout of Ireland's intensive agricultural regime and the influence of the productivist regime on the creation and implementation of agri-environmental regulations in Ireland and Europe. Chapter Four takes An Foras Forbartha, the reluctant antecedent to Ireland's Environmental Protection Agency (EPA) as its institutional focus, relaying the history of the Irish fish kill crisis of the 1980s. The chapter connects silage and concentrated animal housing, the modernising technologies discussed in Chapter Two, to the growing tide of fish kills and eutrophication in rivers and lakes by agricultural pollution in Ireland through the 1970s and 1980s. Chapter Four concludes by showing how the fish kill crisis led to both the solidifying of an environmental regulatory regime and an idea of the Irish factory farm. Chapter Five traces the EU Nitrates Directive, intended to stem the eutrophication of marine and

freshwater systems caused by intensive agriculture, from its conception in the European Commission to its unwelcome landing on Ireland's modern pastures. The chapter compares the Directive's stick with the carrot of the EEC funded Rural Environmental Protection Scheme (REPS) to demonstrate the bifurcation of agricultural production and environmental protection along the same geographical and class lines established by the National Soil Survey in Chapter One.

Chapter 1 - Laying Ground: Agricultural Research and Ireland's Farmland Imaginary

I. Introduction

One of the central ideas examined throughout this thesis is carrying capacity, a concept developed and applied to Irish land through the work of agricultural researchers, policy makers, agricultural advisors, and farmers themselves throughout the postwar period. The most prevalent way carrying capacity is expressed in Ireland today is as the number of livestock units, the equivalent of a single dairy cow, a hectare of land can support, expressed as LU/ha. Other forms of carrying capacity come to intersect with this animal husbandry version of the term at various parts of the history examined in this thesis, like the human carrying capacity of the planet, which emerged from food scarcity discourses in the 1960s explored in Chapter Two, or the 'assimilative capacity' of a river used to dump agricultural waste explored in Chapter Four. The focus of this chapter is the development of a scientific body of soil science research that would serve to naturalise a carrying-capacity centred view of Irish agriculture through scientific analysis of its soil and pasture systems.

Ireland's National Soil Survey, initially formed in 1945 as an arm of the Department of Agriculture is the institutional focus of this chapter, tasked with applying international scientific standards to the mapping of Ireland's agricultural soils. This research was closely connected to political efforts to determine how Ireland's soils would be best used to serve the national interest. The NSS and its staff would later form the institutional core of Ireland's agricultural research institute An Foras Talúntais, using the combination of international science and politics at the core of the soil survey to reconceptualise Ireland's landscape of permanent pasture as productive grassland. The influence of this agricultural research tradition can still be felt today. AFT merged with Ireland's agricultural advisory service An Chomhairle Oiliúna Talmhaíochta (ACOT) in the 1980s to form the research and advisory body Teagasc. This chapter's exploration of the National Soil Survey and the early days of An Foras Talúntais digs into the landscape-level roots of the livestock carrying capacity idea that has come to dominate Irish agriculture in the second half of the twentieth century, while also introducing the Irish agricultural research body that serves as one of the most prominent recurring characters in this thesis as a whole.

The industrial image of Irish soil that emerged after The Emergency came about through a global combination of international expertise, major political transitions, and economic trends, but the science at its base was the work of a small group of researchers initially working within

Ireland's Department of Agriculture. This chapter follows one of these scientists, Tom Walsh, whose career as a director of various institutions closely follows Ireland's state project of agricultural industrialisation.¹ Walsh's colleagues, Patrick Gallagher, Pierce Ryan, and others, were equally influential in this history, collaborating on research and holding similarly prominent positions throughout the postwar decades. The efforts of these scientists to scientifically modernise Irish agricultural practices laid the ground for the agricultural industry and corresponding environmental crises that dominate agricultural conversation today.

This chapter contributes significantly to twentieth-century Irish historiography, expanding upon the institutional histories of the Department of Agriculture and the Agricultural Advisory Service written by Mary Daly and Mícheál Ó Fathartaigh by positioning the scientific research of Tom Walsh and his colleagues at the National Soil Survey and An Foras Talúntais within the politics of post-Emergency Ireland.² The exploration of how Irish soil came to be seen as a resource to be managed and exploited also complements the nascent body of environmental history focused on resource-making in the Irish state including Aoife O'Leary McNeice's work on hydro-electric schemes, Lily Toomey's history of Bord na Móna, and Margaret Duff Garvey's research into Irish state forestry.³ The chapter also lays the ground for the decolonial argument underpinning the thesis as a whole. It applies the concept of sociotechnical imaginaries to both connect the nation-building intentions of postwar Irish soil mapping with previous mapping and resource-making projects in Ireland's imperial history and uses Marx's concept of the metabolic rift to connect postwar efforts to reconceptualise Ireland's pastures as productive grasslands to the nineteenth-century colonial practice of British high farming. Taken together, this lays the theoretical and historiographic ground for the history of agricultural intensification and environmental reconceptualisation explored through the following chapters.

II. Forging a Farmland Imaginary: The National Soil Survey

In the years following the Emergency, Ireland was in the midst of an agricultural identity crisis. As Tony Judt outlines in *Postwar*, Ireland's neutral status during the war led to limited imports and high prices for food and fertiliser. Governments across Europe faced similar issues of

¹ William Murphy, 'Walsh, Thomas', in *Dictionary of Irish Biography*, 2009 ed., ed. Eoin Kinsella (Cambridge University Press, 2009).

² Daly, *The First Department*; Ó Fathartaigh, *Developing Rural Ireland*.

³ Toomey, 'A National Resource of Primary Importance'; 'Sites of Fracture: 20th Century Ireland at the Margins of Capitalism', University of Birmingham, accessed 27 September 2025; Margaret Duff Garvey, 'Replanting Ireland: Parliamentary Debate and Expert Literature on Irish State Forestry 1922 to 1939' (Trinity College Dublin. School of Histories & Humanities. Discipline of History, 2020).

hunger and shortages and instituted programs to increase productivity at the cost of material efficiency. These government efforts took a variety of forms, including price supports for cultivated crops, an increased focus on domestically produced food rather than agricultural trade, and rationing.⁴ While Ireland was not involved in the war, the newly-independent nation's effort to remain militarily neutral led it to be cut off from trade, leading to a similar degree of food scarcity to besieged nations. Ireland's Fianna Fáil government, led by Eamon De Valera, sought to keep domestic agricultural production up through a series of compulsory tillage orders which attempted to shift Ireland's agricultural landscape, which had been dominated by pasture since the Famine, to growing wheat for domestic consumption.⁵ Though these policies kept the Irish people from going hungry, increasing wheat acreage by two and a half times its previous peak, the intensive tillage regime coupled with a lack of fertiliser imports left soils depleted.⁶ Moreover, by the end of the Emergency, both the public and farmers grew resentful of tillage policies, the former because of the dark-brown bread that became denser and lower quality throughout the Emergency, and the latter because the constant wear on the soil through continuous planting of grain, not compensated for in the government's grain pricing.⁷

Despite the fact that De Valera's continuous cropping regime was an explicitly nationalist and postcolonial effort to alleviate hunger in Ireland in a time of crisis, the continuous cropping regime took on much the same practices and ontological assumptions that guided farming under British imperialism. Historians Eamonn Slater and Eoin Flaherty show that imperial farming in Ireland was what initially prompted Karl Marx to articulate the concept of the metabolic rift.⁸ Marx's reading of the work of agricultural scientist Justus von Liebig in the context of imperial Ireland led him to conceive of the colonial export of grain from Ireland and the import of artificial fertilisers from South America as undermining the productive capacity of both the land and the people.⁹ Liebig understood this as an extractive alienation of crops from the system in which they grew, not allowing their nutrients to return to the soil. This alienation created a deficit or rift in the metabolism of soil, a robbery from the agricultural energy system.

The Marxist idea of metabolic alienation, where intensive farming systems extract or alienate soil nutrients that would otherwise be recycled, complements Anna Lowenhaupt Tsing's idea of monocultural alienation, where species themselves are alienated from multispecies

⁴ Judt, *Postwar*, 305.

⁵ Daly, *The First Department*, 224.

⁶ Ibid, 239.

⁷ Ibid, 224, 58.

⁸ Slater and Flaherty, 'Marx on the Reciprocal Interconnections between the Soil and the Human Body', 620.

⁹ Ibid.

assemblages and are instead rendered as an abstract commodity.¹⁰ Tsing and Liebig's complementary ideas show that alienation was essential not only to the extractive nature of the colonial plantation, but to the commoditising monocultural system of high farming itself, which opened a rift in the metabolism of the soil that needed to be made up with nutrients extracted elsewhere. As Bellamy Foster and Clark show in their analysis of the metabolic rift, the intensive system of British high farming left a nutritive rift, requiring nutrients to be imported from both guano mined from islands off the coast of Peru and bones from European battlefields.¹¹

This expanded idea of alienation gives Marx and Liebig's idea of the metabolic rift further resonance with Walter Mignolo's colonial matrix of power.¹² In a high farming system, wheat, turnips, and barley are not seen as living plants in an assemblage but as tools used to convert nutrients from soil, bones, and guano into agricultural commodities. This forms a hierarchy, where the agricultural assemblage of more-than-human actors is split into a simple 'nature' that is meant to be manipulated by a dominant 'human' actors.¹³ The metabolic rift caused by the extraction of soil nutrients also evokes Latour's idea of the hybrid, where efforts 'become modern' and separate humanity from nature leads to further entanglement of human and nonhuman agency into hybrid networks.¹⁴ In the case of British high farming, the depletion of nutrients in Irish soil created a new hybrid system that incorporated guano from Peruvian birds extracted by coerced Chinese labourers into Irish land, all to grow wheat for the benefit of British imperial power.¹⁵

The exhaustion of Ireland's farmland after the Emergency, especially the depletion of soil phosphorus by successive years of wheat tillage, demonstrates the ways in which ontological coloniality can linger even after the political arrangement of colonialism has been largely severed. In this case, the extractive and hierarchical system of high farming remained as the dominant method of cultivating arable crops in postcolonial Ireland, along with the metabolic rift that required continuous external inputs of soil nutrients. The Emergency cut off this external supply of nutrients while the government's compulsory tillage policies required Irish farmers to intensify grain production, causing Ireland's metabolic rift to yawn open in the form of phosphorus depletion.

At the time, however, soil depletion was not seen as resulting from colonial land-use practices but as a failure of postcolonial Ireland, and farmers in particular, to properly feed its

¹⁰ Tsing, *The Mushroom at the End of the World*, 133.

¹¹ Foster and Clark, *The Robbery of Nature: Capitalism and the Ecological Rift*, 2.

¹² Mignolo and Walsh, *On Decoloniality*, 142.

¹³ Ibid.

¹⁴ Latour, *We Have Never Been Modern* 10-2.

¹⁵ Melillo, 'The First Green Revolution', 1028-34.

people. Discussion of agriculture in the Dáil Éireann's Committee on Finance in the early 1940s encapsulates the debate over what should become of Ireland's farmland: Fianna Fáil Minister for Agriculture James Ryan laid the blame for poor yields with the lack of education for farmers, claiming in 1943 that he wasn't sure if some farmers knew "how properly to sow and cultivate wheat," or even what time to cut it.¹⁶ Fianna Fáil Minister for Supplies Seán Lemass went further, insisting that land should be redistributed to the most capable farmers and calling for "the elimination of incompetent and lazy farmers."¹⁷ These statements from the government place the blame for Ireland's food shortages squarely with farmers themselves, rather than with the intensive practices they were compelled to adhere to.

Fine Gael TD James Hughes held a contrary view, contending that it was a lack of understanding of the soil's characteristics that held farmers back from exploiting the land's full production potential.¹⁸ Therefore, Hughes believed, the government should undertake a soil survey of the entire nation with the express purpose of allowing Ireland to "compete against the efficient methods of other countries."¹⁹ Both Ryan and Hughes conceived of the problem as a knowledge deficit among Irish farmers instead of a more systemic failure of intensive monocultural itself. However, they identified the root of this deficit in different ways, which led them to suggest different remedies. Minister Ryan's emphasis on proper technique justified his government's tillage quotas by portraying land as more flexible, seeing most any field as having the potential to yield a bountiful harvest if only farmers knew to sow wheat the correct way and cut it at the right time. But in the perspective of Deputy Hughes and other committee members who favoured a soil survey, land was less flexible. Wheat could not be grown effectively anywhere, so the expertise of soil science would be needed to determine which fields were particularly suited to abundant wheat production and which would be more quickly exhausted. In order to sustainably and profitably exploit Ireland's agricultural potential, the land needed to be understood through systematic scientific assessment, not just through the farmer's firsthand experience. According to Hughes, empirical scientific observation of Ireland's soil would allow farmers to understand what their land was suited to grow, in other words what Ireland's land was good for.

By the end of the Emergency, Hughes's side of the debate won out. A National Soil Survey was established in 1945, headquartered at the newly acquired grounds of Johnstown Castle in Wexford. Tom Walsh, then a lecturer in soil science at University College Dublin (UCD) would

¹⁶ James Ryan, *Dáil Debates*, Vol. 91, No. 8, col. 1114, 22 October 1943.

¹⁷ Lemass memorandum, Department of the Taoiseach S13101A. Paragraph 9-13. Qtd in John Horgan, *Seán Lemass: The Enigmatic Patriot* (Dublin: Gill & Macmillan, 1997), 114.

¹⁸ James Hughes, *Dáil Debates*, Vol. 97, No. 23, col. 2518, 17 July 1945.

¹⁹ *Ibid.*

be appointed to design and lead the National Soil Survey.²⁰ Walsh had experienced Irish agriculture from many vantage points, first obtaining his bachelor's degree in agricultural sciences at UCD in 1937 before working for British fertilizer manufacturer Imperial Chemical Industries Ltd. (ICI). Walsh then served as an agricultural advisor in Tipperary before returning to UCD as a professor.²¹ Walsh's interest in the future of Irish agriculture was well established before he was tapped to head the National Soil Survey. During his time at UCD he published several papers on soil science and soil fertility, including 'Characteristics of Irish Soil Types', written with his colleague Patrick Gallagher in 1942.²² This paper represented the first attempt to view Ireland's soil through the lens of soil science in order to enable comparisons between areas of the island and "the soil groups of the world," an idea that would shape the rest of his career.²³ Through this diverse professional experience, Walsh represented a combination of many of the different types of agricultural expertise that would come to reshape Irish agriculture in the latter half of the twentieth century, including the university, agricultural advisory service, fertiliser manufacturers and, through his involvement with the National Soil Survey and later AFT, state research.

Walsh and Gallagher's report and the subsequent work of the National Soil Survey were aligned with an international move to use science to simplify soil and landscape as an asset. It is helpful to think of this process of simplification and abstraction as the development of what Oane Visser refers to as a new 'land imaginary,' an environmentally focused elaboration of Sheila Jasanoff and Sang-Hyun Kim's concept of the sociotechnical imaginary, which describes a network of ideas concerning "what land is, what it can do or should do, and how humans can or should interact with it."²⁴ Peatlands historians have previously demonstrated the long history of sociotechnical imaginaries applied to the Irish landscape. Esa Ruusaken's exploration of the reports and maps of the nineteenth-century Bogs Commission demonstrates the imperial efforts taken to map drainage channels onto peatlands in order to reimagine them as productive agricultural land.²⁵ Lily Toomey has further shown how these maps and their drainage patterns were appropriated through the postcolonial organisation of Bord na Móna in an effort to reimagine these peatlands as

²⁰ William Murphy, 'Walsh, Thomas'.

²¹ Pierce F. Ryan, 'Introduction', in *Scientific Papers Dr. Tom Walsh 1941-1958* (Dublin: Tom Walsh Memorial Publication Committee, 1992), viii.

²² Patrick H. Gallagher and Thomas Walsh, 'Characteristics of Irish Soil Types', in *Scientific Papers Dr. Tom Walsh 1941-1958* (Dublin: Tom Walsh Memorial Publication Committee, 1942).

²³ *Ibid.*, 22.

²⁴ Oane Visser, 'Persistent Farmland Imaginaries: Celebration of Fertile Soil and the Recurrent Ignorance of Climate', *Agriculture and Human Values* 38, no. 1 (2021), 315.

²⁵ Esa Ruuskanen, 'Encroaching Irish Bogland Frontiers: Science, Policy and Aspirations from the 1770s to the 1840s', in *Histories of Technology, the Environment and Modern Britain*, ed. Jon Agar and Jacob Ward (UCL Press, 2018), 25.

a source of energy sovereignty for the newly independent Republic.²⁶

As Rob Kitchin et al. explain in their survey of critical cartographic theory, the ability of maps to fix particular meanings onto a landscape has made them powerful tools in both colonialism and nation-building.²⁷ By deciding what a particular map will show or not show, maps supersede the specific experience of land by both colonised people and citizens in favour of a higher state narrative.²⁸ The colonial and postcolonial development of Irish peatland imaginaries demonstrates this, as the Bogs Commission maps later appropriated by BNM depict a particular comprehensible view of the landscape that distils the entangled hydrology, ecology, and topography of the land into a network of broken red lines for proposed drainage channels, instructing the reader to ‘cut here.’²⁹

In the development of *farmland* imaginaries around the globe, Visser notes, soil was the primary factor emphasised, while other factors like precipitation, growing season, or previous land cover were either deemphasised or altogether absent.³⁰ In Ireland, the creation of soil maps through the formation of the National Soil Survey was explicitly intended create a farmland imaginary for the Irish state, employing scientific practice to answer to the question of what Ireland’s agricultural land was for. The government’s perception of a knowledge deficit among farmers being at fault for Ireland’s struggle during the Emergency was a necessary justification for the NSS, which officially discounted the particular local knowledge of rural communities in favour of a state-organised scientific reconceptualisation of what Ireland’s soil meant.

This emphasis on soil was rooted in the legacy of Vasily Dokuchaev, a prominent Russian soil scientist who established soil categories like chernozem, podzol, and gley to describe Russia’s soil. These categories were later adopted as a global standard for soil surveying projects.³¹ Walsh and Gallagher’s first paper, and the later publications of the National Soil Survey applied Dokuchaev’s categorization system to Irish soils, but the use of Russian soil science or *pochvovedenie* did not come directly from Russia, nor was the practice entirely Russian. Jan Arend’s article ‘Russian Science in Translation’ shows that the international recognition of Dokuchaev’s work came by way of the German translation of Dokuchaev’s work by Konstantin Glinka, which was later translated a second time into English by American scientist Curtis Fletcher Marbut in 1927.³² Ireland’s National Soil Survey, as Ó Fathartaigh shows in *Developing Rural*

²⁶ Toomey, ‘A National Resource of Primary Importance’, 67-94.

²⁷ Rob Kitchin et al., ‘Introductory Essay: Power and Politics of Mapping’, in *The Map Reader: Theories of Mapping Practice and Cartographic Representation*, 1st ed. (John Wiley & Sons, 2011), 440.

²⁸ Ibid.

²⁹ Toomey, ‘A National Resource of Primary Importance’, 53.

³⁰ Visser, ‘Persistent Farmland Imaginaries’, 318-9.

³¹ Visser, ‘Persistent Farmland Imaginaries’, 317.

³² Jan Arend, ‘Russian Science in Translation: How *Pochvovedenie* Was Brought to the West, c. 1875-1945,’ *Kritika: Explorations in Russian and Eurasian History* 18, no. 4 (Fall 2017), 696.

Ireland, was itself modelled on the United States' own national survey, established fifty years before in 1896.³³ In this way, the scientific lens with which scientists examined Ireland's soil was already a very international and abstract field, no longer rooted in the Russian steppes or indeed any particular place. The influence of international, and particularly American, scientific practice in defining Ireland's farmland imaginary represented a concerted effort, led by Irish agricultural scientists, to internationalise Irish agriculture, moving away from the dominant form of autarkical and protectionist agriculture characteristic of the 1940s and toward the export-oriented industry of today.

The internationally created and politically embedded field of soil science that formed the basis of Ireland's first foray into this field makes it impossible to separate Walsh and Gallagher's research from the economic and political forces that surrounded them. Though their report was concerned primarily with scientific matters like the weathering of parent materials and the potential of molecular ratios as a method of more finely classifying the diversity of Irish soil types, it can still be read as a political text. A common soil type Walsh and Gallagher found across Ireland was *podzol*, consisting of a shallow layer of humus sitting above a compact layer where minerals have leached and accumulated lower in the soil profile.³⁴ The direct translation of *podzol* from Russian is 'ash under,' referring to the layer of what appears to be ash that is exposed when digging up the soil. When discussing the presence of podzolization across Ireland, Walsh and Gallagher's report states that, among many Irish farmers, the lower deposition layers in the soil "are known as 'leac' or 'leac liath'... referring to the soil's compactness."³⁵ In Irish, *leac* refers to a flagstone, while *liath* can mean both grey or the process of something greying or fading, so instead of the Russian connotation of ash under the soil, the Irish term *leac liath* calls to mind a grey or fading flagstone.³⁶ As established by Arend, translating Dokuchaev's work through German and American science obscured the cultural and linguistic roots of terms like *podzol*, meaning that Walsh and Gallagher were not weighing whether 'ash under' was a better descriptor of this Irish soil profile than 'fading flagstone,' but that the international categorisation superseded colloquial Irish terminology.

Podzol, in international soil science, simply meant *podzol*, an untranslatable but globally applicable scientific category. The application of this international scientific category to Irish soil established an institutional layer of meaning that sat above, and to a degree displaced, the pre-existing and colloquially understood Irish descriptions of the soil. By painting over Ireland's

³³ Ó Fathartaigh, *Developing Rural Ireland*, 233.

³⁴ Gallagher and Walsh, 'Characteristics of Irish Soil Types', 23.

³⁵ Ibid.

³⁶ Manchán Magan, *Thirty-Two Words for Field*, ed. Ruairí Ó Brógáin (Dublin: Gill Books, 2020), 20.

agricultural landscape in colours of podzol and gley, the practice of soil science created a farmland imaginary, where the soil had no fading flagstone or ash underneath but was abstracted as the globally transferrable, homogenised idea of podzol.³⁷ Though Walsh and Gallagher's report showed that many farmers both knew of their soil type and had an Irish name for it, the linguistic change in the resulting soil maps dispossessed farmers of their expertise, positing instead that state and international scientific communities were the appropriate sites of expertise with regard to Irish soil. Within this interpretation, efforts to establish a National Soil Survey were not solely intended to helping farmers better understand their land. Instead these efforts were part of a larger state project where farmers were given instruction by state actors on how to operate their soil as a profit generating machine to help Ireland, as Deputy Hughes said in the Dáil, "compete against... other countries."³⁸

The National Soil Survey began its work in earnest in 1945 under Tom Walsh's leadership. The NSS released several regional and county-scale maps and reports over the course of the survey's work, publishing the first survey of County Wexford, where the Soil Survey was headquartered, in 1964. Soil scientists completed an initial survey of the entire island by August of 1969 in cooperation with the Northern Irish Ministry of Agriculture. Tadhg Twomey, chairperson of An Foras Talúntais, presented the resulting map to Minister for Fisheries and Agriculture Neil Blaney at a ceremony at the Shelbourne Hotel. In their television coverage of the presentation, RTÉ reported that the soil map would have three main uses: education, international and domestic scientific research, and the development of regional development plans. The most important finding of the survey, as reported by RTÉ, was that thirty per cent of Ireland's soil was suited to only a limited range of uses.³⁹ In other words, the National Soil Survey's results placed a specific carrying capacity on a significant portion of Ireland's soil, expressed through the metric of range-of-use.

³⁷ Arend, 'Russian Science in Translation', 698.

³⁸ James Hughes, *Dáil Debates*, Vol. 97, No. 23, col. 2518. 17 July 1945.

³⁹ Pat Sweeny, 'Irish Soils Mapped', *RTÉ News*, Raidió Teilifís Éireann, 7 August 1969, 00:01:39.



Figure 1.1: Tadhg Twomey (right), Chairman of the Council of An Foras Talúntais, presents the first map of Ireland's soils to Minister for Fisheries and Agriculture Neil Blaney (left) in 1969. Source: Pat Sweeny, 'Irish Soils Mapped'.

The maps and reports published by the NSS both discussed particular soil characteristics of different soil series and categorised these series into a range of suitable land use across each surveyed area. Determining a range of uses for soils and providing recommendations for regional development plans brought the work of the National Soil Survey into more concretely political territory than Walsh's and Gallagher's work before the establishment of the Soil Survey. Indeed, the focus on range of use was not the only way the NSS could have interpreted their findings. Dokuchaev's primary innovation was to show how the production of different soil series came about through a long period of interaction between vegetation, climate, and the weathering of parent material.⁴⁰ This method of interpretation would have indicated that formations of leac or podzol common across Ireland were generated under extended periods of forest cover, serving as an underground reminder of Ireland's deep past as a temperate rainforest. While this could have been interpreted by the National Soil Survey as guiding farmers on appropriate use for their soil, the range of use interpretation adopted by Irish soil scientists focused instead on the soil's future productive potential rather than its deep past of its origins.

In order to understand what this "range of use" was meant to indicate, it is helpful to contrast the soil surveys of Wexford and West Donegal, completed in 1964 and 1969 respectively. Each contiguous area of similar soil, known as a soil series, was graded into a soil suitability class based on its depth, drainage, topography, texture, and levels of organic matter and nutrients. These classes

⁴⁰ Arend, 'Russian Science in Translation', 688.

were redefined for each new report, meaning there was no consistent suitability class grading across all of the NSS's publications. In County Wexford 53.3 per cent of soils were considered as Class A, meaning "good arable soils, with a wide use potential, and virtually devoid of any major physical limitation to supporting a high level of production, under any form of agriculture normal to our climate." In the case of Wexford's Class D soils, "amelioration of [their] adverse drainage condition" would allow them to become productive pasture or "potential forest soils."⁴¹ In contrast, West Donegal's Class A soils were considered, "of moderate to poor suitability for tillage crops and meadow and of moderate suitability for pasture" and Class D soils were "Unsuitable for tillage or for intensive grazing or meadowing [and] moderately to poorly suitable for extensive grazing and forestry."⁴² The utilitarian ideal in Deputy Hughes's call for a national soil survey, where each soil type would be revealed to have its own optimum use, was simplified in the NSS surveys to the 'good' Class A or B soils with a wider range of uses and 'bad' Class D, E, or F soils that were problematic or otherwise had a limited range of uses. The use of different ranges for different surveys is further evidence for this: Class A Wexford soils had "wide use potential" and Class A Donegal soil is "moderate to poor suitability," but in both reports, Class A soils are definitively classed as higher quality than Class D soils. This difference in scales reveals the limits of state soil mapping for this purpose, as the simplified A-E grading of use range could not be applied uniformly across each map without obscuring the heterogeneity within each surveyed region.

This suitability grading also imposed a stark hierarchy of land use, with "wide use-range" soils almost always being marked suitable for tillage crops and grass whereas those with "limited use range" were only suited for extensive grazing or forestry. The only exception to this association in either report is Wexford's "screen" series whose sandy soil is easily tilled but has a "somewhat limited use-range" suitable for "a narrow range of tillage crops and short-term grass leys" but not for pasture.⁴³ This pattern of classification clarifies that, from the position of state surveyors, the "limited range of uses" reported by *RTE News* as applying to thirty per cent of the island's soil would have been extensive grazing and forestry, not tillage.

Bruno Latour's study of soil surveys in the Brazilian Amazon demonstrates how this kind of simplification is, to a degree, baked into the methodology of the field. Latour pays particular attention to the tools pedologists use to substitute the material realities of the soil, the forest, and the firsthand experience of scientists and labourers with signs: notes of colour, texture, and other

⁴¹ M. J. Gardiner and Pierce F. Ryan, *Soils of Co. Wexford*, Soil Survey Bulletin, (Dublin: An Foras Talúntais, May, 1964), 127.

⁴² Pierce F. Ryan, *West Donegal Resource Survey*, Soil Survey Bulletin, (Dublin: An Foras Talúntais, 1969), 46-49.

⁴³ Gardiner and Ryan, *Soils of Co. Wexford*, 106-16.

characteristics organised into the rows and columns of a table.⁴⁴ The replacement of a soil's materiality with signs like "sandy-clay" or "clayey-sand" is done with the aim of answering the researchers particular hypothesis, in the case of Latour's colleagues, whether a change in soil characteristics indicate whether a forest is retreating from a grassland or advancing upon it.⁴⁵ While this sign-making is not the same as the commoditising alienation discussed by Tsing, these practices of abstraction can be used to inform one another. In the case of the NSS, the scientists' substitution of the soil's materiality, first with international soil-types and then with range-of-use classes, was instrumentalised to answer the government's political question of what the most economical use for Ireland's soil should be.

⁴⁴ Latour, *Pandora's Hope*, 47-51.

⁴⁵ Ibid, 63.

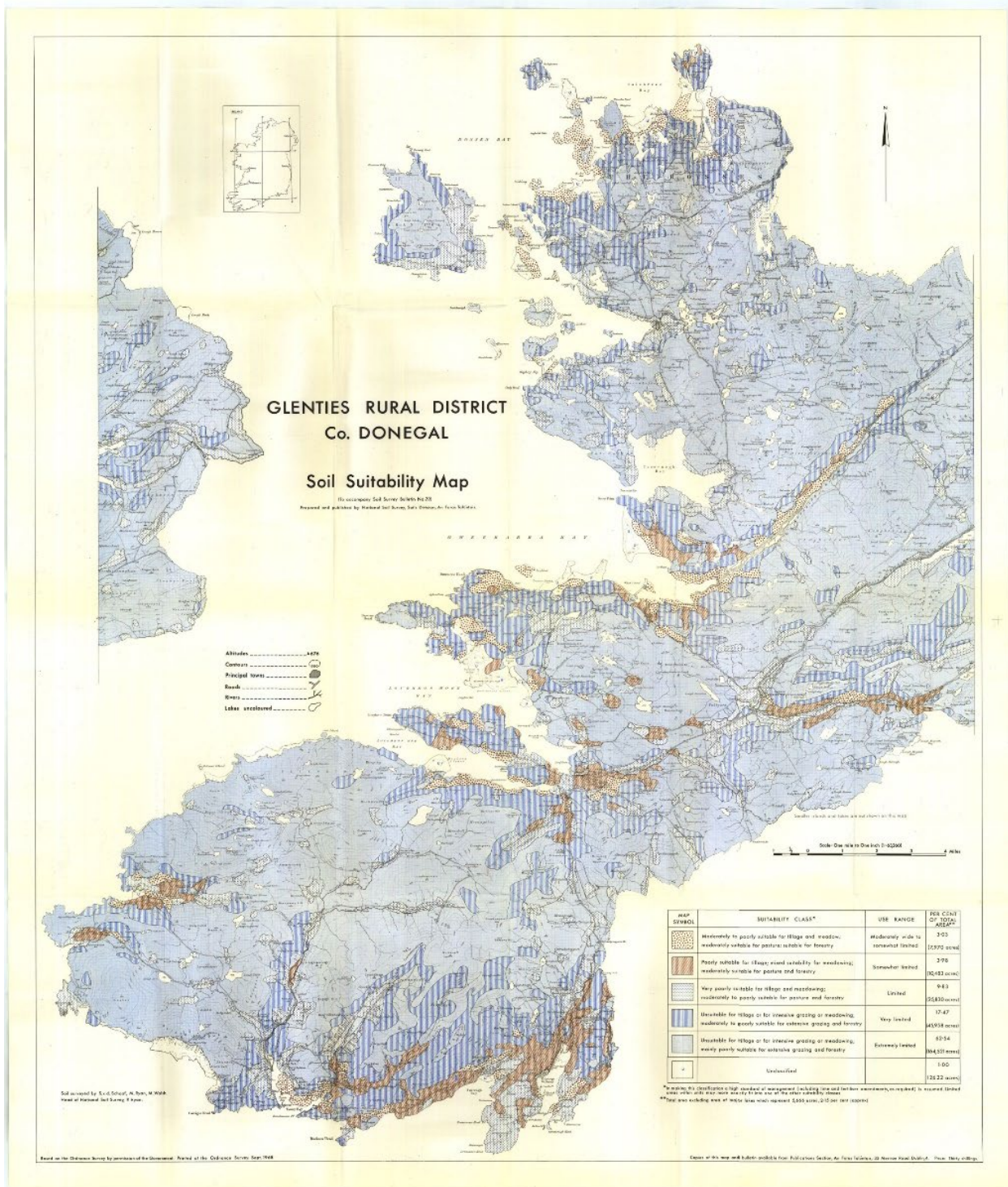


Figure 1.2: The National Soil Survey's Soil Suitability Map for West Donegal. Classes A and B soils are coloured orange while Class C and lower are coloured blue. Source: S.v.d. Schaaf et al., 'Glenties Rural Districts'.

Through their classification of Ireland's soil, not only by soil type but by suitability, the National Soil Survey used science to inform the political question brought up by the fallout of the Emergency: what is Ireland's land for? That thirty per cent of Ireland's land would only be suited

to grazing or forestry added credence to the farmland imaginary of Ireland as a pasture-dominated island, not suited to the self-sufficient aims of growing wheat or other crops. As demonstrated in the soil suitability map of West Donegal, the use of suitability classes reduced the heterogeneity the soil series catalogued by soil scientists to good soil which cartographers coloured orange and bad soil which was coloured blue (Fig. 1.2).⁴⁶

When agricultural experts within and beyond the NSS added economic factors to this scientific analysis, the interpretation that Ireland's soils were primarily suited to pasture extended beyond the Atlantic soils of West Donegal through to the wider-suitability soils in Wexford. The concluding chapter of the Wexford soil survey report, penned by M. T. Connolly of the County Wexford Agriculture Committee and titled 'The Agricultural Pattern in the County', cautioned that the "tillage impulse" of Wexford's farmers "results in some farmers cultivating cropping where soil conditions are not generally suitable [and] could be more profitably devoted to high quality pastures."⁴⁷ In an article for An Foras Talúntais periodical *Farm Research News*, soil scientist Pierce Ryan echoed the idea that Wexford farmers may be growing grain in soil that would offer a better economic return under grass. Ryan added that "such examples of mistaken land use practices could be multiplied many times, and more come to light each time the Soil Survey teams enter a new area."⁴⁸ These comments show how, though soil surveys showed only thirty per cent of Ireland's soil to be suited for a narrow range-of-use, economic interpretations of these surveys further narrowed the potential use cases for even wider-suitability soils.

Highlighting the political and economic framing of the NSS surveys is not meant to imply that the science done by the NSS was incorrect or biased. Farmers in West Donegal working with class D or E soils would have found it difficult to raise wheat even with the best of Minister Ryan's practices, but these limits to the soil would have also made themselves known when the land was used for cattle or sheep. Historicising these surveys allows us to understand how the political motivations of the postwar Irish state led to the establishment of the National Soil Survey and shaped the way its reports were written and interpreted. The state effort to forge a new farmland imaginary was not primarily concerned with whether land would be used to grow wheat or raise cattle but the question of internationalisation itself, namely whether Irish farmers should feed the nation's people or fill its coffers through export and trade. The scientific lens of the National Soil Survey was not built to answer this question on its own, but its research findings certainly lent

⁴⁶ S.v.d. Schoof et al., 'Glenties Rural Districts Co. Donegal: Soil Suitability Map', Soil Survey, An Foras Talúntais, September 1968, 1:63360.

⁴⁷ Gardiner and Ryan, *Soils of Co. Wexford*, 131.

⁴⁸ Pierce F. Ryan, "Towards an Irish soils map," *Farm Research News*, no. 9 (July 1961): 51.

credence to one option over the other. The emphasis Pierce Ryan and M. T. Connolly put on what was most profitable to grow, not simply what was possible, supported the idea that Irish agriculture should be geared toward profitable exports, placing De Valera's policies of compulsory tillage and self-sufficiency solidly in the past.

Tom Walsh did not play a major role in conducting any of the soil science research, but as the Director of the NSS and later An Foras Talúntais, which the Soil Survey was incorporated into, he penned a foreword to each of the Survey's reports, framing how the research was meant to be received. The foreword to the Wexford report was limited to explaining the importance of soil survey work to keeping Ireland's agriculture current "at a time when traditional methods in agriculture are rapidly giving way to new, scientifically-based techniques."⁴⁹ Walsh used the foreword to stress the report's importance to both on-farm management decisions of what crops to grow as well as national-scale projects like drainage schemes.⁵⁰ His foreword for the West Donegal report had a more dynamic agenda, introducing the geographic area as "poorly endowed in physical resources and reflecting all the ills of a high rate of emigration, an adverse population structure, and underdeveloped agriculture, low-income levels and several other rural problems."⁵¹

The foreword framed the report, which, unlike Wexford's soil survey, was titled as a "Resource Survey," as part of a multi-organisation effort to understand and overcome Donegal's "rural problems" by providing a partial blueprint of resources to be developed.⁵² These efforts to alleviate the "rural problems" of the West promoted by the Resource Survey reflect earlier economic diversification attempts in the West conducted by the late nineteenth-century Congested Districts Board (CDB). During Ireland's colonial period, the CDB sought to alleviate poverty and quell political unrest in the West through a system of agricultural consolidation, industrial diversification, and depopulation through economically and politically induced migration to other parts of Ireland and abroad.⁵³ The *West Donegal Resource Survey* had a similar focus on economic improvement through economic diversification, though their efforts were an attempt to stem rather than encourage emigration, using the same research tools applied in more agriculturally productive counties for the broader regional economic development.

The effort to use agricultural planning to develop the West also reflects interwar European efforts to use agriculture as a form of internal colonisation, as explored by Liesbeth van de Grift in

⁴⁹ Gardiner and Ryan, *Soils of Co. Wexford*, iii.

⁵⁰ Ibid.

⁵¹ Ryan, *West Donegal Resource Survey*, iii.

⁵² Ibid.

⁵³ Ciara Breathnach, *The Congested Districts Board of Ireland, 1891-1923*, Cork Studies in History & Culture 5 (Four Courts Press, 2005), 131.

her study of the draining of Italy's Pontine Marshes and the Zuiderzee in the Netherlands.⁵⁴ The cases presented by van de Grift demonstrate an effort to harness agricultural development to civilise inhospitable and sometimes dangerous regions. The postwar Irish incorporation of the West into the national program of soil science serves not to reclaim an uninhabitable landscape like the Zuiderzee but to stem the gradual unsettling of the West by making it agriculturally and economically productive. The environmental and economic effects of this bifurcation in agricultural development across the island, with productive counties in the South and East focused on intensive agricultural production from pasture while Western development focused on diversifying rural economies to stem emigration, is a thread that runs throughout this thesis. As the history of the Congested Districts Board evinces, the "rural problems" of farming difficult land in parts of the Ireland's West were understood long before the compulsory tillage orders of the Emergency. However, the National Soil Survey's labelling of thirty per cent of Ireland's soils as having "limited range of use" further reinforced the understanding that the West's agricultural carrying capacity was deficient within the state's postwar farmland imaginary.⁵⁵

III. Soil Building and Nation Building

The National Soil Survey could only determine a baseline of what could be expected of Ireland's soil based on its composition, indicating what optimum output or carrying capacity could be under different types of production. Soil surveys alone could not provide instruction on how to reach that optimum performance, regardless of whether the soil was suited to a wide or narrow range of uses. Walsh had been invested in this issue of optimal performance as long as he had been working on the categorisation of Ireland's soils. Back in 1942, the same year he and Gallagher published their initial soil survey work in *Characteristics of Irish Soil Types*, Walsh published a two-part report entitled *Soil Fertility Studies* and it was this study of increasing and maintaining the fertility of Irish soil that would shape the majority of his career.⁵⁶

While Irish soil survey texts like *Characteristics of Irish Soil Types* were primarily descriptive, *Soil Fertility Studies* was largely instructive, detailing the influence of different nutrients on the growth of various crops, how to determine nutrient deficiencies from the state of a crop, like brown heart in turnips indicating a lack of adequate boron, and the mechanics of soil testing to determine the proper amendments each farm needed.⁵⁷ Part of the reason for this

⁵⁴ Liesbeth van de Grift, 'Cultivating Land and People', 72.

⁵⁵ Sweeny, 'Irish Soils Mapped'.

⁵⁶ Gallagher and Walsh, 'Characteristics of Irish Soil Types'; Thomas Walsh, 'Soil Fertility Studies', in *Scientific Papers Dr. Tom Walsh*, vol. 1 (Tom Walsh Memorial Publication Committee, 1942).

⁵⁷ Walsh, 'Soil Fertility Studies', 82.

difference is that while the soil type develops over a long period, based on the long weathering of parent rock and the build-up of humus through long-term interaction with vegetation and climate, soil fertility is dynamic, based on fluxes of incredibly mobile molecules like nitrate and phosphate. This allows soil fertility to change from year to year and even within a season. Within Ireland's burgeoning farmland imaginary, the soil type determined the optimum potential carrying capacity of the soil in a given field. Knowledge and manipulation of that soil's fertility, based on the intended agricultural use, was what these agricultural researchers saw as allowing farmers the ability to attain that optimum level of production. Gallagher and Walsh saw adding lime to combat acidity or phosphorus to promote crop growth as amending the soil's perceived deficiencies and strengthening its finer qualities, allowing the farmer to move between the soil's 'natural' state of productivity and the optimum ceiling of production implied by soil survey results.

While the political implications of NSS reports and Walsh's preceding soil categorization research were mostly confined to subtext, framing, and interpretation, Walsh did not hesitate to declare the political importance of soil fertility maintenance explicitly within the otherwise scientific text of his *Soil Fertility Studies*. In its discussion, Walsh declared that "it should be the object of any farmer to build up the nutrient reserve of his soil to a point as nearly as possible to that conducive to maximum growth. This is also in the best interests of the nation, and hence, all assistance possible must be given to the individual farmer to do this."⁵⁸ While the soil survey reports were intended for an audience of national and county agricultural committees that would interpret the survey in order to give recommendations to farmers, Walsh's soil fertility research directly implicated the farmer as the direct user of soil fertility research, imploring them to improve their land and portraying them as linked to the health of the nation.

Soil Fertility Studies was published during the Emergency, when providing Ireland with a self-sufficient source of food became increasingly difficult due to the depletion of soil phosphorus. This context made the idea that the farmer and the state shared joint responsibility for the performance of Ireland's soil incredibly poignant, leading Walsh to argue that the health of Ireland's soil was a matter of importance on both the national and individual scale. Walsh made his nation-building project more explicit later in the discussion, referring to soil fertility as a national asset of the most "vital importance" and alluding directly to the agricultural crisis with a warning that "if it is necessary to draw on a reserve of fertility in times of emergency such a reserve must necessary be accumulated when conditions are normal."⁵⁹ The stark contrast between the NSS's apolitical and descriptive results and the prescriptive tone of Walsh's initial *Soil Fertility*

⁵⁸ Ibid, 115.

⁵⁹ Walsh, 'Soil Fertility Studies', 115.

Studies, as well as the amount of responsibility and agency given to farmers in each publication, results from their contrasting goals. Where the soil survey research was passive, uncovering the baseline status of soil and at most calling the agricultural authority or possibly the farmer to draft a farm plan for proper use of their land, soil fertility research was active, calling the farmer to physically alter the state of their soil and amend its deficiencies. Because these amendments had both farm-level and national impacts, the political implications of soil fertility research rose to the surface more readily than in the NSS's soil survey reports.

Phosphorus and lime were the primary soil-amendments Walsh saw Ireland as lacking in these studies. This impression remained consistent in his later paper, titled 'Some Aspects of the Fertility Status of Irish Soils', which he presented in 1950 to the International Congress of Soil Science in Amsterdam.⁶⁰ With the National Soil Survey underway, Walsh and his colleagues were able to study a diverse range of Ireland's agricultural landscape, from regularly fertilized tillage fields to pastures that had "not received any manurial or other treatment for some 100 years."⁶¹ In 'Some Aspects', Walsh found that potassium levels in fifty per cent of surveyed fields were below normal and that 79.7 per cent of were "very phosphate deficient."⁶² These deficiencies corresponded with what Walsh expected of Irish soil after being so heavily cultivated during the Emergency. Walsh's analysis of this nutrient deficiency was focused on the performance of field crops rather than pasture, with Walsh comparing phosphorus concentrations in potatoes and swedes and pointing to potash-deficiency as the cause of crop failures. But Walsh surprisingly found that nitrate levels and pasture fields both largely escaped the same levels of depletion during the Emergency. According to his analysis, the "nitrogen status of Irish soils, especially under old pasture swards, is at a relatively satisfactory level."⁶³

Walsh developed his analysis of this anomaly in later co-authored papers, 'A Half Century of Fertiliser and Lime Use in Ireland' published in 1957, and 'Economic Optimum Fertilizer Use' published in 1959. In these, he contended that under pasture the nitrogen taken out of the soil by grazing cattle "must be matched against nitrogen additions from clover and other legumes," and that even after times of considerable loss the impact of the nitrogen fixing bacteria in the roots of these plants left "the organic matter and nitrogen states of Irish soils... relatively high."⁶⁴ Walsh

⁶⁰ Thomas Walsh, L. Mannion, and Pierce F. Ryan, 'Some Aspects of the Fertility Status of Irish Soils' (paper presented at the International Congress of Soil Science, Amsterdam, 1950), 111-115.

⁶¹ Walsh et al., 'Some Aspects of the Fertility Status of Irish Soils', 111.

⁶² Walsh, Mannion, and Ryan, 'Some Aspects of the Fertility Status of Irish Soils,' 112.

⁶³ Ibid.

⁶⁴ Thomas Walsh, Pierce F. Ryan, and J. Kilroy, 'A Half Century of Fertiliser and Lime Use in Ireland,' in *Dr. Tom Walsh Scientific Papers* (Dublin: Tom Walsh Memorial Committee, 1957), 764; Thomas Walsh and J. Kilroy, 'Economic Optimum Fertilizer Use,' in *Scientific Papers Dr. Tom Walsh* (Dublin: Tom Walsh Memorial Publication

and his colleagues did not see nitrogen fertiliser as useless in the face of clover, but believed best practice to be building upon rates of nitrogen fixation by clover and other legumes with further fertilization as necessary. Walsh's assessment of nitrogen in the context of arable crops in 'Some Aspects' directly followed after his "satisfactory" assessment of pasture, writing that "there is considerable scope for increased use of nitrogenous fertiliser" referencing field experiments where "potatoes [gave] 70%, mangles 81%, and swedes 72% of maximum growth in this soil with added nitrogen."⁶⁵

Walsh's return to field crops as an example of how nitrate fertilization could be increased after discussing how pastures were able to retain satisfactory nitrate levels through the Emergency reflects a division in the farmland imaginary as it had developed in the immediate postwar period. The history of fertiliser use, which Walsh co-authored in 1957, stated that from the turn of the century to the time of publishing, "practically all farmyard manure and fertilisers available were applied to tillage crops, with root crops receiving the major portion of the farmyard manure."⁶⁶ A 1957 fertilizer use survey showcased in that report clarified that only thirty-six per cent of permanent pasture received fertiliser in contrast with root crops which, in every field studied, were regularly fertilised.⁶⁷ Walsh's research bears this out, showing permanent pasture as a bright spot in the difficult history of nutrient depletion during the Emergency, but nevertheless one that could potentially benefit from additional nutrients.

As systems of growing cereals and root crops in Ireland closely reflected the patterns of English high farming which Marx saw as the source of the metabolic rift, sustaining these systems similarly relied on consistent inputs of soil nutrients.⁶⁸ The intensification of these systems during the Emergency without regular nutrient inputs had depleted soils in the effort to create self-sufficiency. Permanent pastures, in contrast, remained outside of Ireland's metabolic rift, allowing them to support livestock without help from additional fertilizers while sustaining "satisfactory" levels of nitrogen and organic matter. In the context of the metabolic rift, the ability of permanent pastures to sustain consistent soil health stemmed from the fact that one particular crop was not 'alienated' from the larger ecosystem, as Liebig contended that tillage crops were.⁶⁹ Instead these pastures were ecosystems themselves, with the interactions between grasses, legumes, bacteria, fungi, livestock and other animals allowing nutrients to continually cycle within the pasture

Committee, 1959), 1065.

⁶⁵ Walsh, Mannion, and Ryan, 'Some Aspects of the Fertility Status of Irish Soils,' 395.

⁶⁶ Walsh, Ryan, and Kilroy, 'A Half Century of Fertiliser and Lime Use in Ireland,' 744.

⁶⁷ Ibid, 744-55.

⁶⁸ Foster and Clark, *The Robbery of Nature*, 6-9.

⁶⁹ Ibid, 2-5.

assemblage. Walsh's guidance in the midst of The Emergency to "accumulate" a reserve of nutrients that could be drawn upon during difficult times, specifically referred to phosphorus levels within arable fields.⁷⁰ Land that remained under permanent pasture during The Emergency existed outside this paradigm of accumulating and drawing down soil phosphorus. Instead its nitrogen-fixing bacteria, plants, and animals collaborated to sustain sufficient levels of nitrogen and phosphorus within the pasture assemblage.

IV. The Future and the Pasture

In the decade following the Emergency, the research of Walsh and his colleagues at the National Soil Survey had already given the Irish state a more comprehensive, scientific understanding of the soil that had long supported the nation. Their intention was to use empirical science to inform the political question of what should become of Ireland's soil and how best to achieve those aims. But while these scientists were busy investigating the composition and fertility of Irish soil, the political and economic ground upon which their research stood was beginning to shift.

Two important events in this history coincided in 1958. The first was the formation of An Foras Talúntais, Ireland's agricultural research institute, with funding from the United States' Marshall Plan. The Institute was built upon the foundation of the National Soil Survey and was headquartered at Johnstown Castle, with additional sites established around the nation to advance different research focuses. Walsh's leadership shifted as well, as he moved from being the head of the NSS to the directorship of An Foras Talúntais with his long-time NSS colleague Pierce Ryan moving in parallel to the role of vice-director.⁷¹ The newly formed AFT was no longer an arm of the Department of Agriculture but an independent research institute which, while closely aligned with the government's priorities, was independently governed and able to develop its own research programme.

This expansion in agricultural research capacity coincided with another expansion, the publication of the *Programme for Economic Expansion*, penned by civil servant T. K. Whitaker, to which AFT closely linked the aims of its research.⁷² The *Programme* was an aspirational document, laying out the industrial and economic priorities for the new Fianna Fáil government that would be headed by Taoiseach Seán Lemass the following year. It also represented the defining move away from the protectionist view of agricultural production favoured by the outgoing De Valera government toward a liberal, expansionist view of Irish agriculture that looked to the sector

⁷⁰ Walsh, 'Soil Fertility Studies,' 115.

⁷¹ Dáil Éireann, *Agriculture (An Foras Talúntais) Act*. 1 of 1958.

⁷² T. K. Whitaker, *Programme for Economic Expansion*, (Dublin: Stationery Office, 1958).

as an engine of economic growth.⁷³ The structure and research of the newly formed Foras Talúntais would continue the NSS tendency toward internationalisation of Irish agricultural research through its Marshall Plan funding and the alignment of scientific research with the government's expansionist aims.

Agriculture was the first section in the *Programme* and at sixteen pages it was also the longest. According to Whitaker, expansion of the economy and expansion of agricultural production were one and the same, not only facilitating “a higher income for the agricultural community but the future development of the whole economy.”⁷⁴ The primary source of this increase would be grass, “the raw material of our principal export trade, beef and cattle, of milk production and of sheep and lamb production.”⁷⁵

Unlike the scientific analysis examined earlier in this chapter, the *Programme* never mentioned “pastures” or “grazing land,” instead referring throughout to the broad category of “grassland” as the source of this raw material and the object of improvement. While this is a linguistic distinction and ‘grassland’ was not a new term to agricultural science nor an official policy distinction, its use by policy makers and scientists in the Lemass era aligns with the hierarchical and instrumentalising view of Ireland's agricultural land taken by Whitaker and Lemass. The terms ‘pasture’ and ‘grazing land’ used by NSS scientists when categorising the suitable uses of Ireland's soil aligns with their ecological view of these lands, places where diverse and long-lived communities of plants, fungi, and invertebrates interact with and influence the soil's composition in line with the assemblages of Tsing or Law and Mol.⁷⁶ In contrast, the use of “grassland” in the pages of the *Programme for Economic Expansion* calls to mind a tightly managed monoculture, simply a place from which grass, the “raw material of our principal export trade,” is alienated, extracted, and put to use.

This distinction represents the imposition of Mignolo's CMP on Irish pasture, with the diverse ecological dynamics of the pasture assemblage simplified to ‘grassland,’ a tool used by the state to generate economic growth. Discussions of nitrogen within the *Programme* also mark the Lemass era as the introduction of the metabolic rift, long associated with Ireland's arable crops, to Irish pastures through practices of monocultural alienation and soil fertility mining. The efforts of An Foras Talúntais to materially remake grass as a “raw material,” opened it up both to soil fertility mining through intensive grazing practices and monocultural alienation through the

⁷³ Ibid.

⁷⁴ Ibid, 11.

⁷⁵ Ibid, 12.

⁷⁶ Tsing, *The Mushroom at the End of the World*; Law and Mol, ‘The Actor-Enacted’.

reconfiguration and simplification of species composition.

Alongside grass, clover was similarly recast by the *Programme*, as “the cheapest source of nitrogen” available.⁷⁷ Increasing production meant increasing soil fertility and the *Programme* marked fertiliser use as the best way to achieve this goal, recommending substantial government subsidies to incentivise greater fertilisation within pasture systems. Clover was addressed as an secondary benefit of phosphorus fertiliser, with phosphate stimulating clover growth and providing additional nitrogen as a “secondary effect.”⁷⁸ But while Walsh’s scientific analysis framed clover as a base source of nitrogen that could be built upon if needed by additional nitrogen fertiliser, Whitaker’s economic frame only saw clover as useful in that it was cheaper than other alternatives. The subsidies recommended by the report were to initially focus on phosphorus to address the country’s widespread deficiency, but “when a satisfactory increase in the use of phosphates has been attained, it will be Government policy to apply State aid towards securing increased application of potash and nitrogen fertilisers.”⁷⁹ In Whitaker’s telling, clover was useful as an additional benefit of the efforts to bring phosphorus to optimum levels, but so far as it cheaply supported the growth of grass as a primary crop.

These changes in the language with which grassland and clover were discussed indicate that the wholehearted movement toward industrialisation of Irish agriculture began with the *Programme of Economic Expansion*. In opposition to the ecological pasture, a grassland is an industrial site where the raw material of grass is manufactured, and nitrogen from clover is just one of a series of tools used in the process. Tsing refers to this as salvage accumulation, where ‘natural’ processes outside of direct ‘human’ management, in this case the fixation of nitrogen by clover’s symbiotic bacteria, are salvaged by for the accumulation of capital.⁸⁰ But within this hierarchical framework, clover is not a unique part of an ecosystem or an agricultural safety net, instead it becomes an interchangeable feedstock that could easily be replaced when a more economical alternative arrives. In this way, Whitaker’s vision would pull Ireland’s pasture systems into the metabolic rift, where production and export would be supported not by a robust ecosystem assemblage but by a continuous supply of cheap soil nutrients.

The *Programme for Economic Expansion* recognised the newly formed Foras Talúntais as an important driver of agricultural education whose research would be made widely available to farmers through the Department of Agriculture’s advisory services, run at the time through county

⁷⁷ Whitaker, *Programme for Economic Expansion*, 13.

⁷⁸ Ibid.

⁷⁹ Ibid, 15.

⁸⁰ Tsing, *The Mushroom at the End of the World*, 62-6.

committees of agriculture.⁸¹ An Foras Talúntais, likewise, situated its work within the goals of the *Programme* and often referred to the text in their public facing publications. AFT published one such periodical, a short-lived bimonthly pamphlet titled *Farm Research News*, in 1960 and 1961 to publicise its research. Tom Walsh opened its third issue with an article titled ‘Expanding the Economy’, which highlighted the “special role” given to An Foras Talúntais by the *Programme* and listed the ways their research areas aligned with *Programme* priorities including “soil improvement, grassland management, livestock improvement and meat production.”⁸² Paying attention to the way Walsh and other An Foras Talúntais scientists discuss Ireland’s ‘grassland’ and ‘pasture’ through its publications reveals how the Institute attempted to manifest Whitaker and Lemass’s political aims as a material change to Ireland’s agricultural landscape.

The establishment of An Foras Talúntais expanded Ireland’s agricultural research facilities far beyond the grounds of Johnstown Castle, encompassing twenty research centres and field stations across the nation.⁸³ A key addition was the Moorepark dairying research centre in Fermoy, Co. Cork, whose primary focus was the establishment of a modern kind of pasture, a high-yielding grassland sward that would aid the efficient conversion of grass into milk and meat. In *Farm Research News*’s coverage, the creation of Moorepark served as a microcosm of the transformation that the government expected of Irish agriculture. Moorepark researcher Maurice J. Walshe wrote that “When acquired, the farm was under old permanent pasture of an inferior kind. Scrub abounded and there were no buildings.”⁸⁴ After establishing the antiquity of this “old” kind of permanent pasture, Walshe evocatively described the building of the Moorepark facility as a “transformation that has been worked on the land itself.”⁸⁵ Several of the initial studies at Moorepark sought to understand the effects of nitrogen fertilizer on pasture systems. One study compared its effectiveness to that of clover, another attempted to understand its relationship to the appearance of grass tetany disease, caused by magnesium deficiency in cattle, while a third studied the effect of fertiliser on “old permanent pasture.”⁸⁶ In the rationalisation for this third study, Walshe wrote that “Since 75% of our grasslands at present consist of old permanent pasture, it is important to find how this sward will respond to fertiliser treatment. An experiment has begun to determine the relative responses of old permanent and re-seeded pastures to phosphate.”⁸⁷

This label of ‘old permanent’ pasture, like the term ‘grassland,’ is not used in National Soil

⁸¹ Ibid, 24; Ó Fathartaigh, *Developing Rural Ireland*, 230-236.

⁸² Thomas Walsh, ‘Expanding the Economy’, *Farm Research News* 1, no. 3 (July 1960): 3.

⁸³ *The State of Irish Agriculture 1960-1961*, Rural Economy Division, An Foras Talúntais (Dublin, 1962).

⁸⁴ M. J. Walshe, ‘Moorepark, The National Dairying Research Centre,’ *Farm Research News* 1, no. 2 (May 1960): 5.

⁸⁵ Ibid.

⁸⁶ Walshe, ‘Moorepark, The National Dairying Research Centre,’ 6.

⁸⁷ Ibid.

Survey reports whose intended purpose was the categorisation and ranking of Irish agricultural soils. The *West Donegal Resource Survey* used more specific terminology, referring to soil classes being unsuitable for “grazing or meadowing,” while Walsh and Gallagher discussed “permanent pasture” as supplying satisfactory nitrogen, but neither made reference to “old permanent pasture,” “old permanent pasture of an inferior kind,” or, as Pierce Ryan described this same seventy-five per cent in another *Farm Research News* article, “low output permanent pasture.”⁸⁸ This was not a peculiarity of writing style, as Pierce Ryan also served as the lead author of the West Donegal survey where these terms do not appear. Instead, these tags were a political and economic distinction used particularly in public-facing publications like *Farm Research News*. The tagging of permanent pasture as ‘old’ and grassland as ‘good’ in these publications can be read as an effort to connect the material reinvention of pasture dynamics undertaken at Moorepark and other AFT research centres to the political and economic aims of the *Programme for Economic Expansion*.

Historian David Edgerton discusses the association between the agrarian and the past in his book *The Shock of the Old*. He writes that rural economies, especially former colonies in the Global South, are often depicted as being in a kind of past whereas industrialised nations speak to the future regardless of the mix of old and new technologies within both.⁸⁹ One example of this comes from Tony Judt’s characterisation of the postwar agricultural economies of Ireland, France, Italy, and Scandinavia as “backward,” referenced in the introduction of this thesis.⁹⁰ The popular idea of the Lemass Era, that permanent pasture was an ‘old’ relic of the low-output past and should be replaced with modern grasslands reseeded with modern species, reflects this agrarian past-ness: seeing Ireland’s need to become modern through the need to remake its agriculture as a kind of industry. Bivar articulates this same effort to modernise “backward” agricultural practices in postwar France through government programmes of the “aménagement du territoire” which involved the removal of land boundaries and consolidation of holdings, among other practices.⁹¹

A *Farm Research News* article written about An Foras Talúntais’s grass breeding program by Vincent Connolly uses AFT research to connect the political ideas of the *Programme* to the material transformation of Ireland’s grazing land. The article opens by invoking the *Programme for Economic Expansion* and its goal of grassland improvement, pointing to the “many-pronged programme of experimental work [An Foras Talúntais has] designed to attain this end.”⁹² Connolly’s description of the breeding programme’s methodology describes the intended

⁸⁸ Pierce F. Ryan, ‘Soil is a farmer’s basic resource,’ *Farm Research News* 1, no. 3 (July 1960): 17.

⁸⁹ David Edgerton, *The Shock of the Old*, 2nd ed. (Profile Books, 2009), 64-65.

⁹⁰ Judt, *Postwar*, 13-15.

⁹¹ Bivar, *Organic Resistance: The Struggle of Industrial Farming in Postwar France*, 35.

⁹² Vincent Connolly, ‘Breeding seed for better grasses,’ *Farm Research News* 1, no. 9 (July 1961): 56.

transformation of old pasture into a modern productive kind of grassland:

Old permanent pastures consist of grasses which have stood the test of time. The less persistent types have gradually died out, and the remaining ones should in most cases be highly persistent. The first step, therefore, was to collect plants from old permanent pasture in all parts of the country and establish them in experimental plots for the study... While the individual plants selected may be superior... there is no guarantee that its progeny will inherit its good qualities. Potential parent plants must, therefore, be tested by comparing the progeny produced by crossing one with another. Those which inherit the good qualities of the parent, if any such appear, must then be selected out for further breeding.⁹³

The narrative the article superimposed on the experiment is that the time-hardened seeds of the past, when fired in the crucible of modern science, would become the productive grassland of the future, with these modern grasslands to be replanted every three years with new and better seed.⁹⁴ The methodology of the experiment Connolly described is sound and reflects contemporary crop breeding programs, but the use of this particular experiment contained underlying assumptions about how pasture ecologies ought to function. In particular, the isolation of specific grass strains from permanent pasture carries the assumption that the “most persistent” grasses would grow well and possibly even better when alienated from the pasture ecology in which they evolved.⁹⁵

Connolly’s article recognised that the positive traits of these parent grasses may be the result of hybridisation with other pasture plants, but this was portrayed as an obstacle to be overcome through the breeding program rather than a benefit of permanent pasture. Though the article reveres the permanent pasture’s “test of time,” it also assumes the grass species must be alienated from it in order to become the grassland of the future.⁹⁶ While the experiment was scientifically sound, its particular methodology emphasised the scientific process, rather than the co-evolution of grass species in pasture systems, as the avenue toward more productive and lucrative grasslands. The efforts of An Foras Talúntais researchers to nest their research into the expansionist political narrative of the Lemass era, baked the need to not only optimise the use of its soil, but to escape the ecological limits of the ‘old permanent pasture’ into the Institute’s research programme. In the political framing of *Farm Research News*, these grasses became a symbol for Ireland itself, highly

⁹³ Ibid, 57-58.

⁹⁴ Ibid, 57.

⁹⁵ Ibid.

⁹⁶ Ibid.

persistent, having stood the test of time, and ready to escape its old agrarian past.

V. Soil Sampling

Scientific efforts to understand the Irish agricultural landscape in order to forge a new, more profitable one were not isolated to An Foras Talúntais but involved a wider body of agricultural advisors and farmers themselves. The primary tool to bring these other actors into the scientific process and the narrative of progress surrounding it was soil sampling. Soil sampling was first used in Ireland while Johnstown Castle operated under the Department of Agriculture, with 5,000 samples analysed in 1948. The annual sampling rate quickly grew to 72,109 three years later and to 150,000 samples after the lab was reconfigured under the An Foras Talúntais Soils Division in 1958.⁹⁷ The division's chemists analysed soil samples for a variety of deficiencies: phosphorus, potassium, and acidity, which could be corrected with lime, cobalt, copper, molybdenum, boron, and manganese. Nitrogen levels could not be tested due to the high mobility of nitrate, but that was not seen as a pressing issue given that the priority throughout this period was the increase of phosphorus levels.⁹⁸

Soil sampling was a popular practice in state agricultural research across Europe and North America at this time, but writing in 1952 from their positions in the Department of Agriculture, Walsh, Ryan, and their colleague J. McDonnell noted that Ireland did not follow the lead of other countries in enlisting farmers to sample their own soil. Their reasoning was that with lack of proper training "it is impossible to obtain information of [sufficient accuracy]... to allow of the proper interpretation of soil test results."⁹⁹ Because compositions can vary in different parts of a field or even at different soil depths, samplers had to follow a precise methodology to obtain as representative a sample as possible to make the results as useful as possible.

Frank Uekötter has written about the paradoxical rise in soil sampling methods in German agriculture given the widely recognised level of uncertainty in distributed sampling.¹⁰⁰ In the early stages of adoption, however, state soil scientists tended to be more cautious and protective of the methodology, as Walsh, Ryan, and McDonnell were, in order to minimise error.¹⁰¹ But pressures to increase the amount of and access to data generated by An Foras Talúntais eventually led to an

⁹⁷ Thomas Walsh, Pierce F. Ryan, and J. J. McDonnell, 'Methods used in the application of soil analysis to the manurial problems of Irish soils,' in *Scientific Papers Dr. Tom Walsh* (Dublin: Tom Walsh Memorial Publication Committee, 1952), 432; Ryan, 'Soil is a farmer's basic resource,' 16.

⁹⁸ *Fertiliser Manual*, (Wexford: An Foras Talúntais, Jan, 1970), 39.

⁹⁹ Walsh, Ryan, and McDonnell, 'Methods used in the application of soil analysis to the manurial problems of Irish soils,' 432.

¹⁰⁰ Frank Uekötter, 'Know Your Soil', 332.

¹⁰¹ Gabriel Coleman, 'Nitrogen Economy: The Emergence of a Synthetic Fertiliser Regime in New York State' (M. Phil, Trinity College Dublin, 2021), 26.

expansion of the surveying team in 1960 with 150 Land Project Officers from the Department of Agriculture being trained by AFT's Soils Division to sample farms in their assigned areas.¹⁰² A larger expansion came in 1965 when the division empowered the Department of Agriculture's Advisory Service to take samples, publishing the *Guide to Soil and Plant Sampling and Analysis* as a training document to guide advisors in how to sample fields and interpret results, providing fertilizer recommendations to farmers and contributing to nationwide agricultural statistics. The larger force of people equipped to take samples may have somewhat increased the uncertainty of the aggregated results, but the training and advisory expertise of samplers attempted to combat this as the amount of soil samples analysed by the Division's chemistry department grew year on year. By the end of the programme's first decade one million soil samples had been analysed through the programme.¹⁰³

Agricultural advisors were warned in the *AFT Fertiliser Manual*, which came to replace the *Guide to Soil and Plant Sampling and Analysis* in 1970, that "the amount of information which the standard methods of analysis give is very limited" and should be incorporated into a farm plan and accompanied by visual examination from the advisor.¹⁰⁴ In Uekötter's analysis, the German advisory service played an important role in the prevalence of soil sampling, as advisors were generally a trusted part of the local farming community. That advisors took responsibility for a technical and somewhat tedious area of knowledge which farmers were expected to act upon made farmers more willing to participate in soil sampling and trust the results.¹⁰⁵ This intermediary relationship tied the farmer's livelihood directly to the research conducted by An Foras Talúntais, with researchers contributing to a growing library of sample data and farmers gaining laboratory insight into their farm operations. Just as the use of *podzol* as an international scientific term gained prominence over the Irish term *leac*, soil sampling programs imposed scientific analysis over the farmer's own experience and expertise as the best method of understanding soil. Through AFT's growing soil sampling program, farmers and farm landscapes were further incorporated into a knowledge system that depended upon scientific research beyond the farm's borders and the farmer's direct understanding.

The inverse relationship between the growing size of AFT's soil testing data and its resolution changed the way AFT communicated their results on both national and local levels. With tests coming from across the island, researchers could conduct further research on anomalies and

¹⁰² 'News from the Divisions,' *Farm Research News* 1, no. 7 (March 1961): 8. 'News from the Divisions,' 12.

¹⁰³ *An Foras Talúntais: Our Contribution to Irish Agriculture: The First 10 Years, 1958-1968*, (Dublin: An Foras Talúntais, October, 1968), 17.

¹⁰⁴ *Fertiliser Manual*, 39.

¹⁰⁵ Uekötter, 332-35.

pinpoint particular areas where nutrient deficiencies could be an issue, like copper deficiency when growing cereals on reclaimed bogland or magnesium deficiency in areas of Wexford.¹⁰⁶ The aggregated data were also used to generate results that were less useful to particular farmers but more politically salient, like trends across time showing that while average phosphorus and potassium concentrations across Ireland increased from 1958 to 1968, soil acidity worsened over the same period.¹⁰⁷ Knowing that farmers in the aggregate were not using enough lime would be of little use to an individual farmer or even an agricultural advisor, but the results would be useful for ministers and TDs attempting to assess the nation's progress toward the goals dictated by the *Programme for Economic Expansion*.

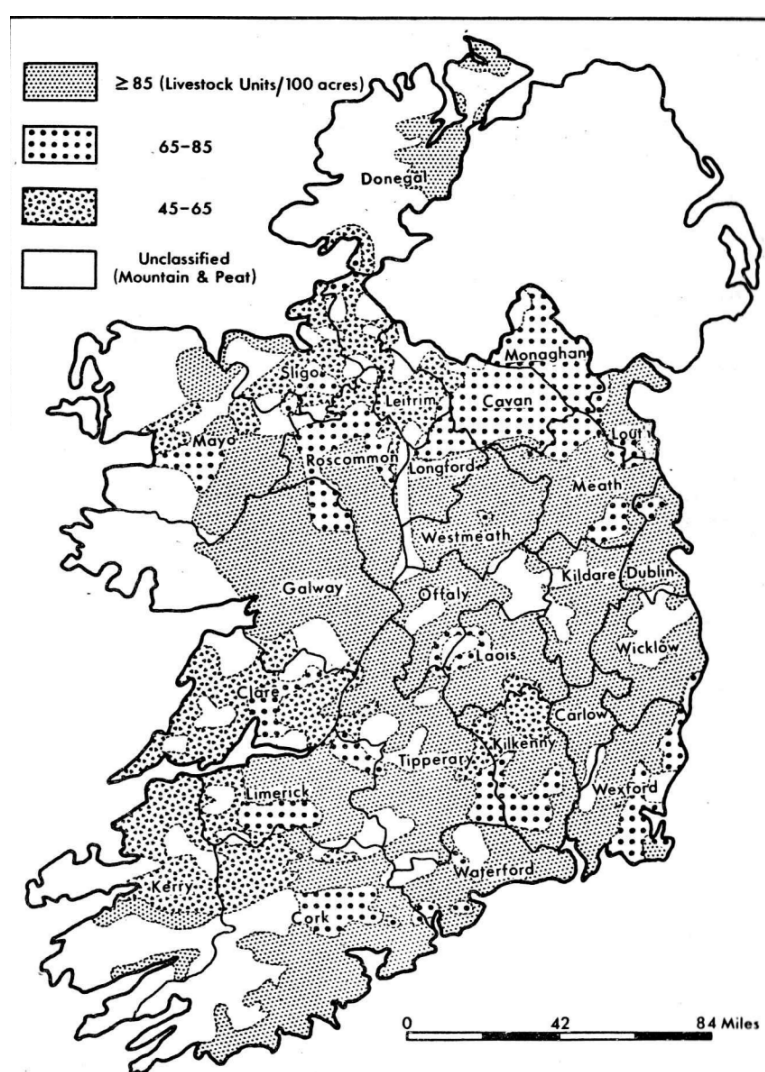


Figure 1.3: “Reduced and simplified representation of map showing estimated grazing capacity of Irish soils.” Source: *Fertiliser Manual*, 1971, 5.

¹⁰⁶ ‘News from the Divisions,’ *Farm Research News* 1, no. 2 (May 1960): 14.

¹⁰⁷ *An Foras Talúntais: Our Contribution to Irish Agriculture*, 17.

This relationship between the local and national use of soil testing data ran parallel to An Foras Talúntais's increased research capacity and stronger political motivations in relation to the earlier work of the NSS. These trends pulled Ireland's farmland imaginary, as it had been constructed through the previous decades of research, in contradictory directions. AFT's research methods had to be sophisticated enough to incorporate a wide variety of metrics: soil type, climate, fertility, and economics, but results needed to be simple enough to be flexibly incorporated into a farm plan. Researchers had to acknowledge sources of uncertainty and the drawbacks of a chosen research method while situating their research within the Lemass era's priorities of economic expansion and industrial transformation. The *Programme for Economic Expansion*, mirrored in the way AFT's scientists spoke about their own work, ultimately came to outline the shape Ireland's farmland imaginary would take: a narrative a transformation of the land itself, from old permanent pasture to modern productive grassland and from autarkic tillage quotas to economically expansive exports. As shown in the figure above (Fig. 1.3), from the productivist perspective of the state, all the research from the NSS and AFT into the wide variety of Ireland's soils and the dynamics of its fertility was most useful in determining the optimum livestock carrying capacity of each region.¹⁰⁸

VI. Global Knowledge, Global Soil

The Lemass era not only ushered in a transformation of Irish soil, but a globalisation of it. The use of Dokuchaev's soil classification terminology, brought to Ireland by way of American science, had already pulled Irish soil into the global scientific arena. But the European and American influence, ushered in by the establishment of An Foras Talúntais with Marshall Plan aid, would concretely establish Irish soil as a global entity. The post-war European Recovery Programme (ERP), often referred to as the Marshall Plan, had a profound effect on agriculture within and beyond Europe's borders. Funds allocated to drainage projects in France and the supply of tractors in Turkey spurred agricultural industrialisation efforts in many countries.¹⁰⁹ As David Painter has pointed out, these energy intensive developments were crucial in making European economies dependent on petroleum.¹¹⁰

International integration with America and within Europe were key priorities of the Marshall Plan and the *Programme for Economic Expansion*. In order to accomplish its goal of

¹⁰⁸ Ibid.

¹⁰⁹ Venus Bivar, 'Manufacturing a Multifunctional Countryside: Operational Landscapes, Urban Desire, and the French State, 1945-1976', *French Politics, Culture & Society* 36, no. 2 (2018), 58; Mehmet Halis Ozer, 'The Effects of the Marshall Plan Aids to the Development of the Agricultural Sector in Turkey, the 1948-1953 Period', *International Journal of Economics and Financial Issues* 4, no. 2 (2014): 433.

¹¹⁰ David S. Painter, 'The Marshall Plan and Oil', *Cold War History* 9, no. 2 (2009), 365.

stopping the growth of communism in Western Europe, the Marshall Plan sought to create more open trading relationships between Europe and the US, and within Europe itself.¹¹¹ Oil was a key commodity and so was food. As historian Bernadette Whelan has explored, increasing Irish exports to Britain, realised in the 1965 Anglo-Irish Free Trade Agreement, would keep the British population fed and therefore, according to the United States, stem the growth of communist sympathies.¹¹² The *Programme for Economic Expansion* saw open European trade as an inevitable development, stating in its second paragraph that “the establishment of a Free Trade Area in Europe will, whether we join or not, and irrespective of the conditions on which we become a member, call for a special effort on our part.”¹¹³ This projected trade was especially focused on agriculture with the *Programme* promising “to secure greater access to continental markets, and to this end... assist... in the negotiation of a multilateral agreement relating to agricultural trade.”¹¹⁴ The internationalisation of the knowledge making around Irish soil was directly tied to an internationalisation of its products in both the American and Irish perspective.

Ireland’s engagement with the Marshall Plan began later than in other nations, as most of Ireland’s ERP funding was held up until the late 1950s. Where countries like Turkey and France saw significant funds devoted to agricultural inputs and infrastructure like tractors, fertilizer, and oil, much of Ireland’s grant funds were heavily skewed toward agricultural research development and organizational infrastructure, bolstering rural women’s, young peoples, and educational institutions like Muintir na Tíre and Macra na Feirme, and establishing An Foras Talúntais around the existing soil research lab at Johnstown Castle. As Whelan explains, United States funding encouraged but did not establish the development and industrialization focus of Ireland’s government in the late 1950s.¹¹⁵ The Marshall Plan did, however, forge influential ties between Irish agriculture and American knowledge production, starting in the early 1950s with the ERP administrators who first visited Ireland to look into grant opportunities.

The Marshall Plan representatives to Ireland, Joseph Carrigan and Paul Miller, were both leaders in agricultural research at American land-grant universities. Carrigan was the Dean of Agriculture at the University of Vermont and Miller was Director of Extension Services at the University of Minnesota.¹¹⁶ According to Mary Daly’s history of the Department of Agriculture, it

¹¹¹ Charles S. Maier, ‘The Politics of Productivity: Foundations of American International Economic Policy after World War II,’ *International Organization* 31, no. 4 (1977): 608-09.

¹¹² Bernadette Whelan, ‘Adopting the ‘American Way’’: Ireland and the Marshall Plan, 1947-57,’ 16, no. 3 (01 May 2008), 30.

¹¹³ Whitaker, *Programme for Economic Expansion*, 7.

¹¹⁴ *Ibid*, 25.

¹¹⁵ Whelan, ‘Adopting the American Way’, 32.

¹¹⁶ Daly, *The First Department*, 281.

was with Carrigan's persuasion that the Irish Minister for Agriculture James Dillon began the process of establishing an agricultural research institute with the Marshall Plan's funds.¹¹⁷ This new research relationship between the US and Ireland even played out in the classification of Irish soil. Though the Co. Wexford soil survey uses the Dokuchaev soil categories inherited by way of American science, the document also included an appendix that translated the internationally used Russian categories to an American classification system developed by the US Department of Agriculture (USDA) in 1960. The USDA called their system a "soil taxonomy" and used "new terminology based on classical Greek and Latin roots" to mimic systems of species naming.¹¹⁸ Whether the USDA system was developed out of a genuine desire for better soil classification or a Cold War Russophobia, the act of translating the soil types used in the Wexford survey to the new American system speaks to the close correspondence between Irish and American agricultural science.

United States officials and scientists also brought with them their own image of what Irish farmland was for. When assessing how Ireland would fit into the aims of the Marshall Plan, grant coordinators wrote that Ireland would be useful to meeting European food demand by increasing production of foods "which she is particularly suited to produce – meat, eggs and dairy produce."¹¹⁹ The assumption that this feminine Ireland was particularly suited to animal husbandry, especially dairy and beef cattle, was already established among Irish Department of Agriculture scientists and Irish farmers, but having the sentiment echoed back by American administrators, agricultural experts, and Marshall Plan dollars strengthened that idea and cemented it in the institutions established through these collaborations.

The establishment of An Foras Talúntais led to an ongoing series of academic excursions of Irish agricultural researchers to the United States. These exchanges were an established part of Marshall Plan funding, with Turkey sending twenty-eight agricultural engineers to the United States in 1948 for training.¹²⁰ According to Mícheál Ó Fathartaigh, Minister Dillon had regularly sent members of Ireland's agricultural advisory service to Britain on training excursions since 1950.¹²¹ The international exchanges of AFT staff were such an important indicator of the work done at the Institute that *Farm Research News* devoted a section of each bimonthly issue to these "interchanges," the first being a sixty-day study tour of United States research facilities and farming

¹¹⁷ Ibid.

¹¹⁸ Gardiner and Ryan, *Soils of Co. Wexford*, 169.

¹¹⁹ ECA Program Coordination Division Position Paper Ireland, qtd. in Daly, *The First Department*, 281.

¹²⁰ Ozer, 'The Effects of the Marshall Plan Aids to the Development of the Agricultural Sector in Turkey', 435.

¹²¹ Ó Fathartaigh, *Developing Rural Ireland*, 230.

organisations undertaken by AFT Council Chair J. G. Litton under a “Leader Grant.”¹²²

An Foras Talúntais was built around the expertise of the Department of Agriculture’s soil research lab and nothing demonstrates that better than their prominence in these interchanges. Aside from Litton, all of the AFT staff travelling to the United States in 1960 came from the soils division, some studying there for an entire year. Of all twenty-four researchers whose trips abroad were documented in *Farm Research News* during this year, all but six were soil scientists.¹²³ Soil researchers were the root of An Foras Talúntais’s work, with its initial infrastructure and leadership, like director Walsh and vice-director Ryan, coming from the field. But these researchers were also the ones branching out, taking in new ideas and international research methods to understand what Ireland’s soil was for and how to transform it into what it could be, establishing Irish agricultural research as a body capable of cutting-edge science of international importance.

No AFT staff member is more representative of this than its director Tom Walsh. Despite his administrative position at An Foras Talúntais, and later as director of Ireland’s agricultural advisory service once it was spun off into the state institution ACOT in 1980. Walsh continued to actively publish and present scientific research. His research focus evolved with the institutions and conversations he worked within, from an early focus on understanding soil behaviour to a late career focus on the effects of fertiliser on Irish agricultural production and “economic optimum fertiliser use” on a farm and national level. In his position as director, Walsh no longer lectured or published domestically, serving instead as a spokesperson for Irish agriculture on a global scale, publishing and presenting at the Organisation for European Economic Co-operation (OEEC), the United Nations Food and Agriculture Organisation (FAO), the International Fertiliser Society, and universities in Poland and England.¹²⁴ Despite this shift in focus, Walsh still carried aspects of his earlier research into these lectures and papers, bringing the unique position of Irish soil nitrogen and its relationship with clover into conversation with new ideas about fertiliser use:

Traditional dependence for nitrogen supply in practically all our permanent pastures has been on clover. The emphasis in fertiliser programmes to date has been on the use of phosphorus, potassium and lime, where necessary, to stimulate clover growth as a basis for obtaining the best economic returns. Under intensive management conditions our recent research clearly shows that fertiliser nitrogen... has an important role in production... The

¹²² ‘News from the Divisions,’ 8.

¹²³ ‘Interchange,’ *Farm Research News* 1, no. 2 (May 1960); ‘Interchange,’ *Farm Research News* 1, no. 3 (July 1960); ‘Interchange,’ *Farm Research News* 1, no. 4 (September 1960).

¹²⁴ Thomas Walsh, *Scientific Papers Dr. Tom Walsh*, 2 vols., vol. 2 (Dublin: Tom Walsh Memorial Publication Committee, 1992), 31; Whelan, ‘Adopting the ‘American Way’.

problem is not primarily one of compatibility between fertiliser nitrogen and clover growth but rather of making the most effective use of both.¹²⁵

Coming from a background in research and agricultural advisory work, Walsh also brought a sensitivity of farm level planning to conversations on international economic development. In speaking to the FAO in 1966 he stated that though Ireland's *Programme for Economic Expansion* saw "considerably increasing lime and fertilizer use... as basic for realising the potential for increased output and export of livestock... the farmer is more concerned with... effective expenditure" and therefore "knowledge of the national optimum economic fertilizer requirement is... of little significance to him."¹²⁶ Walsh, in his regular references to the *Programme for Economic Expansion* and participation in key conversations on international development, seemed to embrace the narrative that the industrialisation and internationalisation of Irish agriculture were key to the nation's development. But in applying his background in agricultural advisory work and soil science to these largely economic and political goals, he was not uncritical but instead attempted to address the nuances of adopting these policies to make them as effective and widely beneficial as possible. Despite, or possibly because they were so tangled in political discourse, Walsh and his An Foras Talúntais colleagues seemed to deeply believe in the beneficence of their research, that with deep understanding of every nuance of the ground beneath their feet Ireland could reify its farmland imaginary and forge an agricultural sector that would support the nation by focusing on lucrative export trade rather than self-sufficient food production.

VII. Conclusion

The early work of Ireland's agricultural research through its central effort to define and then realise a postwar land imaginary represents the groundwork upon which Ireland's industrialised agricultural system would be built. Emerging from a failed regime of autarky whose inherited colonial relationship to the land left the soil exhausted from continuous grain cropping, the Irish government founded the National Soil Survey to remap Ireland's soil as a resource that could slot easily into state economic planning. This process of transferring land expertise from farm workers to state researchers through An Foras Talúntais's soil surveys and fertility tests resulted in the grading of Ireland's diverse soil series on a spectrum of wide to narrow range-of-use. The

¹²⁵ J. Kilroy and Thomas Walsh, 'Economic optimum fertiliser use,' in *Scientific Papers Dr. Tom Walsh* (Dublin: Tom Walsh Memorial Publication Committee, 1959), 1071.

¹²⁶ Thomas Walsh and P. M. McDonnell, 'Factors which influence optimum economic use of fertilisers', in *Scientific Papers Dr. Tom Walsh* (Dublin: Tom Walsh Memorial Publication Committee, 1966), 1136.

incorporation of the economic interests of the Lemass government into reports on scientific research led to a further emphasis on the definition of carrying capacities for Irish soil under pasture systems.

Coupled with these efforts to map and assess Ireland's soil was an effort to redefine its pastures as productive grassland that would function as an economic driver of the government's *Programme for Economic Expansion*. The dismissal of the pasture systems that had remained healthy through the Emergency without additional inputs as 'old' permanent pasture which researchers sought to remake as 'good grassland' required the reconceptualisation of grass and clover not as participants in a mutually supportive assemblage but as raw materials and cheap inputs in an industrial system. This alienation of species introduced pasture systems into the extractive metabolic rift dynamics that had previously been primarily linked with arable farming.

A steady internationalisation of land and expertise undergirded these changes, from the use of both Russian and American soil typologies in the National Soil Survey's reports to the regular interchanges of Irish agricultural researchers to the United States and Britain. The international legibility of Ireland's soil through NSS research came at the loss of Irish names and knowledge of the land. The use of Marshall Plan funding in the establishment of AFT saw Ireland itself instrumentalised in the US fight against a growing communist hunger. In economic terms, the *Programme for Economic Expansion* sought to reshape Ireland's farms for global markets, where cheap fertiliser inputs would be used to bolster grass-fuelled agricultural exports. In order to do this, An Foras Talúntais would be tasked with establishing new productive practices disseminated through intensive programmes of agricultural education and training.

Chapter 2 – Modern Fodder: Hay, Silage, and the Limitless Pasture

I. Introduction

The previous chapter discussed how An Foras Talúntais researchers, by reinterpreting the Irish agricultural landscape through an international lens of soil science and a politics of expansionism laid the foundations for Ireland's agricultural modernisation. Agricultural scientists used politically informed interpretations of their research to establish pasture-based cattle and sheep farming as the ideal land use for the majority of farmland on the island. This meant that most farmers in Ireland were and continue to be in the business of growing grass. In 1958, pasture and other grassland made up eighty-five per cent of Ireland's agricultural land. This prominence was politically codified in T. K. Whitaker's *Programme for Economic Expansion* as a historically appropriate construction of Irish agriculture, stating that "the greatest proportion of our agricultural land has always been and will continue to be under grass."¹ This simplified depiction of Ireland's history, distancing the incoming Lemass government from the tillage quotas of the Emergency and the protectionism of the De Valera government, were given scientific credence based upon the results of the National Soil Survey and the research of An Foras Talúntais, which claimed that even beyond the thirty per cent of Ireland's agricultural land with "limited range of use," good grassland was still the ideal economic use of Ireland's soil and farmland.²

If grass was the foundation of Ireland's past and present, making it the "raw material" of Ireland's future agricultural expansion would require a change in the way grass, clover, and other pasture species functioned within the pasture agroecosystem and the way farmers related to their land. The distinction drawn by An Foras Talúntais researchers between old permanent pasture and good grassland in public-facing publications like *Farm Research News* was a politically informed interpretation of their agricultural research meant to adhere to the goals set by the government in their first and second programmes for economic expansion. This chapter shows how the government used its educational, research, and advisory services to map that distinction onto agricultural practices and the land itself, particularly through the displacement of hay with silage as the primary method for preserving fodder from the mid-1960s through the 1980s. This chapter demonstrates how silage making and related techniques were promoted through an emphasis on 'stocking rate,' a particular measurement of carrying capacity, as the primary metric of Ireland's agricultural intensification.

¹ Whitaker, *Programme for Economic Expansion*, 12.

² M. J. Gardiner and Pierce F. Ryan, *Soils of Co. Wexford*, Soil Survey Bulletin (Dublin: An Foras Talúntais, 1964).

In this context, the potential of silage-making to achieve high levels of fodder production seemed to promise a way to realise the modern industrial agriculture that was so fundamental for the politics of the Lemass era. Silage was the centre of several modernising practices, including the promotion of early-season grass growth, more efficient farm and milking layouts, and drainage of wet and boggy land, intended to increase stocking rates. Hay served as a foil against these modern productive practices through its association with older technologies, lower yielding permanent pasture, and lower stocking rates. Situating a history of agricultural modernisation within Ireland's heavy reliance on grass-based winter fodder for animal husbandry allows for a unique case study of practice and landscape change within the wider twentieth-century history of agricultural globalisation and the green revolution. The practice of silage-making has so far escaped close examination in environmental and agricultural history despite being generally acknowledged as an important technological innovation in Ireland and elsewhere.

Expanding on the alienation of grass from the multispecies assemblage of the pasture, this chapter begins with an exploration of the entangled more-than-human dynamics of the pasture assemblage, aided by John Law and Annemarie Mol's ANT framework. Through their study of Cumbrian sheep during the foot and mouth pandemic of 2001, Law and Mol show that agriculture presents a useful venue for exploring more-than-human agency through a rethinking of action and agency as existing in the space between actors and in the ways they interact with one another.³ Sheep, in Law and Mol's framework, are considered actors with behavioural and material qualities that interact with and shape farmer behaviour, policy, and ecosystems. Under this framework, humans and human institutions also 'enact' these sheep as conceptual objects: assigning them abstract labels like financial assets, carriers of disease, or symbols of heritage.⁴ Law and Mol argue that it is more useful to look for action and agency not as residing in any particular actor, but in the interactions and the enacted meanings they exchange.⁵ Introducing pasture systems as an assemblage of more-than-human action and agency makes visible the interactions between economic, environmental, and political shifts of the postwar Irish pasture. By using an actor network theory framing, this chapter shows that these changes emerged not from human action alone, but from an assemblage of actors including clover, ryegrass, horses, cows, nitrates, water, and more.

Following this more-than-human exploration of pasture systems, the chapter examines the global political implications of this transition and its economic and demographic effects on rural

³ Law and Mol, 'The Actor-Enacted'.

⁴ Ibid, 58-65.

⁵ Ibid, 72-74.

communities. David Edgerton's analysis of technological shifts in rural agricultural landscapes is used again to explore ideas of coloniality and modernity within this transition, specifically within the context of the Green Revolution. In *The Shock of the Old*, Edgerton writes that the idea of the Green Revolution has been primarily applied to the industrialisation of agricultural practices in the 'poor world' of Asia and South America. Agricultural production advances in 'rich world' North American and European countries are generally not considered a part of this same phenomenon, despite their significantly greater magnitude of production increases. Edgerton argues that this is primarily due to agriculture's association with the past and poverty.⁶ This chapter builds upon Edgerton's point that the rich world's advancements during the postwar long boom have been framed the popular imagination as advances in manufacturing and other more novel industries in order to explore how the Irish government pursued its own agricultural revolution.⁷

Ireland's agricultural industrialisation is uniquely situated to expand upon this distinction between the Green Revolution of the poor world and that of the rich world. Ireland was a post-colonial agrarian state whose postwar economy and agricultural sector sits alongside the poor-world countries often associated with narratives of the Green Revolution. The expansionist Lemass government, however, sought to use Ireland's proximity and close trading relationships with Europe and Great Britain to overcome this association with poverty, associating the country instead with the wealthy industrial nations of the Global North. Works of postcolonial theory emerging from Indian scholars like Akhil Gupta clarify the postcolonial dynamics of this relationship between the perceived antiquity of Irish agriculture by its own government and the efforts to bring it into a modern state defined by wealthy European standards of production. Gupta, in his book *Postcolonial Developments*, writes that postcolonial states, regardless of where they exist on the map, are rhetorically stuck in a kind of peripheral past, where issues stemming from residual systems of economic and political inequality are instead discussed as resulting from a kind of antiquity that the nation must escape from.⁸ Combining Edgerton's idea of the Green Revolution in the poor and rich world with these postcolonial ideas of the constructed rhetorical past puts the changing demographics of Irish farmers and their relationship to the state's modernising efforts into a global postcolonial context, allowing Ireland's Green Revolution to sit somewhere between the modern nations of Europe and perceived obsolescence of postcolonial nations in the Global South.

⁶ Edgerton, *The Shock of the Old*, 64.

⁷ Ibid.

⁸ Akhil Gupta, *Postcolonial Developments* (Duke University Press, 1998), 10.

The icon of this effort to modernise Irish agriculture is the portrait of Seán Lemass painted for the cover of *Time Magazine*'s 12 July 1963 issue (Fig. 2.1). The portrait depicts a shamrock-embroidered curtain being parted by a leprechaun to reveal a pristine green lawn leading up to a massive gleaming factory, reflecting Lemass's promise of a "New Spirit in the Ould Sod."⁹ The issue's profile of Lemass laments Ireland's seeming lack of industrial fervour, quoting Patrick Kavanagh's poem *Memory of Brother Michael*: "When Drake was winning seas for England / we sailed in puddles of the past."¹⁰ Kavanagh himself dismissed the poem four years later as something he wrote simply out of a need for money, embarrassed at "how appallingly this poem accepts the myth of Ireland as a spiritual entity," but by then the evocative rhetoric of Ireland as occupying a provincial kind of past had escaped his grasp.¹¹ *Time*'s use of the poem served to position Lemass as a sharp future-oriented break from De Valera's puddles-of-the-past thinking, promising that his government's forthcoming *Second Programme for Economic Expansion* would correct its "ills and lags."¹²

⁹ 'Ireland: Lifting the Green Curtain', *Time Magazine*, 12 July 1963.

¹⁰ Ibid.

¹¹ Patrick Kavanagh, *Collected Pruse* (MacGibbon and Kee, 1967).

¹² *Time Magazine*, 'Ireland: Lifting the Green Curtain'.



Figure 2.1: *Time Magazine* cover for 12 July 1963 depicting Taoiseach Seán Lemass parting Ireland's green curtain. Beyond this shamrock curtain lies a towering factory with a train of solid fuel, possibly coal or machine turf, and a uniform green field of grass. Source: *Time Magazine*, 'Ireland: Lifting the Green Curtain.'

Despite the magazine's gloss of Lemass's industrial dreams, postwar Ireland was still an agrarian economy and, as indicated by the *First Programme for Economic Expansion* and AFT research, pasture-based animal husbandry was still positioned as a major driver of the Irish economy. Therefore, state efforts to recast Ireland as a modern industrial nation would need to focus on industrialising the practices of farmers. The visual juxtaposition in Lemass's portrait of the even green field and the factory lying behind the shamrock curtain indicates how closely efforts to create modern grassland landscapes from Ireland's old permanent pasture were interwoven with the more explicit industrial developments represented in the portrait's factory building. This chapter's focus on preserving grass and the distinction between hay and silage attempts to

document this previously unexplored effort to industrialise Ireland's agricultural practices and its influence on the biodiversity of Ireland's rural landscape itself.

To do so, it is necessary to situate Ireland's fodder transition and its associated web of practical, economic, and ecological transitions within the broader trajectory of the Great Acceleration, formalised by the work of Will Steffen and others. The great acceleration graphs codified by Steffen et al. highlight that this period was characterised not only by economic change but also by profound climatic and ecological change. Most important to Ireland's pasture transition is the sharp increase Steffen et al. show in the global consumption of fertiliser in the postwar period, reflected in the expanded use of nitrogen fertiliser throughout the Irish growing season in order to consistently grow enough grass for silage.¹³ Steffen et al.'s disaggregated graph of fertiliser consumption shows that among OECD countries, of which Ireland is a member, fertiliser consumption increased in the immediate postwar decades, followed by a steady decline from the 1980s to the present. Ireland's national consumption statistics, however, track much more closely with the BRICS (Brazil, Russia, India, China, and South Africa) and other non-OECD nations whose fertiliser consumption has not trended regularly downward, but continues to increase through to the present.¹⁴ Comparing Ireland's fertiliser use per hectare of agricultural land alongside the national consumption totals employed by Steffen et al. further clarifies this distinction in fertiliser use.¹⁵

The variance of Ireland's fertilizer use trends from other OECD nations strengthens the argument that Ireland's postwar industrial modernisation, despite the European dreams of its government, was more closely associated with the poor agrarian world of postcolonial nations. Altogether, the chapter illuminates postwar Irish livestock operations not as a simple system in transition from an antiquated practice to a modern one, but as a site where changes to economic, ecological, political, and climatological systems interacted and influenced one another. Applying ANT theory and postcolonial approaches to this transition allows the Irish case to complicate the well-trodden narratives of the Green Revolution and global postwar agriculture.

II. The Pasture Assemblage

To fully understand why silage production was such an important catalyst for the industrialisation of Irish agriculture, it is important to understand the seasonal rhythm of pasture-

¹³ Steffen et al., 'The Trajectory of the Anthropocene', 81–98.

¹⁴ Ibid.

¹⁵ Food and Agriculture Organization of the United Nations with major processing by Our World in Data, 'Fertilizer use per hectare of cropland – FAO', FAOSTAT, 2025.

based animal husbandry in twentieth-century Ireland. Though the specifics of these practices have changed significantly over the past century, the dynamics explored in this section are rooted in the fundamental way energy, water, and nutrients cycle through pasture landscapes. Therefore, despite significant change to pasture practices over the past century, the underlying dynamics have remained at least superficially stable since the establishment of pasture farming in Ireland during the late-eighteenth century.¹⁶ This exploration of the ecological dynamics of pasture systems also lays the groundwork to show how clover, grasses and other participants in the Irish pasture system act in concert with farmers and livestock as an assemblage similar to the Cumbrian sheep of Law and Mol's analysis.

Publications by An Foras Talúntais researchers reveal not only the political motivations behind their research, but the massive wealth of knowledge gained through their research into Irish agricultural ecology. The work of Roger McCarrick and other researchers and farm advisors paints a lush picture of the annual cycle of growth and nutrient cycling in the Irish pasture assemblage.¹⁷ In the late spring and summer months, warm temperatures and increased solar radiation allow pasture plants to grow vigorously, producing enough biomass to allow livestock onto the pasture to graze. Clovers are the first to begin growing, and their symbiotic relationship with nitrifying bacteria in their roots creates an early flush of nitrogen in the soil that allows grass to start its own growth. The leafy tender new growth in spring and early summer contains a high concentration of nutrients that livestock find tasty, and the quick pace of vegetative growth during this period allows plant species to more easily recover from being eaten, cut, or trampled. By midsummer, pasture plants have taken in enough solar energy to begin focusing their energy on reproduction, producing flowers to be pollinated and seeds for the next generation. Grasses during this time grow taller and develop long stems to lift their flowers high enough to be pollinated by insects and the wind. This stemmy growth is still edible by livestock but not as nutritionally dense as spring growth, as most of the plants' energy is focused on producing and distributing seeds.¹⁸ As the weather turns cold and wet during the fall and winter and solar radiation lessens, pastures slow their above-ground growth, leaving less food for livestock. Additionally, increased precipitation softens the land, making it difficult for livestock to move around as easily. As a single cow can weigh anywhere between one and three tons, leaving cattle out on wet land during the winter months can lead to

¹⁶ Feehan, *Farming in Ireland*, 416.

¹⁷ Roger J. McCarrick, 'Considerations in Conservation and Feeding of Silage', in *Proceedings of Seminar on Livestock Production* (An Foras Talúntais, 1960).

¹⁸ *Ibid*, 2.

“poaching,” where the land becomes uneven, making movement more difficult, changing the flow of water through the field, and reducing grass growth altogether.¹⁹

According to John Feehan’s book *Farming in Ireland*, livestock density would have remained fairly low through much of Ireland’s pre-modern history, meaning that there would have been little need to provide stored food for cattle and sheep during the winter. Instead, livestock were left to forage from ‘winterage’ areas throughout the season, supplementing less productive winter grasses by grazing ivy, seaweed, and other hardier plants. Lower livestock density also reduced the detrimental effect cattle would have on the wet pasture when left out over winter.²⁰ In instances when livestock numbers were too great to be sustained on pasture or winterage during the rainy cold months of the year, cattle were kept indoors, but these animals still needed to eat to survive, reproduce, and, for beef cattle, otherwise known as dry stock, continue to gain weight. This required farmers to grow and preserve extra fodder during the summer months when pastures produce the most biomass in order to keep their herds healthy and marketable.

This difficulty in keeping animals fed over the winter months is the primary limiting factor in how large a herd can be. Summer grazing has a relatively low labour cost as livestock largely manage their own feeding as long as they are continually given access to areas of pasture with an abundance of new growth. The primary issue farmers can run into during summer months is overgrazing, when livestock eat plants so completely that they have little green growth left to photosynthesise with, stunting their future growth. But the labour required for farmers to grow and process food for the winter during the growing season, in addition to hauling and distributing that feed to livestock during the winter, requires a more significant investment of time, energy, and capital. This makes the additional feeding needs of an extra ewe or bullock much more difficult to shoulder during winter than summer, cementing the availability of winter fodder as the most important factor in determining a farm’s stocking rate.

The greater difficulty in managing winter feed gives livestock farmers an acute level of concern with the cost and labour involved in each step of the process when determining the method of winter feeding. There are many options that can be combined to feed cattle through the winter. Barley, which is preserved by drying as it is harvested or sugar beets and turnips, which can be kept in the ground as long as needed through the winter, function as nutrient-dense forms of winter

¹⁹ Feehan, *Farming in Ireland*, 176.

²⁰ *Ibid*, 416.

food. But the cheapest and least labour-intensive option for winter feeding is grass, the same energy source being fed throughout the rest of the year.²¹

In Feehan's telling, hay has been the easiest and most widely used form of winter feeding in Ireland since the practice of haymaking was introduced by the Vikings. In the late eighteenth century a mixed farming regime gained greater traction, where a combination of livestock and tillage crops would be grown together on different parts of the farm. Maintaining two different land uses meant fewer acres for livestock to graze freely and required closer maintenance of the land and livestock by housing cattle and sheep during the winter to allow pastures to recover.²² This idea of mixed farming referred to by Feehan was further intensified into the 'high farming' discussed by Liebig and Marx through the nineteenth century.²³ While pasture systems weren't at this time dependent on the same system of external fertiliser inputs as arable crops, the limiting of pasture to specific fields did require more intensive management in the form of hay and winter housing for animals.

The easiest method of feeding housed cattle and other livestock through the winter was to preserve grass grown during the summer for winter consumption by making hay. Haymaking requires a proportion of pastureland to remain ungrazed through the summer, allowing the grasses to grow tall and mature. In late summer, the pasture is cut and laid on the field to dry in the sun before being shaped into haystacks and bales and stored over the winter. This field-drying is what stops decomposition and allows the hay's nutrients to be preserved, the literal guidance at the root of the saying 'make hay while the sun shines.' The dry grass is also lightweight and easy to transport from a barn or hayloft to the animal housing for feeding. If rain prevents the grass from drying quickly enough, it will begin to rot, making it less nutritious and susceptible to mould. In places with long dry summers, a hay meadow can be harvested multiple times, but Ireland's wet temperate climate generally limits hay harvests to a single cut in high summer.²⁴

This overview of the ecological dynamics of pasture and haymaking systems serves as an entry point for a discussion of the agricultural landscape as an assemblage of actors where agency lies not with any particular actor but in the interactions between them. As in Law and Mol's examination of sheep, humans construct cattle in multiple ways, as carriers of financial value, providers of food, ecosystem engineers, and recyclers of nutrients. Anna Tsing's idea of salvage

²¹ *Telefís Feirme - Farmplan*, episode 4, 'A Future in Sheep', with Justin Keating, aired 24 November 1970, on Raidió Teilifís Éireann, 00:05:13, RTÉ Archives (P493/70).

²² Feehan, *Farming in Ireland*, 416.

²³ Foster and Clark, *The Robbery of Nature*.

²⁴ *Telefís Feirme*, episode 31, 'Silage', with Justin Keating, aired 22 November 1966, on Raidió Teilifís Éireann, RTÉ Archives.

accumulation shows how the bodies and behaviours of cattle, their digestion, rumination, and gestation, are appropriated for the production of commodities and capital in a similar dynamic to the Cumbrian sheep in Law and Mol's analysis.²⁵ But Law and Mol show that farm animals are not only enacted as sources of capital but act as agents in the agricultural assemblage in ways that human farm workers have to accommodate. Cattle choose which plants to eat and which to avoid, compact the ground with their weight in large numbers, and socialise with one another through herd dynamics. Importantly for the narrative of this thesis, pasture plant species are also both enacted as sources of salvage capital and agents acting in the pasture assemblage. Human farmers can enact grasses, clover, and forbs as a crop, a raw material, a weed, or a soil amendment. For sheep, horses, and cows, pasture plants can be enacted as food, poison, or medicine, as well as shelter. While human farmers enact clover as a free soil amendment, grasses enact clover as a source of nutrients, and for nitrifying bacteria clover means home. These systems are not simply constructed by humans for a single use but are assemblages of action and meaning between multiple species of which humans are a single part.

In addition to drying grass to be preserved as hay, pasture plants can also be preserved as winter fodder by fermenting the sugars in grass to make silage. To make silage, pasture is again left ungrazed through the summer but is cut periodically through the season when grasses are in their young leafy nutrient-dense states, before they fully enter their stemmy reproductive phase. The young grass is then packed tightly together in airtight and watertight pits or plastic sheeting to keep aerobic bacteria from decomposing the grass, instead incentivising anaerobic bacteria to ferment the young nutrient-rich grass. Anaerobic bacteria ferment the grass by converting its sugars to lactic acid. This acidity prevents the grass from decomposing, allowing it to maintain nutritional quality throughout the winter.²⁶ In the abstract, making hay and making silage are two different methods of preserving grass as winter feed for animals. But when examined within the context of the pasture assemblage, the decision of farmers to use one system of winter fodder over another shifts the temporality and the dynamics of the entire assemblage.

In the early 1960s, hay was the dominant form of winter fodder employed by Irish farmers, with only two per cent of all pasture conserved as winter feed being made into silage.²⁷ By the dawn of the twenty-first century, the proportion of winter fodder preserved as silage would flip, with the proportion of farmers making silage increasing from two per cent in 1958 to fifty-five per

²⁵ Tsing, *The Mushroom at the End of the World* 62-6; Law and Mol, 'The Actor-Enacted: Cumbrian Sheep in 2001'.

²⁶ *Quality Grass Silage for Dairy and Beef Production Systems: A Best Practice Guide* (Teagasc, 2016), 16.

²⁷ Roger J. McCarrick, 'We Could Carry More Livestock with Silage', *Farm Research News* 1, no. 3 (July-August): 10.

cent in 2003.²⁸ Different statistical measures have been used over the years to measure the use of different grass preservation practices, making it difficult to determine the specific arc of this trend, but the direction and intensity of change to agricultural practices show a decisive shift from hay to silage. From 1964 to 1967, silage making across Ireland trebled from 658,428 tonnes to 1,805,642 tonnes. Between 1975 and 1996, the proportion of agricultural land used for conserved grass (including both hay and silage) increased from 17.7 per cent to 30.6 per cent, while acreage of grazed land, crops and forestry, and total land used for agriculture all decreased during the same period.²⁹ Based on the other statistics presented here, it is possible to infer that much of this increase is due to farmers taking pasture out of grazing to ensile more grass for winter feed. In the short period from 1991 to 1996 when disaggregated national land use statistics on conserved grass were collected, silage increased from sixty-six to seventy-two percent of land use, meaning that by 1996 only around a quarter of conserved grassland was used for hay.³⁰

From a barely notable proportion of farmers in the late 1950s, silage-making has become the second-most dominant agricultural land use practice in Ireland, behind grazed pasture. Throughout this time, it has been the only form of agricultural land use that has undergone consistent growth. But this drastic change in practices did not happen in isolation. The national shift to silage did not only come with shifts to the ecological dynamics of the pasture assemblage but with changes to farmer education methods, farm layouts, machinery, labour organisation, fertiliser inputs, and the underlying constructs of land, livestock, and plants enacted within the pasture assemblage. Following on from An Foras Talúntais's soil surveying research, the shift from hay to silage was spurred on by research of agricultural scientists at AFT's Animal Research Centre in Grange, Co. Meath.

²⁸ Feehan, *Farming in Ireland*, 177.

²⁹ Dan Browne, 'Milk Matters: A Radio Telefís Éireann Series for the Dairy Farmer', Raidió Telefís Éireann, 1968, RTÉ Archives, 23.; *June 1976*, Agricultural Statistics, Area under Crops and Pasture (Central Statistics Office, 1976).; *June 1977*, Agricultural Statistics, Area under Crops and Pasture (Central Statistics Office, 1977).; *June 1980*, Agricultural Statistics (Central Statistics Office, 1983).; *June 1980-1984*, Agricultural Statistics, Land Utilisation and Numbers of Livestock Regional Analysis (Central Statistics Office, 1986).; *June 1985*, Agricultural Statistics, Land Utilisation and Numbers of Livestock Regional Analysis (Central Statistics Office, 1986).; *June 1986*, Agricultural Statistics, Land Utilisation and Numbers of Livestock Regional Analysis (Central Statistics Office, 1987).; *June 1987*, Agricultural Statistics, Land Utilisation and Numbers of Livestock Regional Analysis (Central Statistics Office, 1988).; *June 1988*, Agricultural Statistics, Land Utilisation and Numbers of Livestock Regional Analysis (Central Statistics Office, 1989).; *June 1989*, Agricultural Statistics, Land Utilisation and Numbers of Livestock Regional Analysis (Central Statistics Office, 1990).; *June 1990*, Agricultural Statistics, Land Utilisation and Numbers of Livestock Regional Analysis (Central Statistics Office, 1991).; *June 1992*, Agricultural Statistics, Land Utilisation and Numbers of Livestock Regional Analysis (Central Statistics Office, 1993).

³⁰ *Ibid.*

III. Nitrogen and Carrying Capacity

The primary argument for farmers to make silage instead of hay was its ability to increase the carrying capacity of Ireland's farms. Roger J. McCarrick, one of the agricultural researchers at the Animal Research Centre showcased this promising technology in his 1960 piece for *Farm Research News*, titled 'We Could Carry More Livestock With Silage.' McCarrick used the piece to argue that silage can be made as cheaply as hay with little extra labour or equipment, with the "striking advantage" that silage, unlike hay, does not need to be dried in the sun and can therefore be made during wet weather. McCarrick wrote that "this is a most important point, when we remember the variable and rainy conditions that prevail over most of Ireland. Besides, silage can be made at any time during the growing season... so that the usual bottlenecks of labour, and the uncertainty and haste, normally associated with the risky business of hay-making are eliminated."³¹

McCarrick's reference to Ireland's wet climate attempts to naturalise silage-making as a more appropriate winter-feeding practice for Ireland's farmers than haymaking, similar to AFT's earlier use of soil science to justify grassland animal husbandry as the ideal use of agricultural land in Ireland. To this end, McCarrick cites an AFT study showing ninety-two per cent of hay to be deficient in protein during the wetter-than-average season of 1958, with protein accounting for less than ten per cent protein by weight. The study also showed a fifty-five per cent deficiency in phosphorus, less than 0.2 per cent by weight. In contrast, the much drier summer of 1959 generated deficiencies of protein and phosphorus of fifty-two and thirty-eight per cent respectively for the same hay harvest.³² As McCarrick does not discuss ideal or average levels of protein and phosphorus in hay, it would not have been immediately apparent to farmers how bad ten per cent protein was in comparison to a good year. Putting "less than ten per cent protein" into context, contemporary research shows that grass hays largely vary from eight to fourteen per cent protein, but McCarrick's article emphasises the degree of deficiency rather than these actual protein levels.³³ This emphasised the greater sensitivity of hay nutritional quality to climate when compared with silage.

McCarrick's article is similar in tone to other the *Farm Research News*, where the scientific research itself is impartial, but the framing used by researchers to discuss their work betrays a political bias toward more intensive practices. The discussion of nutrient deficiencies without reference to a baseline gives a partial picture of the experiment that bolsters the argument of hay's moisture sensitivity and, by extension, inconsistency. Climate is an important factor in McCarrick's

³¹ McCarrick, 'We could Carry More Livestock with Silage', 11.

³² Ibid, 11.

³³ 'Understanding Your Hay Analysis', University of Minnesota Extension, 2021.

case for silage-making and, as explored in the final section of this chapter, its importance in determining how farmers feed their herds has only increased through the decades.

It is true that silage, unlike hay, can be cut and processed during rainy weather and does not need a sunny period to be preserved effectively, but the argument in the article was not that this rain resistance made silage easier to process or more resilient to climate shocks. Instead, McCarrick argued that ‘we could carry *more* livestock with silage,’ that silage’s ability to be made in wet weather made it more consistently nutrient-dense than hay and therefore a more efficient form of winter fodder that would allow farmers to carry additional livestock on the same acreage. As with much of *Farm Research News*, McCarrick’s article situated AFT’s research within the expansionist project of the Lemass government, stating explicitly that “there is a definite place for ensilage in the effort to increase the nation’s output of livestock and livestock products.”³⁴ The article opens by stating that Ireland’s livestock industry, “providing as it does a large fraction of our exports and an indispensable part of our home needs of food,” has yet to reach full development. That development, McCarrick argued, was dependent on increasing production efficiency by getting “the best out of our grassland, in yield and in efficiency of utilisation by the animals.”³⁵ The emphasis of silage’s potential for production and export reflects the *Programme for Economic Expansion*’s specific enactment of grass as “raw material” for Ireland’s agricultural production. In this expansionist frame, grass as fodder was not enacted as food that nourishes animals and allows them to remain healthy through the winter, nor was it seen as an embedded within the ecology of a pasture. Instead grass as silage appeared as an industrial input whose increased production would in turn generate an increased output of livestock products.

McCarrick’s research through AFT’s Grange Livestock Research Centre in Meath reflects this rhetoric through its focus on enabling Ireland’s future in silage and making its on-farm production and use as efficient as possible. Unlike his article for *Farm Research News*, McCarrick’s publications in An Foras Talúntais’s *Journal of Agricultural Research* were not concerned with justifying silage as a worthwhile practice or comparing its use with hay. Instead, his research focused entirely on the specifics of optimising silage production. At a 1960 seminar on livestock production hosted by An Foras Talúntais at the Salesian Agricultural College down the road from the Grange Centre in Warrenstown Co. Meath, the research agenda advanced by McCarrick and his fellow researchers was made apparent.³⁶ They were primarily concerned with how to most efficiently and cheaply provide greater amounts of biomass-increasing nitrogen to a

³⁴ Ibid, 12.

³⁵ Ibid, 10.

³⁶ *Proceedings of Seminar on Livestock Production* (An Foras Talúntais, 1960).

silage operation and the trade-offs between clover and artificial fertiliser as the sources of that nitrogen.³⁷ McCarrick ended his piece for *Farm Research News* with similar questions: “Which are the most economical systems of ensiling?... What is the optimum dressing of manure for the different silage crops on various soils? Should we recommend greater use of artificial nitrogen? Or should we rely on clover?”³⁸

This pairing of research into both silage and nitrogen indicates a difference in the idea of carrying capacity promoted by agricultural researchers at the Grange Centre. The work of the National Soil Survey discussed in Chapter One was primarily focused on applying phosphorus fertiliser as a way to remediate soil that had been exhausted by continuous cropping. The soil survey research was still simplified to develop LU/ha carrying capacity maps like the one of Co. Kerry below (Fig 2.2), but the grazing capacity numbers represent an upper optimal limit for the soil given adequate soil phosphorus. This is to some degree rooted in the materiality of phosphorus, which bonds to soil particles and therefore can be built up or depleted over longer periods of time. Nitrogen’s materiality results in entirely different dynamics, as its propensity to be taken up by plants or carried away by water makes its presence in soil much more ephemeral. This is the reason why soil scientists at Johnstown Castle were able to accurately test soil samples for soil phosphorus but not nitrogen.³⁹ Focusing on the contrasting material qualities of these different molecules led soil scientists at Johnstown Castle and the livestock researchers at the Grange Centre to construct differing versions of carrying capacity.

According to geographer Nathan Sayre, the idea of carrying capacity is itself a colonial construction, originally applied to agricultural land during the colonial establishment of rangeland in Australia and New Zealand in the late nineteenth century. The term is slippery, both implying an absolute maximum of livestock the land can support and a plastic value that can be increased with changes to certain variables in the ecosystem. In the Australian context, the limiting factor to this plastic carrying capacity was rainfall, and it was irrigation technology that allowed the carrying capacity of the colonial rangelands to be drastically increased.⁴⁰ In the postwar Irish context phosphorus levels represented an optimum carrying capacity to be built toward whereas nitrogen represented a higher and more plastic carrying capacity for the land that could be extended steadily upwards.

³⁷ Ibid.

³⁸ McCarrick, ‘We Could Carry More Livestock with Silage’, 13

³⁹ *Fertiliser Manual*, 1970, 39.

⁴⁰ Nathan F. Sayre, ‘The Genesis, History, and Limits of Carrying Capacity’, *Annals of the Association of American Geographers* 98, no. 1 (2008), 124.

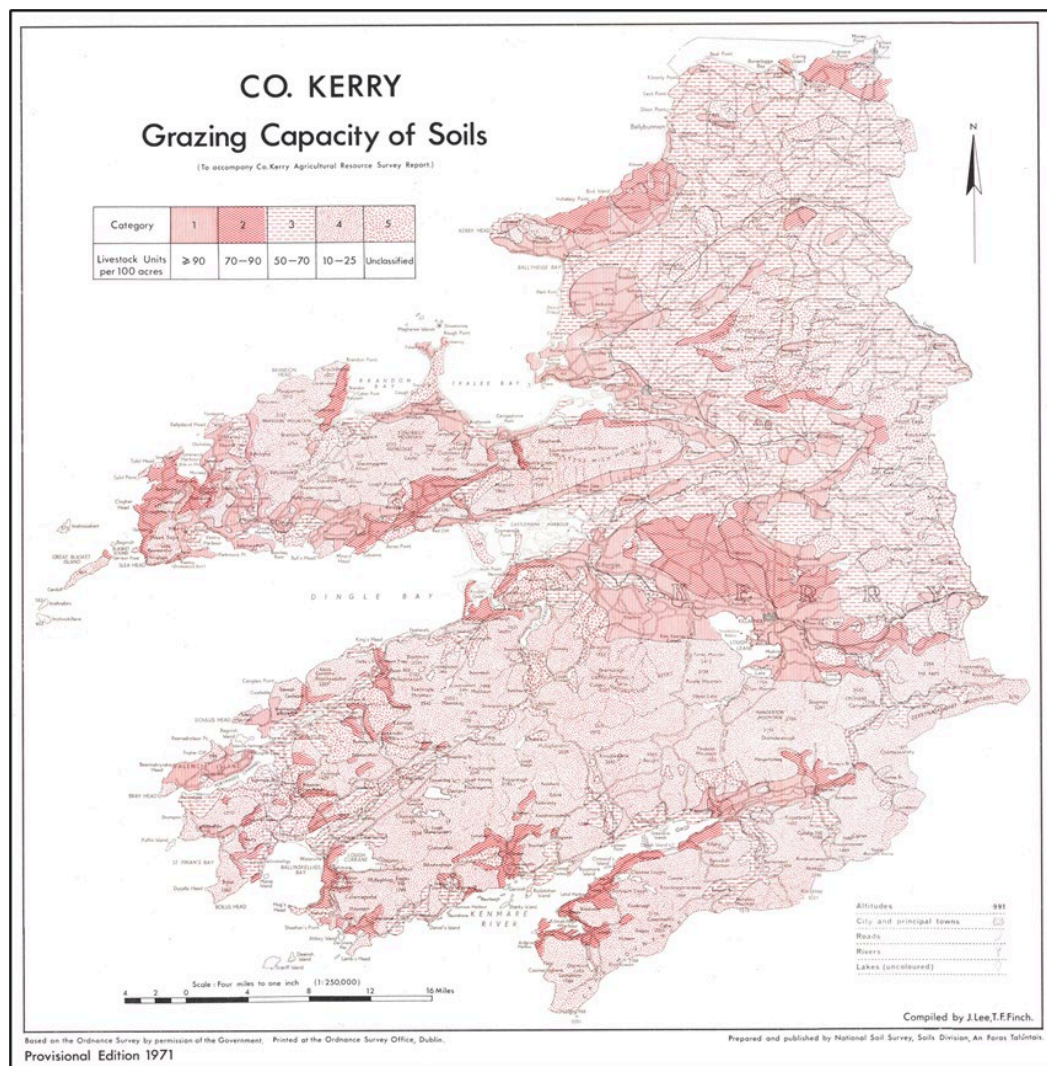


Figure 2.2: Map depicting the grazing capacity of agricultural land in Co. Kerry as based on soil survey data. The map presents stocking rates based on optimum levels of soil fertility. Source: Lee and Finch, Co. Kerry Grazing Capacity of Soils.

Soil maps developed by the team at Johnstown Castle like the one of Co. Kerry (Fig. 2.2) simplify the soil into a unit of analysis for carrying capacity, but their estimates were tied directly to the qualities of the soil, with most of the county limited to one cow or less for every two acres of land.⁴¹ The focus of Roger McCarrick and other Grange researchers on nitrogen as a driver of soil fertility led them to come up with higher and more plastic estimates of carrying capacity, as nitrogen's ephemerality meant that plants would almost always respond to additional nitrogen with additional growth. This is demonstrated in the graphic from farm-education programme *Telefís Feirme* (Fig. 2.3), which showed stocking rate as abstracted from land, dependent instead on fertiliser inputs and particular practices.⁴² As explored later in the chapter, *Telefís Feirme* and other

⁴¹ Ibid.

⁴² Browne, 'Milk Matters', 17.

agricultural advisors coached farmers to not focus on the amount of acres at their disposal, but instead focus on the ways in which its productivity could be increased through rationalisation and amendments like nitrogen fertiliser.

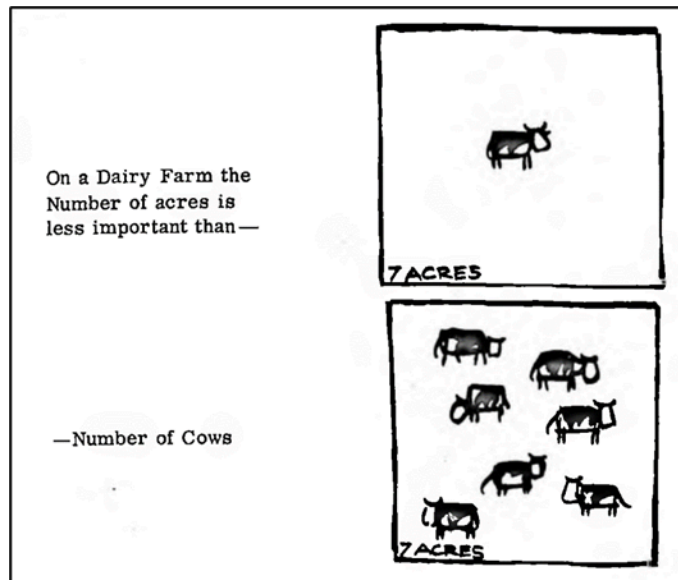


Figure 2.3: Illustration by Gerrit Van Gelderen from *Telefis Feirme's* Milk Matters programme demonstrating that increasing stocking rate to one or more livestock unit/acre was dependent primarily on the farmer's practices rather than the amount or quality of land Source: Browne, 'Milk Matters', 17.

The use of silage as winter fodder and nitrogen as the primary nutrient for increasing biomass production were understood by AFT researchers at the Grange Centre as the levers of this new plastic carrying capacity. In the pages of the *Programme for Economic Expansion*, clover was written about as “by far the cheapest source of nitrogen” available to the industrious Irish farmer.⁴³ But clover's entanglement within Ireland's pasture assemblage allowed it to play more roles than the nitrogen fixation desired by farmers, meaning that the introduction of artificial fertiliser as an additional source of nitrogen would have more complex effects than simply adding one source of nutrients to another.

Clover had been the primary and, in many cases, the sole source of nitrogen within Irish pastures through the Emergency. As Tom Walsh recognised during a 1964 paper on Irish fertiliser use presented at Jagellonian University in Cracow, this use of clover was to the benefit of Irish agricultural resilience. While Walsh spoke of Ireland's soil phosphorus being greatly depleted by tillage efforts during the Emergency, he highlighted that the long-term presence of clover in Ireland's pastures meant that nitrogen and organic matter levels in Irish soil under the same system

⁴³ Whitaker, *Programme for Economic Expansion*, 13.

remained relatively high.⁴⁴ Clover and other legumes like vetch and pulses fix nitrogen in the soil through the symbiotic relationship they develop with nitrogen-fixing bacteria living in nodules in their roots. These bacteria fix nitrogen from the atmosphere in a form the legume can use, leaving any surplus nitrogen free to be taken up by other nearby plants. This symbiotic relationship also makes leguminous plants themselves a rich source of nitrogen when they die and decompose into the soil.⁴⁵

The annual cycle of clover plants within a pasture complements the temporality of grasses and other species. As discussed earlier, clover's bacterial partners allow it to grow quickly in the spring before other plants take off, providing an early flush of nitrogen that spurs on the growth of grasses and other pasture plants. As grasses and broad-leafed plants grow tall enough to shade it out, clover begins to go dormant.⁴⁶ In a 1959 experiment conducted at the Grange Research Centre, Roger McCarrick and his colleagues found that spring growth in a clover-rich sward came a week earlier than in the clover-poor control pasture, showing clover to be a boon for farmers hoping to provide early grass to their livestock.⁴⁷ Though pastures received little fertiliser before the 1960s, those farmers that did fertilise their pastures used primarily phosphorus fertilisers to stimulate the growth of clover which would in turn supply nitrogen for the rest of the pasture.⁴⁸

As nitrogen fertiliser became more readily available and cheaper in the postwar period, artificial nitrogen would seem to be an easy choice for the farmer looking to generate more grassland biomass and carry more livestock, supplementing the nutrients already provided by clover. However, as the researchers at the Warrenstown symposium pointed out on several occasions, the application of nitrogen fertiliser was shown to have an adverse effect on the success of clover, meaning that the increases in biomass that could be gained from the use of artificial nitrogen would be tempered by the resulting depression of clover growth. This effect was shown to be proportional to the amount of clover in the sward, with a clover-rich sward seeing much less benefit from the use of artificial fertiliser compared to a more grass-dominated sward given the same treatment.⁴⁹ Additionally, AFT researcher Eilish Conroy published an article in 1961 which

⁴⁴ Thomas Walsh, 'The Role of Fertilisers in Increasing Agricultural Production in Ireland', in *Scientific Papers: Dr. Tom Walsh 1941-1956*, vol. 2 (Cracow, 1964), 9.

⁴⁵ Quill, Luke, Diogo Ferreira, Brian Joyce, et al. 'An Integrated Mitigation Approach to Diffuse Agricultural Water Pollution—a Scoping Review'. *Frontiers in Environmental Science* 12 (September 2024), 7-8.

⁴⁶ *Telefís Feirme*, episode 22, 'Making the Most of Grass', with Justin Keating, aired 15 March 1966, on Raidió Teilifís Éireann, RTE Archives.

⁴⁷ Roger J. McCarrick, 'Considerations in Conservation and Feeding of Silage', in *Proceedings of Seminar on Livestock Production* (An Foras Talúntais, 1960), 3.

⁴⁸ Walsh, 'The Role of Fertilisers in Increasing Agricultural Production in Ireland', 9.

⁴⁹ Aidan Conway, 'Production from Grass', in *Proceedings of Seminar on Livestock Production* (An Foras Talúntais, 1960). 2-5.; McCarrick, 'Conservation and Feeding of Silage', 2.

found that pasture grass heavily dosed with ammonium sulphate fertiliser, eight cwt/ha and above, was less palatable to cows due to increased sulphur in the grass.⁵⁰ This reduced palatability offset the biomass increases in grass by the fact that cattle were eating less.

This demonstrates the entanglement of agency within the pasture assemblage, in which an addition of nitrogen fertiliser by humans was only one in a series of actions and interactions in the system. In the nitrogen-abundant state created through the addition of artificial fertiliser, clover does not need to seek out its bacterial companions and its nitrogen fixation slows. When fertiliser makes grass too sulfuric for cattle to find it tasty, they will eat less of it even if it grows in abundance. Grass cannot simply be a raw material whose abundance is controlled by a single lever like fertiliser, just as cows are not simply machines that turn cellulose into steak. In his Cracow talk, Tom Walsh referred to this entanglement as the “pasture-fertiliser-use-stocking-rate complex,” saying that “optimum use of fertiliser is related to optimum stocking density involving an ecological complex related not only to fertiliser use and system of grazing but to soil type and climate.”⁵¹ Walsh and other AFT researchers acknowledged these complications and interactions as their research explored them, but these observations changed when put in the context of the state’s expansionist efforts. Writing in *Farm Research News*, An Foras Talúntais scientist Maurice Walsh depicted the difference in sources of nitrogen as a matter of state policy, saying “New Zealand depends almost entirely on clover, while most Netherlands farmers use only nitrogen. Britain and the Six Counties [of Northern Ireland] use both, but with an emphasis on artificial nitrogen.”⁵² Just as with the advent of Irish soil science, the scientific study of Ireland’s pastures recast them as part of a global laboratory. This portrayed the ecological dynamics of clover and fertiliser as contingent on national preferences, the clover-based system of postcolonial New Zealand system, the modern fertiliser-reliant Dutch, or the Northern Irish system caught somewhere between. The varying soils or climates of these places do not come into discussion, instead the complexity of the “pasture-fertiliser-use-stocking-rate complex” is simplified as a political and economic choice between interchangeable methods of growing biomass.

McCarrick’s silage research presented at the Warrenstown seminar had a similarly reductive thrust. Despite the acknowledgement of ecological complications like legume nitrogen, his paper presented the agricultural system as several discrete variables that farmers could adjust in order to influence the quality and abundance of a silage crop, with equal weight given to the

⁵⁰ Eilish Conroy, ‘Effects of Heavy Applications of Nitrogen on the Composition of Herbage’, *Irish Journal of Agricultural Research* 1, no. 1 (1961): 69-71.

⁵¹ Walsh, ‘The Role of Fertilisers in Increasing Agricultural Production in Ireland’, 8.

⁵² Walsh, ‘Moorepark, The National Dairying Research Centre’, 6.

mechanisms of silage preservation and the ecological functioning of the pasture itself. McCarrick's comparison of the discrete variations in methods of preserving silage functioned as a Taylorist, discussion of efficiencies. McCarrick showcased studies on the effects of different additives like molasses, formic acid, and Sodium-Meta-Bi-Sulphite on the fermentation and preservation of the silage, the impacts of either chopping or lacerating silage before ensiling on the preservation of starch and ease of feeding, and other factors like how long grass is left to wilt and how densely silage is packed together.⁵³ This focus on several small variables reimaged the farm as a tightly controlled laboratory where the farmer, like the agricultural researcher, is focused on using cutting-edge research to make small tweaks to equipment and process to incrementally increase the efficiency of the pasture biomass conversion process.

This same drive for efficiency and control was also present in McCarrick's discussion of the ecological variables influencing the growth of grass for pasture: the composition of species within the sward, the provision of adequate nitrogen, and the maturity of the grass when it is harvested.⁵⁴ Though the paper acknowledged a lesser degree of control within ecological systems than in the processing of silage, its recommendations consisted of different ways to reduce uncertainty and make the pasture more precisely controllable. McCarrick both wrote that "the most desirable stage of maturity at which herbage should be harvested varies from farm to farm depending on the type of stock to which is to be fed" and cited studies from Norway, England, and Ireland showing that crude protein can be optimised by cutting grass just as the seed-head emerges and that "no advantage is obtained by allowing the grass crop to become overmature before harvesting."⁵⁵ McCarrick similarly recommended tight management of species diversity in fields cut for silage, as swards with a high proportion of weeds rushes, sedges, and yellow flag result in lower digestibility than those "containing a high proportion of the better species of grasses and clovers."⁵⁶ This recommendation in particular divorced pasture species entirely from the context of their pasture ecology, reducing their opportunities to act in any way other than as inputs for the system of livestock production.

McCarrick's discussion on the trade-offs between clover and nitrogen fertiliser at the Warrenstown symposium similarly acknowledged uncertainty while striving for its reduction. The paper presented the first year's results of a study by An Foras Talúntais where different amounts of ammonia nitrogen were applied to sections of "an old permanent pasture dominated by clover"

⁵³ McCarrick, 'Conservation and Feeding of Silage', 4-8.

⁵⁴ Ibid, 1-3.

⁵⁵ Ibid, 2-3.

⁵⁶ Ibid, 1.

and a modern grassland in the form of “a three-year-old ley” planted with perennial ryegrass, timothy grass, and white clover. The experiment resulted in dry matter yield from both swards, with a greater response from the three-year-old ley and only a small increase in crude protein from the clover-dominated pasture “due to clover depression by Nitrogen.” McCarrick’s conclusion in this early stage of the experiment was that “it does appear that Nitrogen might be a useful tool for increasing yields of silage and hay from less fertile meadows.”⁵⁷

This understanding was reflected in other research and educational materials like *Telefis Feirme*’s 1966 programme ‘Making the Most out of Grass,’ which addressed the complexity of grassland ecology and nutrient dynamics while making concrete recommendations as to how nitrogen fertiliser can be used, even in clover-rich pastures. The programme acknowledged that clover “will take quite a lot of nitrogen from the air and feed it to the grass,” and tailored its artificial fertiliser recommendations to times when clover is less active. This includes extending the season earlier, before clover has the chance to start growing, in leys reserved for silage, where taller grasses shade out clover and reduce its productivity, and in pastures with little clover.⁵⁸

Rhetorically, Roger McCarrick’s framing of AFT research into silage in the Warrenstown talk echoed the ‘new modern European’ vs ‘old agrarian colonial’ dynamic brought to light by Edgerton and Gupta. The clover nitrogen which Tom Walsh praised in Cracow as capable of sustaining Irish agriculture through the Emergency surfaced in the nitrogen experiment as the “old permanent pasture,” workable but resistant to the industrial input of nitrogen fertiliser. The three-year-old ryegrass and timothy dominated ley, in contrast, was easily manipulated and responded eagerly to fertilisers industrial input. Maurice Walshe’s international framing of these different systems for *Farm Research News* also reflects this dynamic. The fertiliser-reliant Netherlands served as the pinnacle of modern European industrial farming while the clover-dependent New Zealand represented another small agrarian postcolonial state. In the context of the Lemass era, the Netherlands and other intensive European agricultural systems represented the future the Irish state strove for while New Zealand represented the agrarian puddles of the past it sought to leave behind. While Walsh describes the six counties in the North as stable, possibly stuck, in a part-clover-part-fertiliser mix of nitrogen, the Republic’s pastures are implied to be incomplete and full of modern possibilities.

This research and rhetoric surrounding clover is also interesting in the context of Tsing’s ideas of salvage accumulation. McCarrick, Walshe and other scientists consistently acknowledged the benefit Ireland’s economy gained from the free work of clover within the permanent pasture

⁵⁷ Ibid, 2.

⁵⁸ *Telefis Feirme*, ‘Making the Most of Grass’.

assemblage. But in the context of McCarrick's efforts to increase efficiency within pasture husbandry systems through silage, the resistance of clover to the addition of fertiliser nitrogen re-enacts its entanglement within Irish pastures as a hindrance to Ireland's efforts to ratchet up stocking rates. While the work of AFT sought to reinvent and modernise Ireland's grassland, the reliance on and benefit from the preexisting ecology of its pastures kept one foot in its extensive agrarian past.

Through their public-facing publications like *Farm Research News*, AFT made the case for farmers to adopt silage as a way to grow their own profits and contribute to the Lemass government's industrious expansion programme. As demonstrated by the proceedings of the Warrenstown seminar, the research behind this transition to silage-making, though aware of the larger complications within the agri-environmental pasture assemblage, was also shaped by this expansionist effort in its use of nitrogen fertiliser as a bridge to a more efficient and scientifically managed farming sector in Ireland.

IV. Silage Ecology

Silage is deeply embedded in a network of technologies which farmers were encouraged to adopt in order to achieve higher stocking rates. An example of what this kind of industrial silage operation had evolved into by the mid-1970s was provided by AFT Moorepark researcher Pat McFeely in a 1974 issue of the *Irish Farmers Journal*.⁵⁹ According to McFeely's research, cows on a well-drained farm should be let out to pasture in the first half of March. Pasture should be stocked at a rate of 1.25 livestock units per acre and divided up into twenty paddocks, each grazed for a single day. In mid-April, after two rotations around all of the paddocks, nine of these paddocks were to be closed for silage and immediately fertilised with artificial nitrogen. With livestock sequestered to the remaining eleven paddocks during the season when grass is growing more quickly, the silage grass would be tall enough to cut in early June. After cutting, six of the silage paddocks were to be fertilised a second time in order for a second cut to be taken in the end of July. Livestock would be rotated around the remaining paddocks to graze. The system was intended to provide enough winter feed to take livestock out of the field by the end of November, giving the grass enough time to recover for early March grazing in the following year (Fig. 2.4 and 2.5).

⁵⁹ Pat McFeely, 'Spring Grassland Management in the Dairy Herd', *Irish Farmers Journal* (Dublin), 25 May 1974, 32-3.

Diagram 1. Sequence of paddock grazing on dry land when grazing is begun on 10 March; paddocks 12-20 are intended for silage.

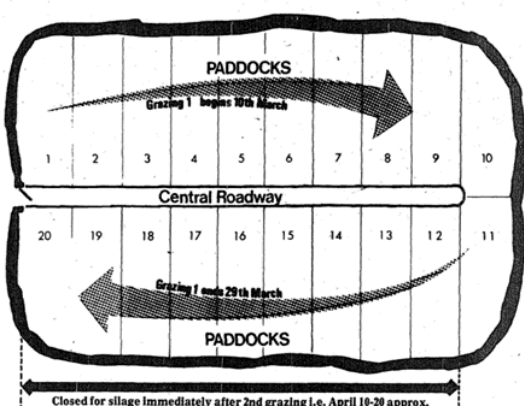


TABLE 1. Effect of time of first grazing on grass growth; mean of three years' results.

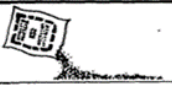
				
	Date of grazing	Yield of grass at 1st grazing (lb. DM/acre)	Total grass production to mid-June (lb. DM/acre)	
No. N Fertilizer	8 March 29 March 19 April	550 800 1725	4400 4200 4600	
40 lb. N/acre per grazing	8 March 29 March 19 April	775 1375 3050	7000 7250 7225	

Figure 2.4:(left): Diagram showing the division of pasture into paddocks and the proportion that should be closed for silage Source: Pat McFeely, 'Spring Grassland Management', 33.

Figure 2.5: (right): Table showing the large positive impact of fertilising on grass yields in contrast to the negligible negative impact on grass yields of allowing cows out to graze earlier in the year. Source: Pat McFeely, 'Spring Grassland Management', 33.

This regimented system of rotation makes the Taylorist formulation of Irish pasture even more apparent, with a field divided into evenly sized and ecologically indistinguishable paddocks through which livestock are rotated daily as if on an assembly line, the rotation timed to give each paddock the most efficient recovery time possible before being grazed again. Fertiliser was not mentioned as a way to boost grass early in the season, but McFeely recommended fertilising each paddock with nitrogen after each grazing and silage cut. Most notably, the article gave no consideration to clover, either in its potential depression by application of artificial nitrogen or in consideration as to which paddocks may need more or less fertiliser to compensate for a lack of clover. In this ideal pasture system of the mid 1970s, nitrogen fertiliser seemed the only source of nitrogen worth mentioning.

The introduction of silage and accompanying increase in fertiliser use sought to reshape the entire Irish pasture assemblage, not only the practices of farmers but the ecology itself. Just as AFT research showed clover to modify its nitrogen-fixing behaviour during different parts of the year and at different baseline levels of nitrogen, other pasture plants also responded differently to different levels of nutrients, moisture, disruption through grazing or cutting, and other factors. Similar to AFT scientists differentiating "good grassland" from "old permanent pasture" in *Farm Research News*, the way *Telefís Feirme* discussed its underlying research emphasised that raising productive healthy animals required growing "good grass grazed at the right stage of growth."⁶⁰

⁶⁰ *Telefís Feirme*, 'Making the Most of Grass', 1. Emphasis in original.

As discussed earlier, this optimal stage of growth was seen to be when the seed-head just begins to emerge and grass's protein rates are highest.

The gold standard of “good grass” advocated for by the programme was perennial ryegrass, and agricultural researchers and educators sought to reshape the pasture assemblage around its particular behaviour. As John Feehan shows in *Farming in Ireland*, ryegrass is competitive in high-nutrient environments, meaning that it is excellent at turning abundant soil nutrients, particularly nitrogen, into biomass more quickly than other grasses and therefore dominating nutrient-rich pastures. Conversely, ryegrass is much less competitive in lower-nutrient environments where it struggles to compete against other plants that are able to make more efficient use of scarce nutrients.⁶¹ Thus, *Telefis Feirme* linked fertiliser and ryegrass as a productive pairing. As part of their episode on “making the most of grass” the programme described a neglected field as “acid and low fertility permitting only poor grasses, and practically no clover. Very weedy.”⁶² Dressing the field with fertiliser and lime allowed “ryegrass and clover [to grow] strongly and gradually [smother] out the poor grasses and weeds.” But the episode's accompanying booklet warned that if fertilisation was stopped, the ryegrass and clover would die out, leading the field to revert back to its original composition.⁶³ In some cases, this increase in fertiliser would suffice to completely change the composition of a pasture, but if ryegrass wasn't present in the existing vegetation, the sward needed to be tilled under and reseeded with ryegrass to increase its productivity.

Through Law and Mol's lens, *Telefis Feirme*'s materials socially enact grass as a producer of biomass. What makes a grass species ‘good’ is that its ability to grow biomass responds predictably to human interventions in fertility and moisture. Perennial ryegrass has high digestibility, meaning that a larger proportion of its plant biomass will be converted into animal biomass, and it withstands repeated cutting and trampling, meaning that it can tolerate high animal stocking rates and the several series of cuts taken for silage.⁶⁴ In addition to its difficulty in low-nutrient environments, perennial ryegrass also struggles with water stress, meaning that if a field is too wet or too dry, a ryegrass sward will suffer.⁶⁵ These behaviours make ryegrass particular about its conditions, but predictably controlled when those conditions are met.

The positive response of ryegrass to human interventions like well-drained fields and high levels of nitrogen fertiliser made it the optimal candidate for the ‘good grassland’ of a modern pasture system. In contrast to ryegrass's growing prominence, clover was steadily de-emphasised

⁶¹ Feehan, *Farming in Ireland*, 397.

⁶² *Telefis Feirme*, ‘Making the Most of Grass’, 5.

⁶³ Ibid.

⁶⁴ Feehan, *Farming in Ireland*, 397.

⁶⁵ Ibid, 395.

as a provider of nitrogen in research and educational materials throughout the 1960s and 1970s as indicated by its absence in McFeely's article for the *Irish Farmers Journal*. As pointed out in 'Making the Most of Grass', clover was less effective when shaded out by the taller grasses of leys used for hay or silage, making the nitrogen-fixing capacity of clover less useful to a farmer whose high stocking rate required them to take two or three cuts of silage each year.⁶⁶ A farmer could achieve greater, more precise, and more immediate production from a silage ley by emphasising the growth of ryegrass and top-dressing the field with nitrogen fertiliser after each cut than by relying on the seemingly fickle production of clover. While ryegrass responded well to artificial fertiliser with increased biomass, clover reduced its presence in fields already abundant in nitrogen. These contrasting reactions to human intervention created a kind of feedback within the pasture assemblage, where the dominance of ryegrass and the reduction of clover and other species led to a greater need for artificial fertiliser and an overall reduction of pasture biodiversity in favour of increased biomass.

This ecological weeding out of the pasture assemblage by the combined practices of silage and nitrogen fertiliser was not limited to clover. As Feehan writes, there is a spectrum of grasses, legumes, and other species that compete and collaborate in a pasture ecosystem depending on levels of nutrients, moisture, and soil composition. A multi-species sward may have a less direct input-output relationship in terms of increasing productivity, but the diversity of the sward gives it additional resilience in the face of variable climate and external impacts.⁶⁷ The shift from a haymaking regime of winter feeding to a silage regime intensified these impacts. A permanent hay meadow is a relatively low-nutrient ecosystem, but that lack of easily available nutrients forces its plant species to rely on one another and the larger assemblage of birds, and insects, humans, cattle, and sheep to keep nutrients moving through the ecosystem. Since silage is cut when the plants are too young to flower, pollinators are robbed of food, as are birds and other species that rely on tall mature grass for camouflage, nesting, or foraging. Feehan pays special homage to the corncrake, its song "missing from the symphony of summer's sounds," with the disappearance of its anthropogenic haymeadow habitat.⁶⁸ In his book *The Moth Snowstorm* Michael McCarthy adds to the list of casualties in his native British countryside the moths and abundant insects of the hay meadow along with the corn buntings, quail, and whinchats whose insect food source and nests are destroyed in the earlier cutting schedule of ryegrass silage.⁶⁹

⁶⁶ *Telefís Feirme*, 'Making the Most of Grass', 2.

⁶⁷ Ibid.

⁶⁸ Ibid, 222.

⁶⁹ Michael McCarthy, *The Moth Snowstorm* (2015), 74.

McCarthy also points to the dependence of horses, which lack the multi-stomach digestive systems of ruminants, on hay rather than the silage “gunk that cows find perfectly acceptable.”⁷⁰ It is no surprise then that Ireland’s agricultural horse population diminished in step with the adoption of silage, falling from an already small 158,400 in 1966 to only 68,500 in 1983, while cattle numbers skyrocketed during the same period.⁷¹ The Irish transition away from horses meant that horse trading and fairs, a regular interface between settled and Traveller communities, were reduced in prominence, as discussed by Aoife Bhreatnach in her book *Becoming Conspicuous*.⁷² The reduced labour provided by horses was replaced by a greater reliance on tractors, leading to a network of subsequent changes to the organisation of space, time, and energy on the farm, as explored in the American context by Deborah Kay Fitzgerald in her book *Every Farm a Factory*.⁷³

In this larger context, the switch from hay to silage was not only a technological shift, but a reorganisation and vast simplification of the entire more-than-human assemblage of actors connected to Irish agriculture. This transition not only streamlined the ecology of permanent pastures to an almost monocultural system of fertiliser-dependent ryegrass with some participation from white clover, but threatened the haymeadow habitats of pollinating insects and birds and diminished the cultural and labour significance of agricultural horses.

In contrast to the input-dependent alienation brought about by the introduction of the British high-farming system to tillage farming, Ireland pasture assemblage remained largely intact during the nineteenth century. As noted by Tom Walsh and others in the early days of the National Soil Survey, these intact permanent pastures had been able to weather the economic shock of The Emergency due to the consistent contribution of nitrogen by clover. Silage and its quasi-monocultural dependence on ryegrass and external input of nitrogen fertiliser represents the expansion of the metabolic rift into the pasture ecosystem. This meant a continuous robbery of soil fertility through the regular intensive removal of biomass in the form of multiple silage cuts per year to feed higher numbers of animals, making the pasture’s alienated ecology dependent on external inputs of fertiliser nitrogen.⁷⁴ As Eamonn Slater and Eoin Flaherty point out in their paper on Marx’s assessment of Irish famine and emigration, the metabolic rift of colonial capitalism not only robbed the soil of its ability to sustain and reproduce itself, but robbed human populations of their ability to sustain themselves and reproduce as a community.⁷⁵ The following sections expand

⁷⁰ Ibid, 73.

⁷¹ *Irish Agriculture in Figures, 1977*, Irish Agriculture in Figures (An Foras Talúntais, 1977); *Irish Agriculture in Figures, 1983*, Irish Agriculture in Figures (An Foras Talúntais, 1983).

⁷² Bhreatnach, *Becoming Conspicuous*, 21.

⁷³ Fitzgerald, *Every Farm a Factory*.

⁷⁴ Foster and Clark, *The Robbery of Nature*, 3-5.

⁷⁵ Slater and Flaherty, ‘Marx on the Reciprocal Interconnections between the Soil and the Human Body’, 623-627.

beyond the detailed understanding of silage making's impact on the more-than-human assemblage of Irish pastures to explore how silage-making was taught and promoted to farmers and the effect of the metabolic rift on Irish farm communities.

V. Expansionist Education: *Telefís Feirme*

Until this point, this thesis has primarily centred on the formation of Ireland's agricultural imaginary through the interweaving of An Foras Talúntais research with the expansionist economic goals of the postwar Lemass government. As discussed in the previous chapter, AFT was established to reshape agricultural expertise through the lens of scientific research. But in order to actually change farmers' practices and reify the postwar agricultural imaginary they created, the work of these scientists had to be communicated and taught to farmers efficiently and persuasively. In the mid-1960s, the effort to educate farmers arose through a network of institutions: the Agricultural Advisory Service, agricultural colleges like the Salesian College in Warrenstown where McCarrick spoke, and, in a small part, Teilifís Éireann's broadcast of agricultural education lessons under the banner of *Telefís Feirme* or 'farm television.'

Telefís Feirme was an early experiment in tele-education by Teilifís Éireann, the Irish national television broadcaster established in 1961 and now known as Raidió Teilifís Éireann or RTÉ. From its outset, RTÉ was well connected to other government departments including the Department of Agriculture, though the government and the newly formed broadcasting service did not necessarily see eye-to-eye on every issue. In 1966, Director-General of Teilifís Éireann Kevin C. McCourt and Minister for Agriculture Charles Haughey exchanged a series of letters and calls regarding Minister Haughey's discomfort with the way the department's agricultural policies would be portrayed in a planned episode of the television programme *Division*.⁷⁶ Though Haughey's did not succeed in changing RTÉ's portrayal of his department's policies, the organisations maintained a friendly working relationship throughout the interaction. Director McCourt's summary of one such meeting between himself, the Minister, and party whip Michael Carty reads: "The atmosphere was affable, Christian-name basis, very easy."⁷⁷

Telefís Feirme was the result of this close relationship between RTÉ, the Department of Agriculture, and the research expertise of AFT. The programme was the project of veterinarian, Labour Party politician, and editor of Teilifís Éireann's agricultural programming Justin Keating, who designed the programme to bring the latest research and best practices to farmers around the country. The programme ran for two seasons from October to March between 1965 and 1967, with

⁷⁶ Kevin C. McCourt, 'Memo', Memo, 14 October 1966, RTÉ Archives.

⁷⁷ Kevin C. McCourt, 'Private and Confidential Memo', Memo, 12 October 1966, RTÉ Archives.

additional seasons focused on different specialisations such as milk, beef, and sheep broadcast periodically throughout the following three years. Household televisions were rare during this time and the program was not intended to be viewed in the home. Instead the Department of Agriculture rented televisions to be set up in the local meeting places of rural community organisations like Macra na Feirme and Muintir na Tíre in order for farmers to watch the programme together.⁷⁸ The close partnership with Macra na Feirme implies that a large proportion of viewers would have been young farmers, but the viewing groups were open to all and discussion of broadcast content certainly spilled out beyond these groups.⁷⁹ To advertise the series, RTÉ posted weekly notices in the *Irish Farmers' Journal* with descriptions of the week's topic and the instruction to "cut this out and bring it to your group meetings with you" (Fig. 2.6).⁸⁰

⁷⁸ 'Telefis Feirme: More Groups Needed', *Irish Farmers Journal* (Dublin), 2 October 1965, 1.

⁷⁹ 'Macra Tie-up with T.V. Programmes', *Irish Farmers Journal* (Dublin), 8 May 1965, 32

⁸⁰ 'Group Notes for No. 2', *Irish Farmers Journal* (Dublin), 23 October 1965, 6.

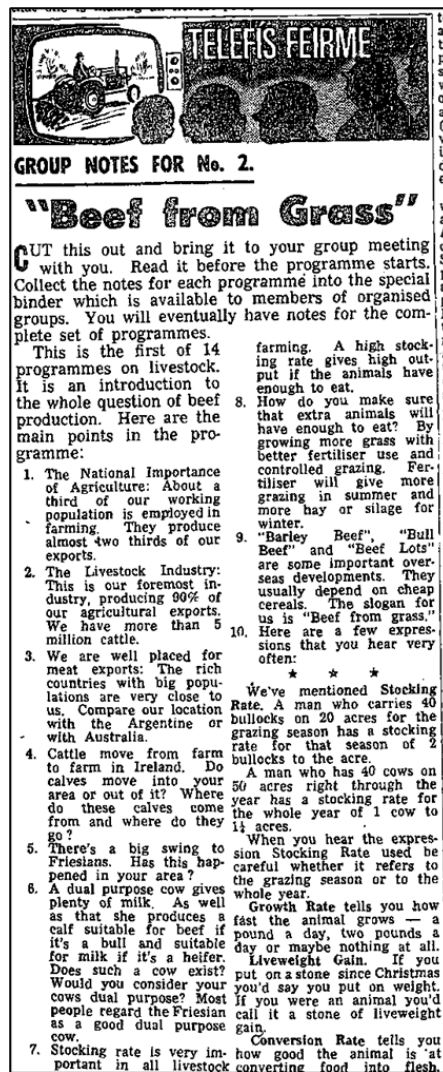


Figure 2.6: Group notes from the second episode of *Telefis Feirme* printed in the *Irish Farmers Journal*. Participants were instructed to cut these out and keep them in a special *Telefis Feirme* folder given to them by their group leader. Source: *Irish Farmers Journal*, 'Group Notes for No. 2', 6.

With these partnerships, 110 groups were set up in advance across the country for farmers to gather at 7:45 pm each Tuesday during the winter to watch the programme, bringing their cut-out *Farmers Journal* pages in special folders provided by "a major Company interested in Agriculture" along with notes taken during the session.⁸¹ While archival material does not make it clear how well these sessions were attended, the institutional collaborations themselves represents a significant organisational effort to teach farmers modern farm practices. Justin Keating, in addition to being the architect of the programme, was also its presenter, issuing instructions on how to properly tune the television set before walking through the latest research from An Foras

⁸¹ *Telefis Feirme*, episode 1, 'Introduction', with Justin Keating, aired 12 October 1965, on Raidió Teilifís Éireann, RTE Archives. 2-4.

Talúntais and highlighting exceptionally productive farms, assisted by illustrations and animations by Gerrit Van Gelderen (Fig. 2.8). Following the broadcast, each group's leader, armed with an additional booklet provided by RTÉ, would lead a discussion on the night's themes and was prompted to report back to local agricultural advisers to give them an idea of the concerns of local farmers.⁸²

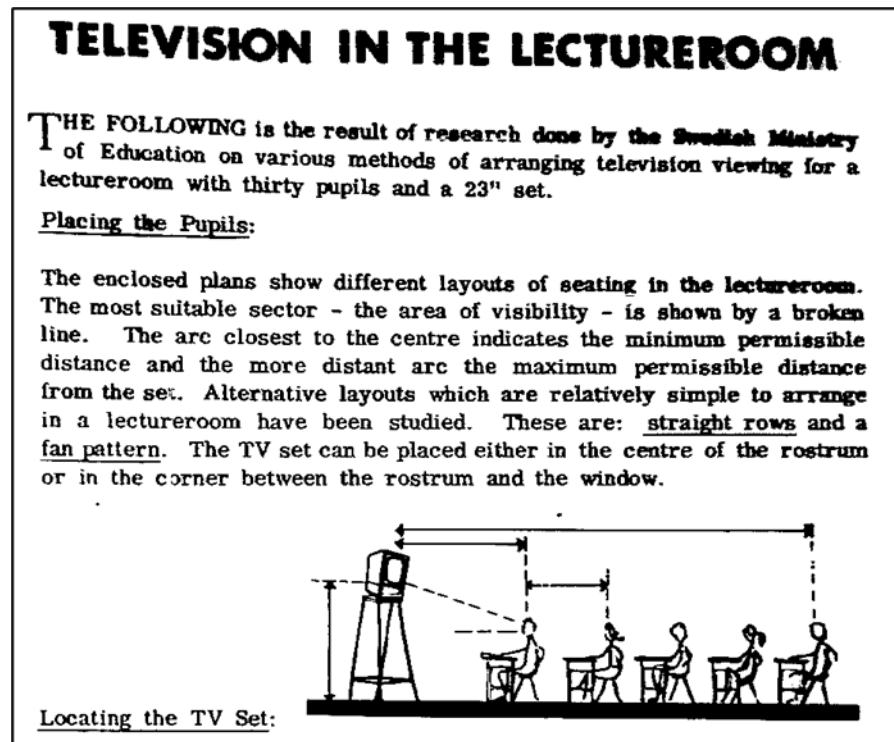


Figure 2.7: Diagram showing optimum TV set positioning included in the first group leader booklet for *Telefis Feirme*. Source: *Telefis Feirme*, 'Introduction'.

Telefis Feirme was not the only or even most widespread form of agricultural education available to farmers during the 1960s, but the story of *Telefis Feirme* is more than a colourful case-study of the futurist fantasy of tele-education that accompanied the early days of the technology's wide-spread adoption. The wide-ranging and expensive collaboration that brought *Telefis Feirme* into farm communities demonstrates the incredible amount of time and resources devoted to educating farmers and modernising their practices in the postwar period. The fact that Teilifis Éireann was able to collaborate with the Department of Agriculture, Macra na Feirme, the *Irish Farmers Journal*, An Foras Talúntais, local agricultural advisers, and a "major Company interested in Agriculture" to provide everything from folders and televisions to ad-hoc classroom space and educators demonstrates that Ireland's contemporary agricultural system did not emerge

⁸² Ó Fathartaigh, *Developing Rural Ireland*, 295.; *Telefis Feirme*, 'Introduction', 2-4.

organically, but was the result of intensive and wide-ranging efforts across a multitude of public and private organisations. By examining the group leaders' booklets and archived recordings of the programme as well as the responses to its messages in the *Irish Farmers Journal*, it becomes clear that *Telefís Feirme* was representative of the attitude of government supported agricultural training throughout the 1960s and 1970s.

The demographic profile of Irish farms was in flux during these decades, as smaller farms with fewer livestock left the sector in the greatest numbers. Over the same period, the aggregate stocking rate of Irish farms was skyrocketing, with the total number of cattle in Ireland increasing from 4.7 million in 1960 to 7.1 million in 1978.⁸³ Though a significant number of small farmers were going out of business, their loss in productivity was more than made up for by further intensification of the largest farms. This intensification is reflected in one of the most commonly recurring arguments within *Telefís Feirme's* programming, the need to increase stocking rates. Agricultural guidance from the 1960s generally encouraged a stocking rate of between one and 1.25 livestock units, the equivalent of one dairy cow or five sheep, on each acre.⁸⁴ This number reflects the higher plastic carrying capacity enabled by nitrogen fertiliser, which was higher than the highest stocking rate depicted on the grazing capacity map for Co. Kerry assembled by An Foras Talúntais (Fig. 2.2). Over and over in its broadcasts and accompanying materials, *Telefís Feirme* emphasised the importance of increasing stocking rates to both the continuing profit of the farmer and the well-being of the Irish state. Graphics like Figure 2.3 above, showing the need to stock higher numbers on small plots of land, reappear consistently, often accompanied by pointed questions in Keating's tough-love coaching style:

IS YOUR LAND HEAVILY STOCKED?

COULD IT CARRY MORE?

HOW MUCH MORE?

IF YOU DON'T FERTILISE TO THE MAXIMUM, YOU DON'T KNOW THE
CARRYING CAPACITY?⁸⁵

⁸³ *Irish Agriculture in Figures, 1973*, Irish Agriculture in Figures (An Foras Talúntais, 1974); *Irish Agriculture in Figures, 1977*; *Irish Agriculture in Figures, 1983*.

⁸⁴ *Telefís Feirme*, 'Making the Most of Grass'; *Telefís Feirme*, episode 25, 'Introduction to the Second Series', with Justin Keating, Raidió Teilifís Éireann, 11 October 1966, RTE Archives; Thomas Walsh, 'Developing a Basis for Fertiliser Use', in *Scientific Papers Dr. Tom Walsh*, vol. 2 (Tom Walsh Memorial Publication Committee, 1967); Browne, 'Milk Matters'; *Fertiliser Manual* (An Foras Talúntais, 1970).

⁸⁵ *Telefís Feirme*, 'Making the Most of Grass'.

As explored in the previous section, the idea of carrying capacity held a particular modernist meaning within animal husbandry operations, amending certain environmental variables, whether that be precipitation or soil nutrients, to increase the ability of a system to support animals. But in the popular imagination of the Cold War 1960s, the idea of carrying capacity had a different association, that of anxiety around food and resource scarcity for the global population. This anxiety was popularised by texts like Anne and Paul Ehrlich's 1968 book *The Population Bomb*, the Club of Rome's 1972 publication *Limits to Growth*, and Garret Hardin's 1968 *Tragedy of The Commons* article.⁸⁶ In their book on the history of ideas of scarcity, Carl Wennerlind and Fredrik Albritton Jonsson write that these texts represent a particular neo-Malthusian offshoot of a larger anxiety around planetary limits triggered by resource extraction and industrial intensification throughout the Cold War.⁸⁷

Edgerton's idea that the unaligned nations of the so-called 'Third World' occupy a kind of past characterised by national poverty and 'underdevelopment' clarifies this anxiety.⁸⁸ Within this neo-Malthusian vision, poor nations, the unsophisticated and technologically primitive, represent the burden of the human race on the planet, the Earth's human carrying capacity. Rich nations, on the other hand, are associated with technological advancement, technology that allows them to simultaneously push out and continuously pursue the carrying capacities of agricultural systems. This technological production is not characterised as extractive but efficiently abundant, so successful that rich nations are able to grow enough food for themselves as well as the global poor. In addition to embodying Cold War anxiety, as Nick Cullather demonstrates in *The Hungry World*, this neo-Malthusian idea also exactly expresses Walter Mignolo's colonial matrix of power.⁸⁹ There is a racialisation in portraying the primarily non-white postcolonial nations as relics of a primitive past while developed, primarily white, nations are seen as technologically sophisticated and progressive. This technological hierarchy itself comes from a supposed mastery over a constructed nature, the ability to define and increase carrying capacity. There is even a gender hierarchy within this dynamic, with women contributing significantly to agricultural labour within the Global South, whereas agriculture and, especially, agricultural expertise are seen as a masculine field, clearly demonstrated by the demographics of Irish researchers, politicians, and farmers

⁸⁶ Paul Ehrlich and Anne Ehrlich, *The Population Bomb* (New York, Ballantine Books, 1968); Donella H. Meadows et al., *The Limits to Growth; a Report for the Club of Rome's Project on the Predicament of Mankind* (Universe Books, 1972); Garrett Hardin, 'The Tragedy of the Commons', *Science* 162, no. 3859 (1968): 1243–48.

⁸⁷ Fredrik Albritton Jonsson and Carl Wennerlind, *Scarcity* (Harvard University Press, 2023), 219–20.

⁸⁸ Edgerton, *The Shock of the Old*, 64.

⁸⁹ Nick Cullather, *The Hungry World: America's Cold War Battle against Poverty in Asia* (Harvard University Press, 2010); Mignolo and Walsh, *On Decoloniality*, 153–164.

appearing in this thesis.⁹⁰ The ugly truth of this Cold War bifurcation of carrying capacity is that an extra cow in a rich country is seen as a boon, whereas an extra human in a poor country is a burden.

Through its ready pursuit of technological advancement and equipped with Marshall Plan-funded research, the Lemass government attempted to associate Ireland with the rich exporting nations of Europe, as shown above in the discussion of the industrial framing of silage by An Foras Talúntais's researchers. This was despite the fact that Ireland remained an economically poor nation which, in spite of its military neutrality, had felt the difficulty of food scarcity as recently as the tillage quotas of the Emergency. AFT research clearly demonstrated diminishing productivity returns to nitrogen applications above a certain point, eventually even making the grass unpalatable to cattle.⁹¹ But educational sources like *Telefís Feirme* adhered to the plastic technological idea of carrying capacity enabled by nitrogen's materiality as a rhetorical device, something farmers must continually strive for and expand upward. In this construction, the amount of land itself was immaterial to the success of the farm. Instead, practices like silage, fertilisation, and efficient farm layouts that increased the plastic technological carrying capacity of the farm were shown as the way to survival and profitability. The most immediate upper limit to the land's productivity was not the land itself but the limit of financing farmers could devote to these forms of capital investment.

The idea of a plastic technological carrying capacity connected the decisions and investments of individual farmers to the national paradigm of economic expansion, where the land itself was seen to reflect the continuous and theoretically infinite expansion of the Irish economy.⁹² *Telefís Feirme*'s first episode began with two figures presented by economist Louis Smith: the agricultural output from 1960, £193 million, and a targeted figure for 1970 of £270 million. This figure was broken down per farmer, first financially: "for every £100 a farmer made in 1960 he is expected to make £140 by 1970" and then in terms of livestock: "If you have nine cows now can you carry twelve in 1970? For most farms the answer is 'Yes and more.'"⁹³ The farmer's job was to expand production, and the tone of the television programme was to prod them along with new tools and kind words. In order to achieve these production increases, *Telefís Feirme* encouraged farmers to make use of the Agricultural Credit Corporation and Cooperative pricing for inputs like

⁹⁰ Cheryl Doss and Charles Gottlieb, 'Gendered Patterns of Labor in Agriculture', *Agricultural Economics* 56, no. 3 (2025): 431–45.

⁹¹ Conroy, 'Effects of Heavy Applications of Nitrogen on the Composition of Herbage'.

⁹² Matthias Schmelzer, *The Hegemony of Growth: The OECD and the Making of the Economic Growth Paradigm* (Cambridge University Press, 2016), 12.

⁹³ *Telefís Feirme*, 'Introduction', 2–3.

fertiliser in order to expand their financial limits and, by extension, increase production in their own and the nation's interest:

INTENSIVE FARMING = HIGH INVESTMENT FARMING

We borrow less than almost any other Western European farmers. However there has been a big rise in borrowing for farm investment in recent years. (Let's not talk about the present Credit Squeeze Now)

If you borrow you try to invest in enterprises that will give a quick return - money producing items as far as possible.

• Fertiliser increases yields very quickly. • Cash crops return money after 6 months, often less. • Stock return money reasonably quickly. • A cow in milk will begin returning money at the end of the month.	• Buildings are not in themselves money producers. • Machinery is not in itself a money producer. • You can't avoid spending money here, but remember it has to be earned on the other side of the page.”⁹⁴

As demonstrated in the above passage, *Telefis Feirme* acknowledged difficulties like the “credit squeeze” in obtaining capital for these infrastructural investments but did not portray them as a valid explanation as to why Irish farmers borrowed less than other European farmers. The programme instead encouraged farmers to invest in smaller and more ‘liquid’ purchases like livestock and fertiliser to achieve a quick financial turnaround instead of making long-term capital investments like animal housing or a milking parlour that would allow farmers to access more lucrative markets.⁹⁵ Instead of acknowledging the difficulty in accessing capital, the lack of borrowing by Irish farmers was itself determined to be the problem. As in the image below, printed in the group leaders’ pamphlet accompanying *Telefis Feirme*’s 1968 ‘Milk Matters’ programme, the first thing farmers needed to in order to carry more stock was confidence, confidence in their own abilities, the advice provided to them, and in the market’s ability to provide adequate returns on their capital and labour investments in fertiliser, silage making infrastructure, and infrastructural changes (Fig. 2.8).

⁹⁴ *Telefis Feirme*, episode 23, ‘Comparing Crops’, aired 22 March 1966, on Raidió Telefís Éireann, RTÉ Archives, 5-6.

⁹⁵ Ibid.

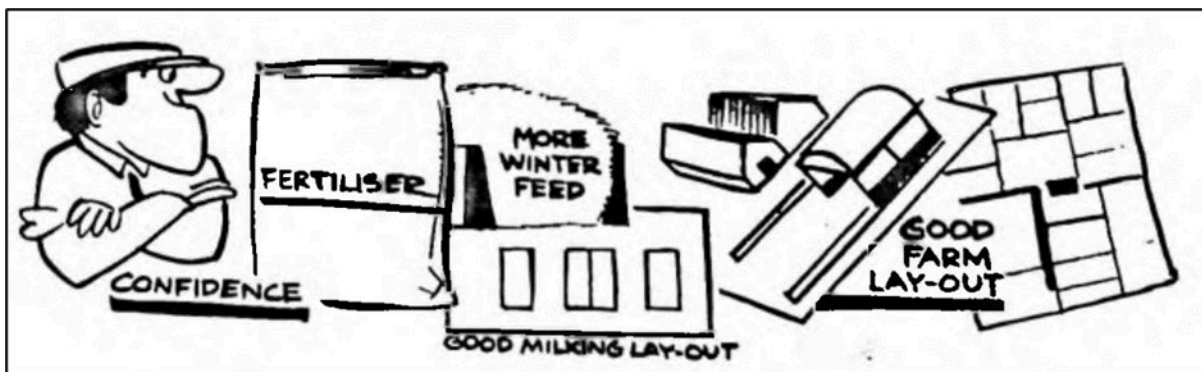


Figure 2.8: An illustration by Gerrit Van Gelderen from the *Telefis Feirme* Milk Matters group leader booklet. The illustration provides an answer to the question "What do you need to carry more stock?" Source: Browne, 'Milk Matters', 19.

These educational programmes, from *Telefis Feirme* and beyond, were incredibly influential to the way farmers saw the potential of their land. In an oral history interview conducted on their farm in Monaghan, Co. Carlow, Owen and Bernadette Roche spoke about how going to agricultural college influenced Owen's future prospects for the land, which he and his father had always accompanied with an off-farm income: "I went to agricultural college back in [1978]. I was in Multyfarnham up in Westmeath. I spent a year up there doing agriculture. That's when I came back here thinking I could be full time on the farm."⁹⁶ Owen and Bernadette made an effort to switch from a mixed farming operation of beef cattle and spring grain to dairy, using a hand-operated bucket plant to milk the cows, but the labour and financial investments proved too much for them to maintain:

It was an awful lot of effort because... before I go to work we milk the cows. Ber would get up at four o'clock in the morning, drive down to the bridge, down over the Slaney and she'd wait there for the milk tank to come. Then [she'd] come back, we'd wash it out and go to work and then come back and milk the cows.⁹⁷

Though the outlook presented in these educational programmes was positive and convinced many farmers to attempt to expand their operations, the reality of the financial and labour investments asked of them was much more difficult than came across on the silver screen or in the agricultural college classroom. Following Ireland's accession to the EEC in 1973, high agricultural

⁹⁶ Owen Roche, 'NuReCycle Oral History, Monaghan Co Carlow', 24 February 2024, Digital Recording, 00:52:00.

⁹⁷ Ibid, 01:02:00.

inflation further intensified the connection between capital investment and Irish agricultural development, leading to a growing gap between the productivity and wealth of Ireland's largest and smallest farmers. The price of agricultural inputs tripled between 1972 and 1978, as did land prices. European investment in agriculture increased just as sharply, with eighty-one per cent of Ireland's funding from the EEC going to agricultural programmes through the 1970s. As Andy Bielenberg shows in his historical overview of Ireland's economy, this funding was primarily intended for infrastructural investments like milking parlours that would have only been realistic for large intensive dairy farmers whose milk sold for five times the price at the end of the decade as it did in the beginning.⁹⁸

To end the first episode of *Telefís Feirme*, Keating took viewers to a farm owned by Jim Kelly who was making over £2,000 each year off his 60 acres. The episode's accompanying booklet prompts group leaders to ask their members to imagine themselves in his place:

Answer the following questions for yourself: –

How many acres are there in our farm?

How much stock could it really carry?

We have our own ideas on this and we'll be talking about them in the next programme.

You saw Jim Kelly's farm.

You don't think you could do as well as he does?

Are you quite sure you couldn't?

We know you can. Why do you feel so sure? Because there are so many farmers in Ireland doing it already. Jim Kelly has 60 acres. Maybe you have less – much less. There are farmers in Ireland on 20 and 30 acres making more per acre than Jim Kelly.

There's a lot of bad land in the country. Maybe your farm is mostly bad land. Is it drained? Is it fertilised? Can you honestly say to yourself "Our farm is as productive as we can possibly make it?"⁹⁹

⁹⁸ Andy Bielenberg, 'Economy in Independent Ireland', in *The Princeton History of Modern Ireland*, ed. Richard Bourke and Ian McBride (Princeton University Press, 2016), 431.

⁹⁹ *Telefís Feirme*, 'Introduction', 4.

Farmers like John Monahan, author of the regular *Farmers Journal* column ‘A Farmer Talks’, were critical of Jim Kelly’s success. As Monahan reported, the farmers he spoke with “don’t deny this is possible – but they claim to have worked out that he was using something like £22,000 capital... In fact two thousand pounds is quite a poor return for so much capital, hard work, and skill. It is particularly poor when you remember that farming is a very high risk business.” Monahan was clearly not the only one to criticise the programme’s unbelievable numbers, as Justin Keating opened *Telefís Feirme*’s second season by addressing the “row about Jim Kelly’s farm,” claiming that their intention was to “indicate the outer limit of the possible, the goal, and not the starting point for future development” and acknowledged the limits to capital on the majority of Irish farms.¹⁰⁰ But this acknowledgement was not a solution to these issues itself, and the criticisms of Monahan and others brought a dose of reality to the positive coaching pressure of *Telefís Feirme*’s coverage. Monahan mentioned that the “economic crisis or whatever it is we’ve got” made it very difficult for many farmers to invest this kind of capital, and statistics bear out the fact that these financial conditions made it equally difficult for smaller farmers to even survive.

Between 1965, when the first season of *Telefís Feirme* aired, and 1980, the number of agricultural holdings in Ireland dropped from 282,600 to 269,800. Virtually all of those casualties came from farms under fifty acres, while the number of farms over fifty acres remained steady. Holdings between fifteen and thirty acres, the largest proportion in 1965, fell by over 10,000 during this period.¹⁰¹ The criticism of the farmers John Monahan spoke to, backed by these statistics, adds an important and somewhat tragic nuance to Ireland’s history of agricultural industrialisation, that the farmers that succeeded weren’t simply the ones who most readily adopted the guidance of experts like An Foras Talúntais and programmes like *Telefís Feirme*, but were simply the ones who were financially able to take on the capital investment required. Pushes for farmers to grow-or-die are common across this period, in many cases leading to much more drastic reductions in the number of farmers, as in France where the number of farms decreased 2.5 per cent every year between 1955 and 1975.¹⁰² Despite the smaller proportion of farms lost in Ireland, the legacy of the Land Commission and the importance of small farms to Ireland’s independence movement and national character means this reduction in farms and farm labour remains significant.¹⁰³

¹⁰⁰ *Telefís Feirme*, episode 25, ‘Introduction to the Second Series’, with Justin Keating on Raidió Telefís Éireann, 11 October 1966, RTÉ Archives.

¹⁰¹ *Irish Agriculture in Figures, 1973; Irish Agriculture in Figures, 1977; Irish Agriculture in Figures, 1983.*

¹⁰² Bivar, *Organic Resistance*, 177.

¹⁰³ Terence Dooley et al., eds, *Land Reform and Legislation in Ireland, 1800-2024* (Four Courts Press, 2024).

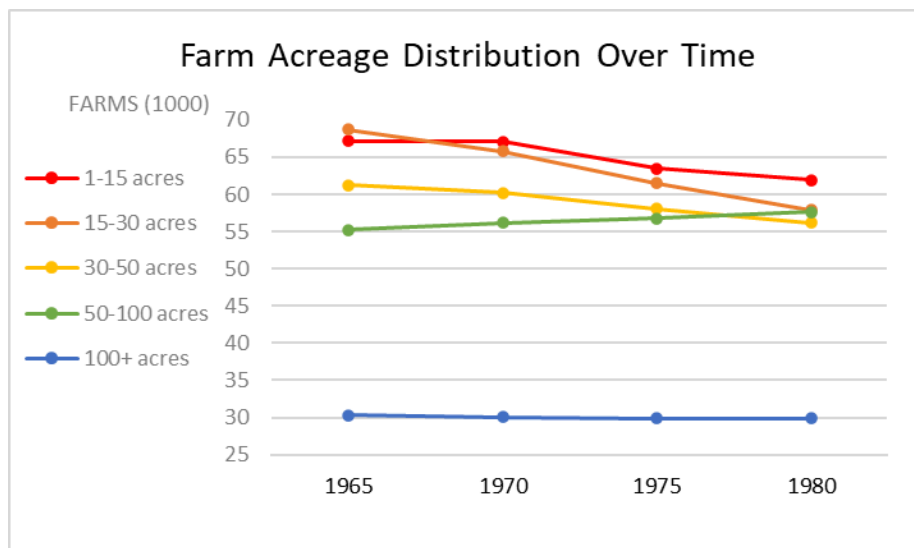


Figure 2.9: Aggregated data from the Central Statistics Office showing the change in number of farms over time divided by acreage. Source: *Irish Agriculture in Figures, 1973*; *Irish Agriculture in Figures, 1977*; *Irish Agriculture in Figures, 1983*.

The uneven effect of this push for industrialisation and expansion reflected Seán Lemass's understanding of agriculture as simply another industry that must be run as efficiently as possible. Writing to the government's economic policy committee in 1945 while he was Minister for Supplies, he suggested that "only a limited number of families can be settled on the land, on economic holdings, and policy must be directed to ensuring that ownership will be confined to persons willing and capable of working them adequately," further advocating for "the elimination of incompetent or lazy farmers."¹⁰⁴ This thinking reflected the efforts of the late nineteenth-century Congested Districts Board which sought to alleviate Irish poverty by reducing the density of farms on the less-productive land in the West of Ireland by promoting economic diversification as well as emigration.¹⁰⁵ As demonstrated in this section, it was not laziness that pushed farmers off the land but an incompatibility between the capitally intensive idea of modern grassland systems that relied on silage, ryegrass, and synthetic fertiliser with the financial and material realities of many farm operations.

This hollowing out of the farming sector maps neatly onto Marx's idea that the metabolic rift's toll is not only ecological but societal. The expansion of the metabolic rift to Ireland's pasture assemblage not only affected the soil's ability to reproduce, gradually replacing clover nitrogen with artificial inputs, but the reproductive ability of rural agricultural society as well.¹⁰⁶ The reconfiguring of pasture systems toward a reliance on consistent inputs of fertiliser to achieve

¹⁰⁴ Lemass memorandum, Department of the Taoiseach S13101A. Paragraph 9-13.

¹⁰⁵ Breathnach, *The Congested Districts Board*, 131.

¹⁰⁶ Slater and Flaherty, 'Marx on the Reciprocal Interconnections between the Soil and the Human Body'.

higher stocking rates was not financially viable to smaller farmers whose livelihoods had long benefitted from the abundance of clover nitrogen and the resilience of ecologically complex pastures. Despite the efforts of programmes like *Telefís Feirme* to encourage farmers to switch and invest in new livestock feeding regimes with increased stocking rates, many agricultural communities were unable to socially reproduce and sustain their relationship with the land, leading to a hollowing out of both ecological and economic diversity within Irish agriculture.

This does not mean that there were no cases in which these assemblages persisted through this wave of agricultural modernisation. The research and educational archives discussed thus far depict a clear linear transition from hay to silage as the dominant fodder-making practice throughout the second half of the twentieth century: as more farmers were educated into the most up-to-date practices, more switched to making silage. But, as Edgerton shows in *Shock of the Old*, technological modernisation is never a linear path from one technology or practice to another. Instead, modernisation is patchy and incomplete, as new technologies often coexist and even rely on the persistence of older modes.¹⁰⁷ In an oral history recorded in Belclare, Galway, Pat O'Brien talked about the continued practice of overwintering cattle outdoors into the 1980s when land reclamation grants were used to drain and clear these wilder areas in order to bring them under more intensive production. Pat spoke of the use of ephemeral bodies of water known as turloughs as shelter for cattle and the maintenance of 'wintrage' areas to sustain them outdoors until hay was needed in spring.¹⁰⁸ "The turloughs," Pat said, "were like a house in wintertime for the cattle... It would be warm in the hawthorn. It was like a small forest with hawthorn... and all the wildlife, swans and all, ducks and everything would be in there during the winter."¹⁰⁹ In Carlow, Owen Roche's father continued to keep horses on the farm through the 1980s, maintaining a haymeadow to supply the primary source of winter fodder for horses and cattle alike. It was only in 2008 with grant aid from the Targeted Agricultural Modernisation Scheme from the Department of Agriculture that Owen was able to afford the infrastructure needed to make silage, using the grant to build animal housing and a modern silage pit with an underground tank to collect effluent from the fermenting silage.¹¹⁰ Interviews on both the Roche and O'Brien farms yielded stories about the use of a square baler, a newer technological innovation for haying, to make bales of silage before

¹⁰⁷ Edgerton, *The Shock of the Old*, xi-xii.

¹⁰⁸ Patrick O'Brien, 'NuReCycle Oral History, Belclare, Co Galway', 22 September 2024, Digital Recording, 00:25:14.

¹⁰⁹ Ibid, 01:36:00.

¹¹⁰ Roche, 'NuReCycle Oral History, 01:02:00.

switching over to using silage pits and round silage bales, implying a more fluid transition between fodder regimes than implied by AFT research publications.¹¹¹

In both cases, farms were able to persist through this economic hollowing out of agriculture because of off-farm incomes. Both Pat and Owen had factory jobs and the O'Brien farm was additionally supported by Elizabeth O'Brien's off-farm job.¹¹² Though both farms now make primarily silage with some hay for young suckler cattle, the interdependence of actors within the pasture assemblage, between horses and haymeadows, and between cattle and hawthorn, allowed, for some time, the opportunity for resistance and resilience against efforts to modernise and simplify Ireland's pasture landscapes. Venus Bivar's research into the resistance of farmers in France's organic movement to agricultural modernisation during the 1960s shows their motivation as active and ideological, in addition to being shaped by increased financial pressures on small farmers.¹¹³ These Irish case study shows that less ideologically-motivated farmers than those in the organic movement were also pulled into a kind of organic resistance through the entanglement of their practices with the more-than-human assemblage of the farm itself. The decision to make hay or silage was not always made by the farmer alone, and in many cases went against farmers' wishes to modernise, but the ability for human farmers to adapt to or resist different practices was situated in more-than-human assemblages of action.

VI. "The Year When Nothing Went Right"

According to Feehan's *Farming in Ireland*, it was not entirely the education and research into silage making that triggered the industry-wide shift from hay to silage, but the climate. Feehan claims the incredibly wet summers of the 1980s served as the fulcrum that made it difficult for any farmers to hold on to their haymaking practice.¹¹⁴ Testimony from reporters, researchers, and farmers in the *Irish Farmers Journal* bear this hypothesis out. Michael Moroney wrote in 1981 that "after the disastrous season last year... first time silage makers... will surely have the sense and foresight to continue on this method of winter conservation."¹¹⁵ In July of 1985, an editorial column bemoaned "impossible hay weather" and advised that "while weather is still unsettled, the best treatment, both for cut meadows and growing meadows, is silage."¹¹⁶

¹¹¹ Ibid; O'Brien, 'NuReCycle Oral History.

¹¹² O'Brien, 'NuReCycle Oral History, 00:27:35; Roche, 'NuReCycle Oral History, 00:11:00; Angela Nugent, 'REPS a Lifeline: Committed to Scheme', *Irish Farmers Journal* (Dublin), 18 September 1999, 34.

¹¹³ Bivar, *Organic Resistance*, 114-8.

¹¹⁴ Feehan, *Farming in Ireland*, 506.

¹¹⁵ Michael Moroney, 'Lower Acreage Expected This Year', *Irish Farmers Journal* (Dublin), 27 June 1981.

¹¹⁶ 'Impossible Hay Weather', *Irish Farmers Journal* (Dublin), 20 July 1985, 2.

The following week's issue featured Vincent Flynn of AFT's Grange Centre who urged farmers affected by the failed hay crop to take a late cut of silage. Flynn wrote that "The basic aim... should be to get the bad hay off the fields and apply three bags of nitrogen, assuming that P & K levels were adequate, and then take a silage cut in six weeks time."¹¹⁷ Angela Nugent, who would later come to cover the environmental beat for the *Farmers Journal*, reported on the Northern Irish government's efforts to address the forage crisis in December of the same year, relaying that groups of small western farmers would be able to receive a grant to partially cover the cost of foragers and tractors bought as a group. These grants would only have covered twenty-four per cent for a forage harvester or fifteen per cent for a tractor, meaning that groups of farmers would still have to invest a significant amount in these purchases at a time when interest rates were prohibitively high.¹¹⁸

Wet years in 1980, 1981, and again in 1985 pushed already financially-squeezed farmers to switch rapidly to this new technology. But the urgency of this 'fodder crisis' led to imperfect transfers of knowledge and the abandonment of best practices by farmers and even the agricultural researchers that, as shown earlier in this chapter, were meticulous about fine-tuning every aspect of silage production. Vincent Flynn's advice to farmers to apply nitrogen to fields to ran contrary to the guidance supplied in AFT's own fertiliser manual, which cautioned against applying nitrogen in wet weather due to the elevated risk of runoff and lost productivity.¹¹⁹ Nugent's article described an imperfect attempt at a silage-making demonstration in Castledillon, Co. Armagh in May 1985, writing that "conditions were very wet, machines were cutting up the fields and the risk of lifting clay was high. The difficult ensiling conditions showed through in the dry matter content — 16.1 per cent on average."¹²⁰ That these efforts by advisors and researchers to encourage farmers to switch to silage in the face of rough weather did not meet their own standards of efficiency shows the financial, rather than environmental or scientific, motivations of the situation. It would be immediately apparent to farmers and researchers at the Castledillon demonstration watching heavy machinery tear up the field or reading Flynn's advice to spread nitrogen during wet weather that these efforts to save the productivity of pastures would come at the cost of the farm's future performance. But economic conditions, which were possibly more dire than the weather, forced researchers and farmers into a contradictory position of justifying these desperate measures despite their uncertain and imprecise outcomes.

¹¹⁷ 'Farmers Advised to Take Late Silage Cut', *Irish Farmers Journal* (Dublin), 27 July 1985, 3.

¹¹⁸ Angela Nugent, 'Winter Feeding Strategies', *Irish Farmers Journal* (Dublin), 7 December 1985, 19.

¹¹⁹ An Foras Talúntais, *Fertiliser Manual*, 22.

¹²⁰ Angela Nugent. 'Winter Feeding Strategies.' *Irish Farmers Journal*. 7 December 1985. 19.

The wet summers of the 1980s were not only bad years for haymaking. As Des Maguire wrote in the *Journal*, 1980 was “a year when nothing, not even the weather, seemed to fall right.” In 1980, the European Economic Community’s (EEC) newly introduced Common Agricultural Policy (CAP) prices failed to keep up with rising Irish inflation, squeezing farm incomes between higher input costs and lower output prices. Maguire cited the average income of farmers as sixty per cent lower than before Ireland joined the EEC, with their purchasing power similarly only two thirds of pre-EEC levels. This meant that, despite the government’s promises of economic expansion through this new market, farmers were left with little purchasing power to invest in the infrastructure needed to modernise their operations and stood an even smaller chance of profiting from any investments they had already made.¹²¹

For farmers in the parts of the West of Ireland designated as Less Favoured Areas under the CAP, things were even worse. As Nugent reported, farmers in these poorer Western areas depended more heavily on hay than their Eastern counterparts, making the rainy summers of the 1980s even more difficult to weather.¹²² In July of 1975, the *Farmers Journal* reported that head of the Sligo branch of the Irish Farmers Association (IFA) Joe Coulter had called a meeting of all Western county IFA heads and the Minister for Agriculture to seek a subsidy for farmers to make late-season silage. This demonstrated an early push for European and Irish governments to pay out financially to support the modernisation of Irish farms.¹²³ As Feehan points out, the wetter weather of the 1980s certainly would have prompted more farmers to switch to silage feeding practices, but it was the way in which the rainy 1980s worsened preexisting economic precarity, especially among smaller farmers, that ultimately led to wide adoption of silage-making.

The difficulty of making hay during these rainy summers would have lent credence to the arguments of researchers and educators that silage was a more ‘natural’ way to preserve winter fodder in Ireland, but this does not mean that silage was not immune to climatic disruption. As was made apparent through Nugent’s reporting of the Castledillon demonstration, bringing machinery onto a wet field could tear up the ground and stunt future growth much worse than overwintering cattle ever could.¹²⁴ Many *Farmers Journal* contributors during the wet 1980s pointed out that, though silage is easier to make than hay in wet conditions, ensiling grass while wet decreases its digestible dry matter, lowers its nutritional content, and limits the ability of bacteria in the grass to

¹²¹ Des Maguire, ‘The Year When Nothing Went Right’, *Irish Farmers Journal* (Dublin), 27 December 1980, 9.

¹²² Nugent, ‘Winter Feeding Strategies’, 19.

¹²³ ‘Meeting on Western Fodder Crisis’, *Irish Farmers Journal* (Dublin), 27 July 1985, 4.

¹²⁴ Nugent, ‘Winter Feeding Strategies’, 19.

properly ferment and preserve the grass before it rots.¹²⁵ To speed the fermentation process and prevent the wet grass from rotting, farmers would need to apply additives to the silage. In the Castledillon demonstration, for example, nineteen litres of molasses were added to every ton of silage, providing sugars that bacteria could ferment more quickly than grass starches, allowing the fermentation process to take hold and the silage to become sufficiently acidic before the wet grass began to rot.¹²⁶

Private companies selling additives took to the pages of the *Journal* during this rapid and imperfect switch to silage making in wet conditions. Alongside the researchers and farmers discussing late silage making, the July 1985 issue of the *Journal* contained advertisements for products like ‘Grass-Sile,’ which “contains a unique sugar producing enzyme system that will ensure a good fermentation on wet low sugar forage.”¹²⁷ A similar advertisement for ‘Cosil,’ sulfuric acid branded as a silage additive, went a step further in disguising itself as a research report, titling the ad “Late (autumn) silage — Grange trials good” and including tables of actual experimental results with their brand-name inserted in parentheses after the values for sulphuric acid. As the advertising copy reads: “Sulphuric — Cosil — preserved silage cut on August 27th, fed ad lib, without concentrates to Hereford heifers for 135 days, achieved a daily live weight gain of 1.8 lb (Table A)... The results showed that sulphuric acid — Cosil — produced feed of a high [drymatter percentage] and greatly enhanced the feeding value of the late autumn harvest silage.”¹²⁸

While adding any kind of acid directly into silage would have the desired effect of preserving the grass through decreased pH, the advertisement’s use of scientific language played on the trust Irish farmers had been asked to place into the now twenty-year-old AFT by attempting to associate themselves with research done at the Grange Centre. Despite the precarious finances of farmers during the 1980s, these companies hoped to preserve their own profits by convincing desperate farmers who were being forced to switch to imperfect silage practices that their products would bring scientifically verified results. The efforts of researchers and educators to ‘naturalise’ silage as the most appropriate form of winter fodder for the Irish climate emphasised the difficulties that can emerge when trying to make hay in rainy weather while deemphasising the losses in productivity and preservation difficulties that these same conditions can introduce for a silage operation. The need to add molasses or sulfuric acid to trigger the grass’s bacteria to ferment the

¹²⁵ ‘Farm Management.’ *Irish Farmers Journal* (Dublin). 4 Jun 1988. 10; *Irish Farmers Journal*, ‘Impossible Hay Weather’, 2; Maguire, ‘The Year When Nothing Went Right’, 10.

¹²⁶ Nugent, ‘Winter Feeding Strategies’, 19.

¹²⁷ ‘Grass-Sile.’ Advertisement. *Irish Farmers Journal* (Dublin). 27 July 1985. 11.

¹²⁸ ‘Late (autumn) silage — Grange trials good.’ Advertisement. *Irish Farmers Journal* (Dublin). 27 July 1985, 17.

grass in wet conditions meant another input that financially precarious farmers would have to purchase.

VII. Conclusion

As climate volatility increases, efforts to preserve winter fodder have become more complicated. The Roche's farm in Carlow converted primarily to making silage in 2008, but still cuts small amounts of hay each year for calves. However, as Owen explains, predicting when to cut hay has become even more difficult in recent years. "It's not predictable when you can cut, you have to watch the weather. When they hay is getting near that you want to cut it, you could have a spell of a month that you can't as the weather conditions are not going to allow it... You need at least a week projected of good weather before you cut your hay."¹²⁹ Though they have been making silage since 2008 with help from a TAMS (Targeted Agricultural Modernisation Scheme) grant to build a silage pit and additional animal housing, their practices haven't been intensive enough to warrant reseeding with a more intensive ryegrass and clover mix for silage. Specifically, the Roche operation only takes one silage cut whereas farmers with higher stocking rates rely on ryegrass's ability to quickly bounce back with additional nitrogen to take two or three silage cuts each year.¹³⁰

But the simplified ecology of the kind of ryegrass-dominated sward that made intensive silage operations possible faces its own difficulties, particularly under drought conditions. This climate vulnerability was one topic explored in the conversations between anonymised farmers recorded by artist Dierdre O'Mahony during her 2022 *Sustainment Experiments* installation in Kilkenny. One farmer, discussing their transition from a grass sward to a multispecies sward, describes the difficulty with unpredictability of moisture "we're in trouble again now this year when its dry... we had that field in grass before and the minute, it'd literally be gone brown straight away."¹³¹ Though the farmer explains that other plants in the newly planted multispecies sward like clover, vetch, and plantago survived the dry weather, the grasses within the sward did die back. This shows that, though unpredictably wet weather can spell trouble for farmers hoping to cut hay, increasingly common drought spells have left ryegrass-dominated silage leys equally vulnerable. Even as the wet climate of the 1980s caused many farmers to switch to silage making, today's increasing climate volatility leaves many farmers in an increasingly precarious position, made worse by the sunk costs of investment in infrastructure to support this silage regime.

¹²⁹ Roche, 'NuReCycle Oral History, 00:48:00.

¹³⁰ Ibid, 00:29:00-00:33:00.

¹³¹ Dierdre O'Mahony, *Sustainment Experiments Feast Transcript*, 13 October 2022, Transcribed Audio Recording, 111.

In some ways, the Roche's operation in Carlow represents a more sustainable operation in the current state of climate volatility. Their diversified fodder operation, a single silage cut in the summer followed by a top-dressing of nitrogen and a small hay harvest, allows the operation more flexibility with variation in precipitation. This is all made possible by the less intensive stocking rate. The carrying capacity of the farm is not the maximum the land can support, but the rate at which the operation can absorb any volatile shocks. But in the contrasting economic framework of Irish agriculture, the farm is not and has never been self-sustaining. Despite all their efforts, the three generations of Roche's that have lived on the farm have always needed off-farm income to sustain themselves. Despite the training and efforts to switch to the consistent pay rate of a dairy operation and even the recent TAMS grants, the farm has remained a small dry-stock operation supported by off-farm income. In Owen's own words:

The idea [in the 80s] was to intensify and get more into the dairying, and then my plan was that if I got set up in the dairying, I could give up the part time job and come back. But then with Glanbia, which is Tirlán now... I couldn't develop enough and they would not come to collect the milk at the house because of the roadway. And so that made the decision that we had to change [back to dry-stock].

...

If I did not have an off-farm income, none of [the improvements to the farm] would have happened. You have to have so much yourself... until you got the stocking numbers up so that you had the cash flow to pay back the loans... and to get the stock numbers up you had to have the sheds. But then, you know, the cart before the horse kind of thing.¹³²

Owen's experience with an off-farm income is common among Irish farmers. In the 1970s, more than a quarter of farm families were unable to support themselves with farm income alone and this proportion continued to increase over the next decades. Twenty-seven per cent of farmers had off-farm jobs by the middle of the 1990s, including forty-one per cent of small operations like the Roche farm.¹³³ The history of the Roche's farm shows how the Lemass government's efforts to transition the farming sector from a 'poor world' agrarian model to a 'rich world' industrial model played out on the ground. Farmers tried to apply the expert knowledge about how to improve

¹³² Ibid, 00:43:00.

¹³³ Paul Rouse, 'The Farmers Since 1850', in *The Cambridge Social History of Modern Ireland*, ed. Eugenio F. Biagini and Mary E. Daly (Cambridge University Press, 2017), 142.

their practices and their incomes, but without access to capital to invest in industrial-scale infrastructure the new industrial spirit wasn't able to take to their 'ould sod.'

As Gupta argues in *Postcolonial Development*, the characterisation of poorer countries as existing in a kind of underdeveloped past served to brush away the economic inequalities within those nations.¹³⁴ The assumption of the postwar government was that modernising Ireland's agriculture would fix inequalities of its colonial and provincial past but, as this chapter has shown, these modernisation efforts have only served to worsen preexisting inequalities. This chapter has examined that modernising process to show how silage, as a form of agricultural intensification and a manifestation of Marx's metabolic rift within pasture systems, was linked to the economic and political intentions for agriculture in postwar Ireland and produced corresponding ecological and sociological changes on the land. Silage and its associated agricultural practices served as material links between the EEC and the *Programme for Economic Expansion*, ecological effects like decreasing bird populations and pasture biodiversity, and socioeconomic changes like a shrinking number of smallholder farmers and a reliance on off-farm income.

The multispecies assemblage of the farm's pasture also played into the microhistory of both the Roche's and the O'Brien's farms as mediating this transition effort. When Owen Roche's father first bought the land, they had a mix of dry stock and tillage barley, but when they attempted to switch to a dairy operation in the 1980s, they reseeded the barley field to grow grass. As they were still making hay at the time instead of silage they "didn't go in for the new varieties of grass," instead reseeding with a mixed permanent pasture.¹³⁵ Just as the modernisation of Irish farming was patchy on a national scale, the modernisation of individual farms was itself patchy, with Owen and Bernadette investing in the technologies they could afford, like a portable bucket-plant milking machine and a tractor, but forgoing more investment-heavy practices like silage making in favour of the functional and cheaper 'old' technology of hay. As explored earlier, the more-than-human dynamics shaped this resistance as much as the intention of the farmer.

As Law and Mol show in their study, the dynamics of any given farm are a biological, economic, political, and energetic assemblage of actors.¹³⁶ The farmer is generally seen to be the driver, sometimes with explicit intention and sometimes unintentionally, of these dynamics. But the farmer is always interpreting and reacting to the dynamics of these entangled systems, whether that be a wet year, a strong market, the early spring growth of clover, or the inability of a horse or a calf to digest silage. The postwar Irish government coached farmers to adopt more modern

¹³⁴ Gupta, *Postcolonial Developments*, 10.

¹³⁵ Roche, 'NuReCycle Oral History, 00:13:00.

¹³⁶ Law and Mol, 'The Actor-Enacted'.

industrial technologies, typified by the ryegrass and silage network of technologies, through research and educational programmes. But the economic reality of the time meant that only some farmers were able to readily adapt to this new technological regime and join the new 'rich world' farming industry in Ireland while others were pushed into it through coinciding economic and climate volatility. Cheap supplies of nitrogen fertiliser were the fuel of this new system and, as Chapter Three will explore, this provision of cheap nutrients also required an economic and energetic reorganisation within the Irish state.

Chapter 3 – Fossil Fuelled Farms: The Development of Nítrigin Éireann Teoranta

I. Introduction

The increasing use of nitrogen fertiliser use in postwar Irish agriculture is necessarily interlinked with the nation's history of fossil energy, most importantly the exploitation of domestic natural gas resources beginning with the establishment of Ireland's national gas board Bord Gáis Éireann (BGE) in the 1970s. Ireland's natural gas industry and infrastructure developed concurrently with expansion of the state's fertiliser manufacturing capacity and the increasing use of nitrogen fertiliser in pasture agriculture. With Ireland's accession to the European Economic Community in 1973, Ireland's industrial, agricultural, and energy sectors faced into a new common market and a global energy crisis at the same time. This chapter uses the case study of Nítrigin Éireann Teoranta (NET), the state-owned nitrogen fertiliser manufacturer, to discuss the central role nitrogen fertiliser manufacturing played in building the modern Irish industrial state: as a cornerstone of its fossil energy network, an engine for the expansion of its agricultural production, and a tether to international commodity and energy markets. While this chapter focuses on the dynamics of the factory rather than the farm, the developments in Irish fertiliser manufacturing and fossil energy it explores were deeply intertwined with the agricultural intensification sought by An Foras Talúntais and the Irish state.

In order to deepen the ANT analysis of Ireland's pasture assemblage, this chapter incorporates a new materialist perspective by paying heed not only to the agency of non-human actors like clovers, cattle, and ryegrass, but to the impact of inert materials on interactions within this assemblage. The previous chapter addressed these material concerns through the exploration of how wetness influenced the preservation of silage and hay and how fertiliser nitrate influenced the behaviour of clovers and ryegrass. This chapter furthers this analysis by exploring the material influence of methane gas from beneath the Irish Sea to the manufacture of artificial fertiliser and the linked intensification of Ireland's pasture systems. By tracing the interwoven paths of methane and nitrate molecules through Ireland's pipelines, fields, and financial markets, this chapter aims to show that the history of Ireland's agricultural industrialisation is also the history of the fossil fuelling of the Irish economy. Analysing the ways in which the material qualities of methane and nitrate interacted with the ideas and intentions of human actors, reveals the influence of these inert

molecules on the shape of industrial processes and ecosystems key to Ireland's agricultural intensification.

Kendra Smith-Howard argues in her contribution to an *Agricultural History* roundtable on new materialism that agricultural historians are already well-practised at taking the material world and its impacts on historical narratives seriously. For Smith-Howard, looking to the power of the material world to influence historical developments allows historians to paint a clearer picture of human interaction with the world around them.¹ The preceding discussion of more-than-human agency in pasture systems demonstrated that efforts to transition Ireland's fodder regime from hay to silage were not taken by humans alone. This chapter further expands this analysis by showing how the materiality of methane and nitrate fertiliser shaped both Ireland's agricultural and energy industry in the 1970s and 1980s. This analysis is aided by the work of Christopher Jones and Margarita Balmaceda who have shown in their respective books *Routes of Power* and *Russian Energy Chains* the ways in which the materiality of energy sources and infrastructure shapes and maintains different use patterns.² By showing how institutions and individuals enacted methane and nitrate as signifiers of financial value or national power and the impact of their molecular materiality on human systems, this chapter maps out a companion assemblage of energy embedded within the agricultural modernisation of the 1970s and 1980s.³

The chapter also adds to the novel body of work by environmental historians and energy humanities scholars on the energy history of the Irish State, including the work of Patrick Bresnahan and Patrick Brodie on eco-modernity in Ireland, Lily Toomey's history of Bord na Móna and Aoife O'Leary McNeice's work on the ESB's hydroelectric schemes.⁴ While all these analyses take into account the materiality of Ireland's energy systems, the research presented in this chapter aims to show how the history of fossil energy in Ireland is inextricably linked with the development of the state's agricultural economy. Incorporating energy history literature serves to deepen the ideas of carrying capacity and the metabolic rift that run throughout this thesis. The 'robbery' system of high farming witnessed by Liebig and Marx in the nineteenth century was one based on the import of nitrogen mined from Peruvian guano and Chilean saltpetre to fields of the British empire. As Edward Melillo shows in his article 'The First Green Revolution', this system of imports, coming

¹ Kendra Smith-Howard, 'An Invitation to Dance', *Agricultural History* 96, nos. 1–2 (2022): 231–36.

² Christopher F. Jones, *Routes of Power* (Harvard University Press, 2014); Margarita M. Balmaceda, *Russian Energy Chains: The Remaking of Technopolitics from Siberia to Ukraine to the European Union* (Columbia University Press, 2021).

³ Law and Mol, 'The Actor-Enacted', 58.

⁴ Patrick Bresnahan and Patrick Brodie, *From the Bog to the Cloud* (Bristol University Press, 2025); Toomey, 'A National Resource of Primary Importance'; 'Sites of Fracture: 20th Century Ireland at the Margins of Capitalism', University of Birmingham.

after the abolition of slavery, relied on the coerced labour of indentured Chinese labourers, reflecting Marx's idea of the metabolic rift as extracting from both agricultural landscapes and the bodies of workers.⁵ While phosphorus extraction continues to follow this traditional pattern of colonial mining, as explored in Katerina Martina Teiawa's book *Consuming Ocean Island*, the invention of the Haber-Bosch process in the early twentieth century unlocked the atmosphere as a new source of nitrogen to be salvaged.⁶ As shown by Arnaud Page, this technology wasn't widely used for the manufacture of fertilisers outside of Germany until the use of ammonium nitrate for the manufacture of explosives during the Second World War developed the productive capacity to feasibly manufacture nitrate fertiliser from the atmosphere.⁷

The chapter contributes to agricultural history through its exploration of the Green Revolution in the context of Ireland and in relation to the fossil energy-fertiliser connection. Michael Staub's article 'Farming with Petroleum' discusses the connection between fossil energy interests and the technology package of the high-yielding crops, nitrate fertiliser, and water management that supported the Green Revolution.⁸ The Irish case study presented in this chapter seeks to strengthen that analysis by showing the entanglement between the Irish state's interests in fossil fuel exploitation and agricultural intensification. The plastic nitrogen-dependent carrying capacity of silage explored in Chapter Two depended on a steady supply of inexpensive fertiliser synthesised from the bottomless well of the atmosphere and the much more exhaustible source of fossil energy from below the Irish sea.

⁵ Melillo, 'The First Green Revolution, 1029-1032.

⁶ Katerina Martina Teiawa, *Consuming Ocean Island: Stories of People and Phosphate from Banaba* (Indiana University Press, 2014).

⁷ Page, "'The Greatest Victory Which the Chemist Has Won in the Fight (...) against Nature'" 396-397.

⁸ Staub, 'Farming with Petroleum' 349-75.



Figure 3.1: Advertisement for NET fertiliser from the Irish Farmers' Journal in February 1970. Source: *Irish Farmers Journal*, 'Declare War!', 19.

The above advertisement for Irish nitrogen fertiliser from the early years of state-owned nitrogen fertiliser manufacturer Nítrigin Éireann Teoranta demonstrates the multiple ways nitrates, fossil energy, the state, and the agricultural market were connected throughout the late twentieth-century period of agricultural expansion (Fig. 3.1). First, the overt Cold War imagery of the tank and the call to “fight rising costs with greater profits” paints farmers not as stewards of the land but as soldiers for the larger state programme for economic expansion in the face of scarcity.⁹ Crucially, the way the advertisement asks them to fight is through profit-seeking and the redirection of funds away from “expensive” human labour and toward new efficient industrial technologies. More implicitly, the association between the tanks and the bags of fertilisers mirrors the joint fossil fuelling of both technologies: like the military machines the bags of fertiliser sit on, NET relied on heavy fuel oil as the petroleum feedstock and energy source for its manufacturing operations in

⁹ ‘Declare War!’, *Irish Farmers Journal* (Dublin), 21 February 1970, 19.

Arklow until moving to domestic sources of natural gas in the 1970s. The bags of fertiliser also sit proudly upright on the tank, not simply a weapon to be fired but seemingly a fellow soldier and an active partner in this campaign for bigger profits and higher production. This active image of NET's synthetic fertiliser fed directly into the efforts to reorganise the ecology of Ireland's pastures for profit and production through silage and higher stocking rates.

Taken together, these ideas of state-led economic expansion, the integration of agricultural and fossil industries, and the active roles of both fertilisers and fossil-fuels in shaping infrastructures and practices are the key themes explored throughout this chapter. The chapter first introduces NET and Bord Gáis, the two institutional actors at its centre: outlining NET's founding in Arklow, Co. Wicklow and Bord Gáis's establishment in Co. Cork in the context of European fossil fuel exploration and a boom in global nitrate manufacturing. The chapter then shows how these two institutions came together with the expansion of NET into the Marino Point facility in Co. Cork, exploring how the materiality of natural gas shaped both the development of Ireland's natural gas infrastructure and supported NET's ability to cheaply manufacture synthetic nitrate. The chapter concludes with an analysis of the conflicting financial and political motivations that led to NET's financial struggles as well as its eventual growth and globalisation.

Previous chapters have discussed how the Irish government's priorities as expressed in its *Programmes for Economic Expansion* were to strengthen its farmers and their exports by establishing independent state bodies like AFT and NET. These efforts to bring about agricultural expansion stood alongside and intersected with the government's efforts to expand its industrial capacity by investigating the nation's fossil energy prospects. This linked approach toward agricultural expansion and industrial exploitation in the Lemass era developed in the context of Ireland's efforts to remain competitive in an increasingly oil and gas dependent and interconnected Europe. The chapter argues that the dependence of industrial nitrate synthesis processes on cheap supplies of fossil energy, primarily natural gas, entangled the Irish government's efforts to modernise and intensify the nation's agriculture with its desire for energy sovereignty and industrialisation. The use of atmospheric nitrogen also expanded the extractive focus of the metabolic rift within Irish agriculture, from guano mined in the Pacific World to a domestic supply of fossil energy. Considering this shift in the context of the metabolic rift in Ireland allows for the incorporation of aspects of agricultural fossil capitalism, explored by Andrew Watson and others, to the Marxist and decolonial frameworks elaborated throughout this thesis.¹⁰

¹⁰ Watson, "The Single Most Important Factor" 629–63.

II. Entangled Industries

In 1962, the Irish government incorporated Nítrigin Éireann Teoranta, a semi-state nitrogen fertiliser manufacturer, in Arklow, County Wicklow, coinciding with the founding of An Foras Talúntais.¹¹ Both institutions were created as an attempt to realise the Lemass government's commitment to expanding the Irish economy through linked investments in agricultural production, industrial growth, and exploitation of the nation's resources. The government's decision to site a fertiliser manufacturer in Arklow emerged from the long history of industrial production in the port of Arklow, specifically the manufacturing of nitrogen and phosphorus fertilisers. The area had been shaped by a long history of copper mining, going back to 150 CE. These mining operations generated an abundance of sulfur-laden pyrites as a byproduct.¹² Since the nineteenth century, these pyrites were sold to fertiliser manufacturers to make sulphuric acid, the primary feedstock of superphosphate, before the creation of NET.¹³ From 1895 to 1918, Arklow had also been the site of a factory manufacturing cordite, a nitrogen based explosive used in both mining and weaponry.¹⁴ The region's history as an industrial port and its proximity to fertiliser base materials allowed the town to easily fit in to the government's effort to establish an Irish fertiliser manufacturer.

NET was at the centre of the Government's efforts to modernise the nation's agricultural industry and industrialise its economy. The company's initial facilities in Arklow were completed in 1965 alongside the *Second Programme for Economic Expansion*, which portrayed the company as the state's way to provide cheap fertiliser to modernising farmers and a welcome addition to Ireland's suite of state-sponsored industrial bodies.¹⁵ Ireland's fertiliser industry consisted of several private firms at the time, including Grassland Fertilisers, Belgian-Irish owned Shamrock Fertilisers, and the Dutch-Irish owned Albatross-Windmill Fertiliser Company, which were focused primarily on manufacturing phosphorus.¹⁶ Efforts to build up soil phosphorus, depleted during the Emergency, to promote tillage crops and the growth of clover within pastures was the first priority of the Lemass government, though the practice of fertilising pastures with either nitrogen or phosphorus was not universal. In 1964, only fifty-nine per cent of fertiliser in Ireland was applied to pasture despite pasture making up ninety per cent of the nation's agricultural land.¹⁷

¹¹ Dáil Éireann, *Nítrigin Éireann Teoranta Bill*, No. 2 (1963).

¹² Mary Hargaden, 'Avoca West - Mining', *County Wicklow Heritage*, 12 May 2015.

¹³ Ibid.

¹⁴ Anthony Cannon, 'Arklow's Explosive History: Kynoch, 1895-1918', *History Ireland* 14, no. 1 (2006).

¹⁵ Department of Industry and Commerce and Department of Finance, *Second Programme for Economic Expansion*, vol. 2 (Stationery Office, 1964), 251.

¹⁶ Cooper and Davis, *The Irish Fertiliser Industry*, 200-3.

¹⁷ Ibid 178-9.

As Mark Cooper and John Davis detail in their history of the Irish fertiliser industry, any nitrogen fertiliser sold by Irish fertiliser manufacturing firms in the 1960s and 1970s would have been based on nitrate imports and used to make compound fertilisers, where nitrogen, phosphorous, and potassium were combined in a single bag. This left NET as the first and only domestic producer of nitrogen fertiliser in the form of granulated calcium ammonium nitrate (CAN). The start of NET's operations aligned with the government's policy shift from supporting a static concept of carrying capacity that relied on a build-up of phosphorus in the soil to a more plastic carrying capacity that would require continuous and increasing inputs of nitrogen fertiliser.¹⁸ Despite manufacturing ammonia and nitrates domestically, NET's Arklow facility still relied on imports of fossil fuel, specifically naphtha oil, which served as both an energy source and industrial feedstock in order to manufacture fertiliser.¹⁹ The facility soon expanded into making compound fertilisers that included phosphorus and potassium along with nitrogen, making use of the region's pyrites once again to manufacture the phosphorus fertilisers.²⁰

The development of Ireland's natural gas infrastructure stands alongside a larger European history of fossil fuel exploration and efforts to achieve state energy sovereignty. Political scientist Adam Hanieh has shown that reorganisation of global energy regimes in the postwar period spurred European nations on to rely more heavily on domestic gas and oil reserves as their primary sources of fossil energy over coal.²¹ An inflection point in this transition was the passing of the United Nations Geneva Convention on the Continental Shelf in 1958, which entered into force five years later in 1964. The convention on the continental shelf ratified a state's right to exploit natural resources on or beneath its coastal marine area, leading to a rush of American oil companies approaching coastal nations with offers to explore their petrochemical potential.²² In 1959, a large gas deposit was discovered in the Dutch province of Groningen and the adjoining stretch of the North Sea by a joint venture of Shell and Esso, identifying the sea and the surrounding waters as a promising source for European fossil energy. Historians of infrastructure have demonstrated that this reimagining of the sea as an energy source for northern Europe led to a wave of exploration partnerships between oil companies and European nations which resulted in the discovery of

¹⁸ Ibid, 200-3.

¹⁹ 'Capital Restructuring of Nitrigin Eireann Teoranta', Office of the Minister for Industry, Commerce, and Tourism, 29 April 1981, National Archives of Ireland, FIN/2016/20/213, 52.

²⁰ Cooper and Davis, *The Irish Fertiliser Industry*, 201.

²¹ Adam Hanieh, 'Petrochemical Empire: The Geo-Politics of Fossil-Fuel Production', *New Left Review* 130 (August 2021): 28.

²² *Convention on the Continental Shelf*, United Nations, Vol. 499 (1958), 311.

massive oil and gas fields like the Ekofisk field beneath Norway's continental shelf though exploratory drilling by Phillips Petroleum.²³

These exploration efforts were not limited to the North Sea but extended in all directions, including the Irish Sea and Ireland's Atlantic coast. On January 13th, 1959, the same year gas was discovered in the Netherlands, the Ambassador Oil Corporation of Texas approached the Irish government with a proposal to embark on an Irish programme of exploratory drilling for oil and gas. The Irish government subsequently granted Ambassador Oil a license to drill exploratory bores across the entire Republic of Ireland, both on land and the continental shelf. Seán Lemass, serving at the time as Minister for Industry and Commerce, remarked in a 1959 report to the Dáil that "prospects of oil resources being discovered in this country are very doubtful," but he nonetheless connected the contract with Ambassador Oil to Ireland's other efforts to exploit Ireland's potential mineral resources laid out in the newly published *Programme for Economic Expansion*.²⁴ In his statement to the Dáil, Lemass detailed the government's commitment to partnering with private US industries to grow Ireland's economy through an exploitation of its resources.²⁵ This degree of state involvement in energy and infrastructure was not unique. Lily Toomey's research into Irish peat extraction shows that since the 1920s, efforts to modernise Ireland had been closely linked to nationalist efforts to harness domestic energy sources, including turf and hydroelectricity.²⁶ As shown in earlier chapters, the productivity of Ireland's soil and the exploitation of its mineral wealth were both shaped by the same paradigm. The development of domestic natural resources like fossil fuel were therefore seen as the engine of Lemass-era expansion, even though much of the actual development was ultimately driven by US companies for their own financial benefit.

Marathon Petroleum Ireland, a subsidiary of the American corporation, acquired Ambassador Oil in 1966.²⁷ After an unsuccessful exploration of Ireland's land and the introduction of the Convention on the Continental Shelf in 1969, Marathon began exploring the continental shelf, drilling several wells across the 5,838,800 acres covered by a series of maritime leases off Ireland's Southern coast.²⁸ Marathon finally obtained "significant results" for methane gas at a test well twenty-nine miles off the coast of Kinsale Head in west Co. Cork in 1971, a find which later confirmed as viable for exploitation in 1973.²⁹

²³ Högselius et al., *Europe's Infrastructure Transition*, 294-95.

²⁴ Seán Lemass. 'Vote 50: Industry and Commerce. Committee on Finance. *Dáil Debates*, Dáil Éireann (16th Dáil). Vol. 175. No. 5. Col. 570. 27 May 1959.; Whitaker, *Programme for Economic Expansion*, 44-5.

²⁵ Ibid.

²⁶ Toomey, "'A National Resource of Primary Importance'", 173-176.

²⁷ 'Kinsale Head Information Memorandum', TAOIS/2015/21/1206, 11.

²⁸ Ibid.

²⁹ Patrick Lalor. 'Vote 40: Industry and Commerce'. *Dáil Debates*, Committee on Finance, Dáil Éireann (19th Dáil). Vol. 256. No. 10. Col. 1849. 11 November 1971.

The discovery of the Kinsale Head gas field marked the origin of Ireland's contemporary natural gas infrastructure. Today, this pipeline network extends across the island, linking the cities of Dublin, Galway, Limerick, Cork, Waterford, and Wexford in a southern loop with spurs extending out to Ballineen in West Cork, the Corrib gas field off the coast of Bellanaboy in Sligo, and up through Northern Ireland to Derry and Antrim, where it crosses beneath the Irish Sea to connect with the UK's gas network in Scotland.³⁰ Before the 1970s, however, no such intercity gas network existed. Instead, natural gas use was limited to small urban networks of 'town gas,' which supplied light and heating in major port cities like Dublin and Cork and were operated by independent companies. These companies manufactured town gas from imported coal and oil, similar to the naphtha used by NET at its Arklow facility. The gas was then stored and injected into the urban pipe network from gasometers, dynamic siloes that expanded and shrunk with the variable pressure of the gas contained within them, the remains of which still tower over parts of Dublin and other Irish cities.³¹

As opposed to coal gas, deposits like the Kinsale field were deemed 'natural' because they were naturally occurring and did not have to be manufactured. The discovery of this natural wealth off the coast of Cork was of immediate interest to the largest of these city gas companies, the Dublin Gas Company. In 1977, as Marathon drilling platforms from Houston, Texas were put in place in the Celtic Sea, the Dublin Gas Company began lobbying the government to build a pipeline from the field in Cork directly to Dublin, claiming that the savings from not having to manufacture gas would halve their customers' bills "if the gas was piped directly to them."³²

Crucially, the discovery of the Kinsale field coincided with the 1973 global oil crisis. The associated economic difficulties, above all increasing energy prices, meant that finding domestic sources of fossil energy was a concern not only for urban gas companies but for the entire Irish state. The necessity of acquiring sovereignty over alternative sources of energy was made poignant across the globe.³³ As Christian Marx demonstrates, the oil crisis involved major shifts in German industry, as it pushed chemical manufacturer BASF to diversify their energy consumption by switching some production to coal, which had been in decline since the 1960s, and increasing its reliance on gas.³⁴ The oil crisis had similar effects for Ireland's industry, where it served as a

³⁰ *Network Development Plan* (Gas Networks Ireland, 2021), 17.

³¹ 'Plans to Pull Down Dublin Landmark', *RTÉ News* (Raidió Telefís Éireann, 28 October 1993), RTÉ Archives; Kate McMorrough, 'Innovative Apartments by the Gasometer', *The Irish Times*, 31 March 2005.

³² Tom Fallon and Tomas Mac Ruairi, 'Battle for Kinsale Gas', *Irish Press*, 20 July 1977, 1.

³³ Frank Bösch and Rüdiger Graf, 'Reacting to Anticipations: Energy Crisis and Energy Politics in the 1970s. An Introduction.', *Historical Social Research / Historische Sozialforschung* 39, no. 4 (2014), 12.

³⁴ Christian Marx, 'Failed Solutions to the Energy Crisis: Nuclear Power, Coal Conversion, and the Chemical Industry in West Germany since the 1960s', *Historical Social Research / Historische Sozialforschung* 39, no. 4 (2014), 269.

catalyst for energy infrastructure development and created incentives for a thoroughly-planned and productive incorporation of gas and other energy resources.

The gas field was a modest discovery, nothing the size of the Groningen or Ekofisk finds in the North Sea, which brought its judicious use to the front of mind for the government. Speaking before the Dáil in 1974, Minister for Transport and Power Peter Barry estimated that the gas would last twenty years at a flow rate of 125 million cubic feet per day, something he described as significant but “not sufficiently large to justify a grid distribution system for use of the gas as a fuel throughout Ireland.”³⁵ Nevertheless, the gas was still projected to satisfy around twelve per cent of the nation’s energy use, both representing a relief from high fuel prices and a hopeful sign of Irish modernisation.³⁶ Farmer and Cork East TD Patrick Hegarty’s statement to the Dáil demonstrates the nationalist optimism with which the gas was viewed by many politicians, dismissing any misgivings about the size of the find. Upon completion of the pipeline to bring gas ashore Hegarty called the project a “revolution,” saying with a romantic sense of celebration “we all looked in awe and wonder at the achievement of putting a pipe into the seabed, across a most beautiful beach and onto good farmland without creating any hassle... I do not share some of the pessimism expressed. I hope we will have more and more gas finds off Kinsale Head.”³⁷ In order to facilitate this judicious use of gas from the Kinsale field, the government established An Bord Gáis through the 1976 Gas Act, granting the board the responsibility to “set up and maintain a system for the supply of natural gas.”³⁸ Under their agreement, Marathon Petroleum Ireland would retain ownership of the gas as Bord Gáis became its sole customer.³⁹ Bord Gáis would then be responsible for setting rates and constructing the necessary pipeline infrastructure for all natural gas used across the island.

NET, which had already existed for a decade by the time initial rumours of Irish gas began to stir, would have benefitted greatly from use of domestic natural gas. Government efforts to spur the use of nitrogen fertiliser had already given the state monopoly on the nitrates industry a foothold. The share of fertilisers used on grassland increased from fifty-nine per cent to seventy-one per cent between 1964 and 1972, and the vast majority of that increase came from the use of nitrogen.⁴⁰ This increasing demand outpaced the capacity of NET’s Arklow facility, which was able to produce only 42,000 tons per year, requiring the import of an additional 100,000 tons of

³⁵ Peter Barry. ‘Electricity (Supply) (Amendment) Bill, 1974: Second Stage’. *Dáil Debates*, Dáil Éireann (20th Dáil). Vol. 274. No. 1. Col. 44-45. 2 Jul 1974.

³⁶ Peter Barry. ‘Vote 42: Transport and Power’. *Dáil Debates*, Dáil Éireann (20th Dáil). Vol. 280. No. 3. Col. 403. 24 April 1975.

³⁷ Patrick Hegarty. ‘Gas (Amendment) Bill, 1980: Second and Subsequent Stages.’ *Dáil Debates*, Dáil Éireann (21st Dáil). Vol. 325. No. 1. Col. 136. 2 Dec 1980.

³⁸ ‘Kinsale Head Information Memorandum’, TAOIS/2015/21/1206, 17.

³⁹ *Ibid.*

⁴⁰ Cooper and Davis, *The Irish Fertiliser Industry*, 179.

nitrogen fertiliser from producers in France and the Netherlands to fully satiate Ireland's modern farmers.⁴¹ To close this import gap, the company announced plans in early 1973, before either the onset of the oil crisis or the official confirmation of the viability of the Kinsale gas field, for a second manufacturing facility in Marino Point on Cork Harbour which, like the Arklow plant, would use imported fuel oil as its feedstock. The plant was to manufacture both ammonia, which could then be sent to the Arklow facility for the manufacture of CAN and compound fertilisers, as well as urea which could be used directly by farmers as a nitrogen fertiliser. As the promise of natural gas was realised, NET quickly revised their plans to allow the factory to use this new domestic energy source, simultaneously revising the expected production capacity of the new facility upward from 900 tons per day of ammonia and 500 tons per day of urea to 1350 tons per day of ammonia and 1000 tons per day of urea.⁴²

The 1973 oil crisis made the use of natural gas as the feedstock for the Marino Point facility not only useful but essential for the company's finances. While the demand for nitrates from modernising farmers more than justified NET's existence in the eyes of the state, the company had operated with marginal profits since its opening and had gone into debt in 1972 in order to finance its expansion into compound fertilisers. Skyrocketing prices for imported oil used by the Arklow factory during the 1973 oil crisis, only worsened NET's debt burden, as did the creation of a subsidiary, Arklow Gypsum, in 1978 to manufacture drywall from the gypsum byproduct of the manufacturing process for phosphate fertiliser.⁴³ Crucially, NET's primary competitor in the nitrogen fertiliser market, the Belfast based company Imperial Chemical Industries, began using the UK's share of North Sea gas as a feedstock in the 1970s. According to the Irish Department of Industry & Commerce in 1977, the competitive pressure from ICI's cheaper gas-based production would have sunk the Marino Point project before it was completed if it were forced to rely on imported oil.⁴⁴

Thus, the integration of Bord Gáis and NET was a point of discussion from the time of the Kinsale gas field's discovery and throughout NET's history. Some, like Dún Laoghaire TD Barry Desmond, expressed doubt as to whether NET's use of the gas was well advised, arguing before the Dáil in 1980 that "Irish people are using natural gas, from a finite resource, to make fertiliser at a massive loss, a portion of which apparently is being exported to some European and Asian markets at a loss... Therefore, it could even be argued that... some farmers in Europe are spreading

⁴¹ Ibid, 259.

⁴² Secretary to Desmond O'Malley, 'Letter to the Department of Finance', 22 December 1977, National Archives of Ireland, FIN/2016/16/342.

⁴³ Cooper and Davis, *The Irish Fertiliser Industry*, 277.

⁴⁴ Secretary to Desmond O'Malley, 'Letter to the Department of Finance', FIN/2016/16/342.

natural gas fertiliser on their fields with the help of a massive subsidy from the Irish people.”⁴⁵ Desmond’s argument shows that, given the novelty and scarcity of the Kinsale gas, the fertiliser manufactured at NET’s Marino facility was not seen as separate from its feedstock, with Desmond characterising it not simply as fertiliser but “natural gas fertiliser,” a hybrid agricultural-energy product. Patrick Hegarty, in defending NET’s use of the gas, made the same connection, saying “I would defend against all comers the decision to use natural gas for nitrogenous fertilisers. For far too long we had the same dependency for our fertiliser imports as we had for oil,” connecting the market fluctuations of both products and providing NET’s “natural gas fertiliser” as a more integrated, less economically volatile, and less expensive alternative.⁴⁶ As Michael Staub’s article ‘Farming with Petroleum’ shows, this acknowledgement of the industrial connection between natural gas and nitrogen fertiliser was a common point of discussion not only among Irish TD’s but among American industry actors and ecologists alike in the 1960s. Staub’s article shows that, as in Ireland, the 1973 oil crisis only served to make this connection more prominent in the global conversation.⁴⁷

III. Methane Materiality and the Irish Gas Network

Bord Gáis’s mandate to establish a natural gas network for the exploitation of the Kinsale field was a more complicated undertaking than simply welding together pipes. The construction of the gas network required taking the materiality of the gas itself into account, in its ability to interact with a larger assemblage of political, economic, and more-than-human intention. As Margarita Balmaceda explains in her book *Russian Energy Chains* that the materiality of gas as an energy source requires specific considerations in its transportation and use.⁴⁸ Natural gas is gaseous at room temperature, meaning it easily dissipates into the atmosphere, has a lower energy-to-volume ratio than other forms of fossil energy, and must be kept at a minimum pressure to move through a system of pipelines. In order to make use of Ireland’s newest domestic energy source, Bord Gáis could not build a rail system or a series of simple pipes like those used to transport solid and liquid fuel but instead needed to build a technically sophisticated and expensive system of pressurised pipelines to contain and transport the gas. Unlike infrastructure to transport liquid or solid fuels, such as oil, coal, or peat, this pipeline network could not be allowed to function at half-capacity if

⁴⁵ Barry Desmond. ‘Gas (Amendment) Bill, 1980: Second and Subsequent Stages.’ *Dáil Debates*, Dáil Éireann (21st Dáil). Vol. 325. No. 1. Col. 126. 2 Dec 1980.

⁴⁶ Patrick Hegarty. ‘Gas (Amendment) Bill, 1980: Second and Subsequent Stages.’ *Dáil Debates*, Dáil Éireann (21st Dáil). Vol. 325. No. 1. Col. 136. 2 Dec 1980.

⁴⁷ Staub, ‘Farming with Petroleum’, 354–7.

⁴⁸ Balmaceda, *Russian Energy Chains*, 55.

demand were to drop for a time, as the gas would not continue to move through the system if pressure was not maintained at a minimum rate.⁴⁹ BGE and the Irish state's social enactment of Kinsale field as a source of resilience and development involved a complicated material commitment. The gas needed to move from under the sea to the sites where it would be combusted. If the gas was not kept under this constant pressure, it would act differently, staying stationary in the pipeline or even dissipating into the atmosphere. The gaseous materiality of the Kinsale methane can thus be understood as a significant factor in shaping interactions between the gas itself, institutions, and their desires. This materiality prompted these institutions to develop particular spatial and temporal patterns of energy use.

Just as NET needed cheap gas to remain financially stable as a company in the increasingly competitive fertiliser market, the materiality of the Kinsale gas required anchor tenants, customers who would consistently use large amounts of gas, in order for the gas network's infrastructure to maintain adequate pressure and continue to shuttle gas around Bord Gáis's network. This demand would also have to be constant, as halving the supply through the pipeline network if demand slumped would cause the whole system to grind to a halt. NET and the Energy Supply Board (ESB), state industrial bodies themselves, were to serve as those anchor customers. NET's Marino Point plant would use fifty-two million cubic feet of gas per day and the ESB would use eighty-nine million cubic feet per day by switching its previously oil-powered generating station at Aghada, Co. Cork, to run on gas and building additional gas turbines at the site. These large industrial clients with immense needs for continuous supplies of gas represented the necessary baseline demand to keep the gas acting as expected instead of dissipating. Meanwhile, three per cent of the gas could be allocated to the Cork Gas Company to satisfy its network of town gas and local industry customers, specifically because ESB and NET's constant, high-volume demand would balance out the smaller and more variable demand of the Cork Gas Company's network.⁵⁰ The below graph from the Department of Finance's archival records (Fig 3.2) shows NET's demand as the literal base upon which BGE's growing network of smaller and more variable tenants was built throughout the 1970s and 1980s. While the ESB was projected to eventually reduce its demand for gas, the portion allocated to NET was expected to remain constant throughout the lifetime of the Marino Point facility.⁵¹

⁴⁹ Ibid.

⁵⁰ Justin Keating, 'Memorandum for the Information of the Government: Utilisation of Natural Gas Deposit off Cork Coast', Office of the Minister for Industry and Commerce, 12 March 1974, National Archives of Ireland, FIN/2016/20/213.

⁵¹ *Proposal by Revenue to Impose 2p/Gallon Duty on Gas from the Kinsale Head Field* (Department of Finance, 1981), National Archives of Ireland, FIN/2016/16/342.

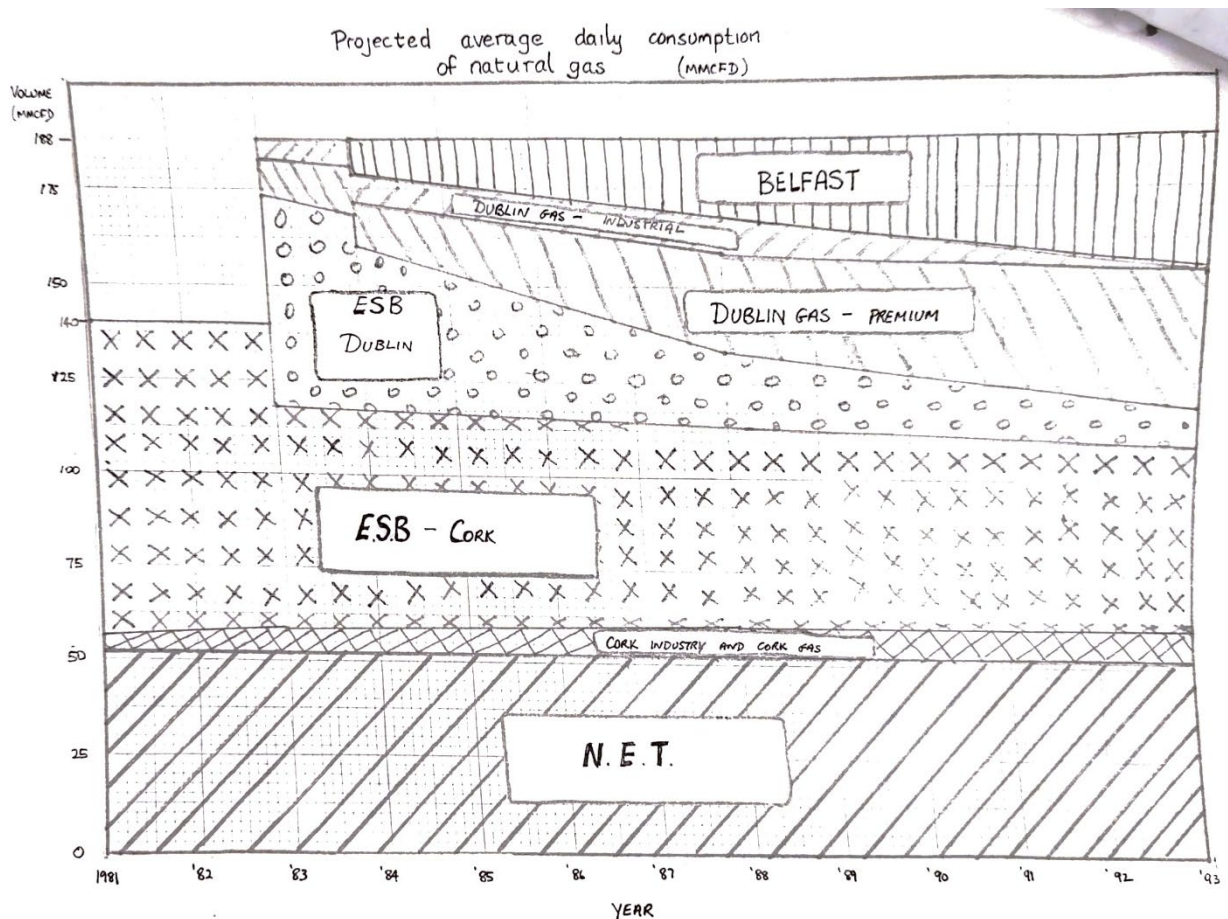


Figure 3.2: Graph included in a 1981 Department of Finance report on a proposal to impose a tax on Kinsale Head gas showing projected volumes of gas from Bord Gáis customers. Source: *Proposal by Revenue to Impose 2p/Gallon Duty on Gas from the Kinsale Head Field*, FIN/2016/16/342.

The development of Ireland's gas network and its relationship to Ireland's industry reflect a broader pattern within fossil energy history. In his book *Routes of Power*, Christopher Jones argues that new energy sources rely primarily on the existence of adequate supply infrastructure to generate the energy demand that ultimately legitimates the energy source. In other words, supply infrastructure must drive demand within energy regimes, demand does not generate supply.⁵²

Before the Kinsale Head discovery, Irish industry primarily depended on the import of fuel oil, while most gas customers, like the Cork Gas Company, relied on suppliers of town gas which represented relatively small and variable demand. In 1974, during discussions on how Kinsale gas was to be best used, TD Justin Keating, who had moved on from his agriculture programming position at RTÉ and was now serving in the Cosgrave government as Minister for Industry and

⁵² Jones, *Routes of Power*, 5.

Commerce, noted that “gas for the generation of electricity would not economically be the best use in normal circumstances but the energy crisis has altered priorities.”⁵³ Keating’s statement further demonstrates how the 1973 oil crisis and the ready abundance of energy from the Kinsale field influenced the creation of Ireland’s gas network. As Minister Keating acknowledged, gas was a less efficient source for generating electricity than other fossil fuels, but its inexpensive abundance made it worthwhile for ESB to not only switch over its current generating capacity in the Cork area to burn gas, but to build additional gas-burning turbines to increase its uptake of the new fuel source.⁵⁴

NET which had initially intended to use imported oil in its Marino Point, similarly re-tooled the Marino plant to use gas and opted to more than double its manufacturing capacity in response to the promised supply of the new energy source. Looking at Jones and Balmaceda together shows how, in the Irish context, these loops of energy supply and demand fed back into one another. BGE’s promise of a cheap supply of methane in the face of the 1973 oil crisis created demand from the ESB and NET, while the materiality of natural gas required these high-volume customers so that the gas network would be able to function and expand. With the constant demand from NET and the ESB, Bord Gáis’s network could reach smaller markets like the Cork Gas Company and, as projected by the Department of Finance (Fig 3.2), the cities of Dublin and Belfast. This expanded supply network was to create demand from more and different energy users, further cementing natural gas and its infrastructure into Ireland’s economic and material fabric. Taking the materiality of natural gas into account allows us to see that gas was not only a commodity, but an active participant in the political and economic assemblage of Ireland’s energy infrastructure.

⁵³ Keating, ‘Memorandum for the Information of the Government: Utilisation of Natural Gas Deposit off Cork Coast’, FIN/2016/20/213, 2.

⁵⁴ Gerald Luke, ‘Marathon Remain Cautious at Kinsale’, *Business and Finance* (Dubin), 11 August 1977, 12.

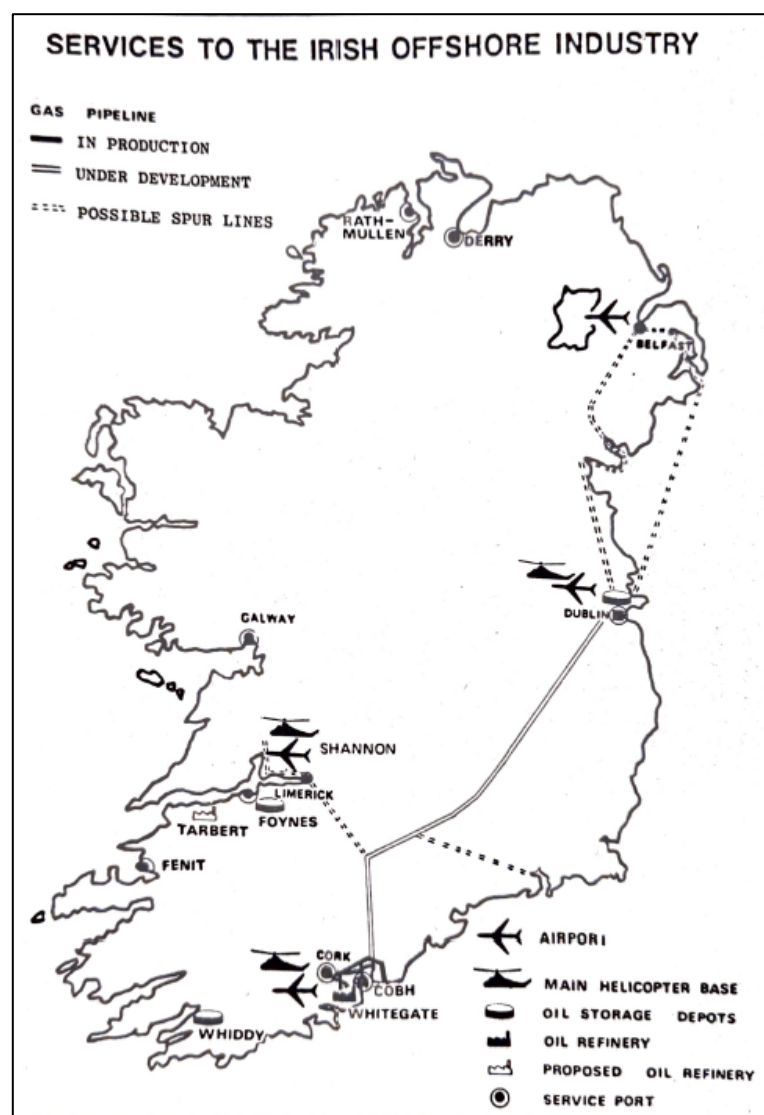


Figure 3.3: Map of existing and proposed pipelines across the island of Ireland created by Offshore Intelligence Ltd. and published in *The Irish Times* as part of a 1982 special report on Ireland's gas infrastructure. Source: Offshore Intelligence Ltd., 'Services to the Irish Offshore Industry', 16.

The initial gas network, illustrated in black in the map above (Fig 3.3), was contained to the Cork region when it began operating in 1979, while a pipeline from Cork to Dublin was only just announced at the time of the map's publication in the *Irish Times* in 1982.⁵⁵ As mentioned earlier in this chapter, the Dublin Gas Company initially proposed a pipeline to bring the Kinsale gas to Dublin in 1977, but Bord Gáis opted instead to begin with the small regional gas network around Cork rather than this intercity pipeline. Jones's ideas of energy regimes and Balmaceda's observations on the materiality of energy sources help understand this pattern of infrastructural

⁵⁵ Offshore Intelligence Ltd., 'Services to the Irish Offshore Industry', Quarterly Service Review, *The Irish Times*, 26 August 1982, 16.

development. First, considering the sizeable and continuous investment that would be needed to keep gas from changing pressure or dissipating within the network, the smaller initial gas network in the geographical area around Cork City was much less expensive to build and maintain than a lengthy set of pipelines to only supply the Dublin Gas Company. Though the network was regional, Bord Gáis was still able to argue that it was serving the Irish state and its population by turning the gas into cheap electricity and nitrate fertiliser.

Balmaceda also highlights that the material requirement for gas at pressure to flow in a single direction creates extractive geographies, where pressurised pipelines only allow gas to flow from the point of extraction to a single point of use.⁵⁶ In the case of the Kinsale gas this meant that a direct pipeline from the Kinsale gas field to Dublin would have created a one-way relationship, where the Cork region would not be able to make use of the majority of fossil fuel extracted from its coast. While Balmaceda shows how the material behaviour of gas under pressure shapes this relationship, Jones, in *Routes of Power*, argues that the investment in large-scale infrastructure like a pipeline system enables and reinforces these extractive relationships, entrenching uneven patterns of economic development.⁵⁷ While still built to extract gas from under the sea, the smaller regional network countered this trend, facilitating the industrialisation of Cork Harbour and the surrounding region. The regional network allowed the economic growth and industrialisation generated by the ESB, NET, and the availability of gas for smaller customers through the Cork Gas Company to stay in the region.

As indicated by the above map, the Dublin Gas Company did eventually come on as a customer in the 1980s, but the Department of Finance's projections show its demand to be much smaller than either of the industrial anchors with only a marginal estimated rate of increase over the years (Fig 3.2).⁵⁸ If Bord Gáis would have built the Cork to Dublin pipeline first as the Dublin Gas Company wanted, its smaller and more variable demand would not have allowed the pipeline network to operate reliably, especially considering the greater volume of gas needed in the system to maintain a minimum pressure over the pipeline's intercity distance. It was therefore important for Bord Gáis to maintain NET and ESB as customers for gas to continue to flow through the network as it grew to other cities. However, the appearance of the planned Cork-Dublin pipeline and the imagined routes to Limerick, Waterford, and Belfast with their associated heliports and airports, shows that the Kinsale gas also acted upon the imagination of the Irish state. Like gas

⁵⁶ Balmaceda, *Russian Energy Chains*, 56.

⁵⁷ Jones, *Routes of Power*, 141.

⁵⁸ *Proposal by Revenue to Impose 2p/Gallon Duty on Gas from the Kinsale Head Field*, National Archives of Ireland, FIN/2016/16/342.

under pressure flowing continually outward, the pressure of this newfound energy source led government and industrial actors to seek infrastructural and industrial expansion, despite the relatively small and time-limited footprint of the Kinsale find. NET was no exception, as its involvement with the gas network meant that the governments hopes for an expanded productive agricultural sector were likewise fuelled by this new source of domestic energy.

Comparison reveals the intricate interplay of political and industrial enactment of natural gas with the material demands of gas networks. The history of Denmark's gas network, as demonstrated by Mogens Rüdiger, presents a European counterexample to Ireland's natural gas and agricultural development. Like Ireland, Denmark, which joined the EEC in 1973, was a primarily agricultural economy with an oil-import dependant energy market. Like in the rest of northern Europe, the discovery of gas in Groningen prompted the Danish government to consider gas exploration and establish a state-owned gas company.⁵⁹ The Danish Oil and Natural Gas company (DONG) began constructing a gas grid in 1979, the same year gas came ashore in Ireland, relatively late compared to the development of gas and oil infrastructure in the rest of northern Europe.⁶⁰

The crucial difference between the Danish and Irish cases is that Denmark built its pipeline network to supply gas to its existing decentralised system of district heating from combined heat and power plants (CHP). Not only was this gas network more extensive than Ireland's Cork-centred network, but the distributed infrastructure of the heating districts reflected the underlying political value of democratic self-determination. Each of the heating districts were governed independently and would be given six years to switch over to natural gas as their energy source, spreading the demand for gas much thinner in both space and time.⁶¹ Unlike Bord Gáis's state-owned industrial tenants in Ireland, the smaller and more distributed demand of the Danish CHP plants made it more difficult to maintain adequate pressure in a much larger network of pipelines, similar to the Dublin Gas Company's initial 1977 proposal to pipe gas directly to Dublin's urban gas network. Though both networks were built by semi-state companies, which enacted natural gas as a source of energy that would serve the interests of the state and its people, the material qualities of natural gas acted against DONG's efforts to harness the gas by piping it into small-scale regional heat and power plants.

⁵⁹ Mogens Rüdiger, 'The 1973 Oil Crisis and the Designing of a Danish Energy Policy', *Historical Social Research / Historische Sozialforschung* 39, no. 4 (2014), 98.

⁶⁰ Rüdiger, 'The 1973 Oil Crisis and the Designing of a Danish Energy Policy', 106.

⁶¹ Mogens Rüdiger, 'The Natural Gas Controversy: The Introduction of Natural Gas in Denmark, 1972-1984', *Centaurus* 41 (1999), 101.

The Danish Government was caught between the materiality of natural gas, whose use as fuel worked best with networked high-volume infrastructure, and the distributed democratic processes of the heating districts, which felt they were being forced to adopt gas as their fuel.⁶² The shape of Denmark's distributed gas grid made this conflict material, ultimately leading to the delay of gas distribution through the network until 1984. Bord Gáis's centralised but smaller network, which served Ireland's people and state indirectly by providing electricity and nitrogen fertiliser, was more financially viable and easier to maintain on paper. Still, its reliance on a small number of large anchor customers would threaten to throw the whole distribution system into jeopardy if one of those customers decreased its demand or dropped out entirely. As NET continued to struggle financially and the relationship between Bord Gáis and Marathon Petroleum soured due to price fluctuations in the mid-1980s, NET's role as a necessary anchor to Ireland's new gas network became increasingly contentious.

IV. Gas Money and Fertiliser Finance

In May 1980, the chairman of NET received a report on the audit of their 1979 accounts conducted by William J. Mulcahy of the Comptroller & Auditor General's office.⁶³ The report declared that "the financial position of the company as reflected in the accounts and in the projections for 1980 and 1981 is a matter of grave concern to the Comptroller and Auditor General as indeed it must be to you and your board."⁶⁴ For 1979, the year NET's new facility was to come online, the company ran a loss of £11.9 million with projected losses in 1980 of £25 million.⁶⁵ As laid out previously, the company, despite embarking on a major expansion of its operations, had been in financial difficulties for years. The losses NET incurred by importing fuel oil during the oil crisis were compounded by high interest rates and international exchange rates on its borrowing. The company's expansion into compound fertiliser had incurred further debt, while the establishment of the subsidiary Arklow Gypsum in 1978 to sell the byproduct of phosphate manufacturing as construction materials incurred additional losses before it was shut down only two years later.⁶⁶

Though NET's Marino Point factory was a state-of-the-art facility when it was completed, its 1979 opening was fifteen months behind schedule due to major delays as well as industrial

⁶² Ibid.

⁶³ William J Mulcahy, 'Letter to J. P. Donnell', May 1980, National Archives of Ireland, TAOIS/2011/17/957.

⁶⁴ Ibid.

⁶⁵ Ibid.

⁶⁶ 'Capital Restructuring of Nitrigin Eireann Teoranta', Office of the Minister for Industry, Commerce, and Tourism, 29 April 1981, National Archives of Ireland, FIN/2016/20/213, 52.

action by construction workers. Those delays had come at an additional expense to the company, with construction costs ballooning from first estimates of £63.6 million in April of 1975 to an actual cost of £137.3 million. The collective weight of these shortfalls required NET to borrow even more at high interest rates to stay in business, with the company's short and medium-term borrowing topping £200 million in 1980.⁶⁷ These financial moves were criticised at the time. *Business and Finance Magazine* had commented already in 1973 that NET's anticipatory expansion was a common impulse among Irish fertiliser manufactures which resulted in a fertiliser oversupply the previous decade.⁶⁸ Mark Cooper and John Davis, in their history of the Irish fertiliser industry, criticise the government's establishment of NET in the first place, writing that "while it may have satisfied national pride and provided some employment in Arklow, the decision to proceed with an ammonia plant and fertiliser complex at Arklow was not justified at the time either commercially or on the grounds that it was good for the Irish fertiliser industry."⁶⁹

Though Cooper and Davis are right to call NET a financial misstep that cost the government dearly, the pattern of continual expansion and investment aligned with both Ireland's efforts toward economic expansion and global trends in nitrogen fertiliser manufacturing. The modernisation and growth of Irish agriculture was a high priority for the government, and silage and other mechanisms of that modernisation were pinned to the plastic carrying capacity enabled by nitrogen fertiliser. As Staub's research into the US fertiliser industry shows, oil companies from across the United States and the world also began purchasing nitrogen fertiliser manufacturers in 1963 as a promising new market for their fossil energy.⁷⁰ So even though it was recognised as poor financial strategy both at the time and in hindsight, it is not surprising that industrialists, and their backers in the Irish government, felt it would be good business to expand into the nitrates market.

This expansionism of the fertiliser industry, through its connections to fossil fuel companies, can be viewed through Jones's viewpoint as an active example of using supply to actively create demand.⁷¹ The expectation was that the fertiliser industry would manufacture such an abundance of nitrates that farmers and nations would have to shift their practices around it. In Bord Gáis's case, expansion of fertiliser production capacity, even at the financial risk of NET and the gas network, served as way to facilitate the distribution of an abundant supply of fossil energy from below the Celtic Sea.

⁶⁷ 'Prospectus for Proposed Consultancy Study', Interdepartmental Committee to Consider Options for the Future of Nitrigin Eireann Teoranta, 1 August 1981, National Archives of Ireland, TAOIS/2013/100/823, 2.

⁶⁸ Cooper and Davis, *The Irish Fertiliser Industry*, 277.

⁶⁹ *Ibid*, 207.

⁷⁰ Staub, 'Farming with Petroleum', 354.

⁷¹ Jones, *Routes of Power*, 61-62.

This supply-dependant growth outlined by Jones is also visible in the fertiliser industry's efforts to maintain an abundant supply of cheap nitrates. Even at a financial loss to NET, the expansion of manufacturing capacity ultimately enabled a shift to fertiliser-dependant on-farm practices like silage making and intensive stocking rates. In *Routes of Power*, Jones explores the adoption of anthracite-burning stoves in domestic spaces along the eastern United States as a key piece of supply infrastructure that locked in demand for the new energy source.⁷² In a similar fashion, the infrastructural investments needed to support high stocking rates and silage-making on Irish farms: silage pits, slatted animal housing, and farm machinery, infrastructurally locked farmers in to these practices, and by extension established a stable Irish market for nitrate fertiliser. The stable fertiliser market enabled by this infrastructure, along with BGE's network of pipelines, further locked in continuing Irish demand for gas.

From the beginning of NET's involvement with the Kinsale gas field, and even before the gas began flowing to their Marino Point facility, the company's financial difficulties meant that their Cork operations and the survival of the company as a whole depended on their supply of gas remaining steady and cheap. There was concern as early as 1978, a year before gas was due to come ashore, as to whether NET could afford a planned levy on the gas. With the Finance Minister due to announce the levy in his 1978 budget speech, R. J. Curran, a civil servant within the department, cautioned that the NET plant "may not be viable unless it gets gas at or near the price negotiated with Marathon, which apparently has been assumed by NET so far."⁷³ Curran added in parentheses that "the presumption of NET in its apparent assumption that it will get the gas at a low price is staggering, particularly bearing in mind that contracts for the construction of the plant have already been made."⁷⁴

Despite this unpopularity within the Department of Finance, NET's existential reliance on an inexpensive supply of gas led to much discussion as to how to legally exempt the company from a natural gas excise duty to be paid to the exchequer on gas sold by BGE. One particularly convoluted proposal of how to carve NET out of the tax reads: "natural gas, other than natural gas used for the generation of electricity, sold under a contract... entered into prior to 1 January, 1978 shall be free of duty or subject to a duty of _____ per 1,000 cubic feet."⁷⁵ The reason for the difficult language was to exempt only NET, but not the more financially stable ESB, from paying

⁷² Ibid.

⁷³ R. J. Curran, 'Possible Reference in the Budget to the Imposition of a Transmission Tax on Kinsale Head Gas', 7 January 1976, National Archives of Ireland, FIN/2016/16/342.

⁷⁴ Ibid.

⁷⁵ 'Revised Outline of a Proposal for an Excise Duty on Natural Gas', Department of Finance, 1978, National Archives of Ireland, FIN/2016/16/342, 4.

the natural gas duty without creating a loophole for other fertiliser manufacturers like ICI to take advantage of this artificially cheap gas. Further complicating the situation, the selective exemption of NET from the excise duty gave preference to a state-owned company over other European firms and would therefore have been in violation of EEC anti-competition policies. In the end, it was decided that Bord Gáis, instead of adding any kind of tax to their gas would charge an “energy-related price which has been negotiated with the consumers” the profits from which would be implicitly passed along to the exchequer.⁷⁶ This non-tax allowed Bord Gáis to exercise a large amount of discretion over what it charged to its customers while avoiding issues with the EEC and preserving some income for Bord Gáis and the Exchequer. Given that these were prices between businesses and not taxes, each company’s rate would not immediately be made available to concerned members of the public or the Oireachtas.⁷⁷

Thus, the Irish state actively subsidised the development of the fossil-dependent fertiliser industry in order to support its expansionist agricultural policy. As Paul Tansey reported in the *Irish Times*, the way this negotiated “energy-related price” manifested in 1981’s actual rates was that NET was charged a base price of 6.5p per therm for gas, ESB 14p per therm, and other industries 45p per therm. The base price of 16p per therm charged to the similarly struggling state-sponsored body Irish steel indicates that the exceptional price charged to NET may not have only been related to their financial issues, but the state’s intention to keep the price of their fertiliser products as low as possible.⁷⁸ According to Bord Gáis, contracts with new industries at the 45p base rate were based on the price of gas and diesel at the time of negotiation. For the ESB, their price of 14p was set to match the price of alternative fuels like heavy fuel oil that the utility would otherwise use to generate the same amount of electricity as an incentive for them to keep using natural gas. For NET, their 6.5p rate corresponded to, in Tansey’s words, “the amount paid to Marathon and BGE’s transmission charges... the rock bottom price... not related to any energy equivalent.”⁷⁹ While other state-owned bodies like the ESB and Irish Steel were paying far below the market rate for gas, NET’s fraction of that rate demonstrates the importance of exploiting this the fertiliser-gas connection to the Irish state.

Regardless of whether the exact price was known to the public, the subsidisation of NET made it a source of scrutiny and intrigue in the government as well as the public. In an exchange

⁷⁶ Secretary to Desmond O’Malley, ‘Letter to the Department of Finance’, 19 January 1979, National Archives of Ireland, FIN/2016/16/342; ‘Natural Gas; Question of Introducing Excise Duty’, Department of Finance, 1980, National Archives of Ireland, FIN/2016/16/342.

⁷⁷ Paul Tansey, ‘NET Cost in Natural Gas’, *The Irish Times* (Dublin), 3 December 1980, 10.

⁷⁸ Department of Finance, ‘Letter to Mr. O’Toole’, 3 October 1980, National Archives of Ireland, FIN/2016/16/342.

⁷⁹ ‘Natural Gas; Question of Introducing Excise Duty’ (Department of Finance, 1980), FIN/2016/16/342, National Archives of Ireland.

with fellow Department of Finance staffer Philip Furlong about a proposed 4.4p tax on Kinsale gas for the 1980 budget, J. Nolan called the financing of NET's new plant "a nightmare of gargantuan proportions," but cautioned that the imposition of a tax "would make a disastrous situation even more disastrous even though it pains one to think of natural gas being used at a fraction of its energy-related price."⁸⁰ This demonstrates the complication of sources of fossil energy, not only as materially influential to the development of infrastructure, but as social objects that serve as symbols of mutable economic value. Law and Mol discuss how the enactment of Cumbrian sheep as symbols of economic value could fluctuate drastically, for instance when the market was oversaturated or when foot in mouth made them a liability.⁸¹ The conflict between NET and the Department of Finance over gas rates shows similar complications, with the value of natural gas at times inflated by scarcity, deflated by currency exchanges, or compounded by interest rates. NET's fertiliser is similarly enacted and revalued in different ways by different actors. The low financial value NET was able to avail of for Kinsale gas would have resulted in a relatively low fertiliser price for farmers, but these low price were not related caused by energy market fluctuations or oversupply, but the high political value of fertiliser nitrogen as a tool of the state's efforts to industrialise Irish agriculture. This high political value meant that Bord Gáis, the Exchequer, and NET all took on various financial losses, some more willingly than others, in order to facilitate the continued manufacture and use of nitrate fertiliser.

Paul Tansey's reporting on the rates charged by BGE came as part of his series of investigative articles on NET's struggling finances. In this series, Tansey posited that NET's overly optimistic projections of growth in fertiliser demand from Irish farmers were costing the public dearly, as the subsidised cost of natural gas needed to be supplemented by £80 million in equity to continue servicing its debt.⁸² Tim Farris, writing for *Business and Finance* presented a similar investigative analysis of the company's finances, claiming that NET's financial issues went back further than the Marino Point development, that "even in its early years the company was a marginal operator, its highest return on capital employed being 8.7% in 1969" and that, since the following year, the company had "suffered losses in all years except 1971 and 1973."⁸³ Farris did not lay the blame for NET's losses solely on the manufacturer, but recognised that the 1973 oil crisis sent the company into a downward spiral of increasing feedstock costs and oversaturated sales markets.

⁸⁰ J. Nolan, 'Letter to Philip Furlong', 4 December 1980, National Archives of Ireland, FIN/2016/16/342.

⁸¹ Law and Mol, 'The Actor-Enacted', 63

⁸² Paul Tansey, 'NET Likely to Lose £30m This Year', *The Irish Times* (Dublin), 12 January 1980; Paul Tansey, 'NET Now Owes £190 Million, Oireachtas Committee Told', *The Irish Times* (Dublin), 23 October 1980, 7.

⁸³ Tom Ferris, 'The NET Debacle', *Business and Finance*, 28 May 1981.

This spiral forced NET to choose between cutting its more costly operations like making compound fertilisers or the expansion of operations to make production costs less expensive in the long run. Farris's article concluded that between these two options the expansion track was preferred from a business point of view because it would have helped NET protect its share of the fertiliser market in Ireland. But Farris also acknowledged the Irish government's planned reliance on agriculture as its primary economic engine, explaining that despite NET's continually worsening finances, keeping up the supply of fertiliser for Irish farmers would have taken priority for the government.⁸⁴ This choice to gamble on expansion in the face of a market downturn was why the expansion to Marino Point was planned before a natural gas feedstock became a possibility. Even if expansion would have pushed NET further into debt or if the oil-dependent process would not have been able to compete with international competitors like ICI, NET's financial salience depended on the company chasing the global wave of agricultural industrialisation, relying on the Irish state's dependence on cheap synthetic nitrate to do so.

Once the Marino plant was built, its position as an anchor of Bord Gáis's nascent gas network further solidified NET's centrality to the state's development plans. This made it imperative for the government to step in and find a way out of NET's financial difficulties. Thus, in 1980 an interdepartmental committee, consisting of officials from the departments of Finance, Energy, Agriculture, the department of Industry, Commerce and Tourism, and the Taoiseach was formed to investigate NET's finances and come up with a way to resolve its issues. The options presented to the committee were to operate both or just one of NET's plants, close NET and dismantle its facilities to sell abroad, sell the company or enter into a joint venture with a private manufacturer, or "mothballing" the new Marino Point plant until it could be operated profitably.⁸⁵ The Department of Energy's supplement to the Committee's proceedings make its perspectives clear, stressing "that the fundamental question to be addressed by the Committee should be a comparison of the use of gas for fertilizer manufacture with that for energy purposes," and calling the subsidy given to NET for the purchase of natural gas "a continuous drain of State funds."⁸⁶ The Department of Energy evidently saw a potential expansion of ESB's operations if NET's share of the gas were to become available. Still, the ESB did not immediately have the capacity to absorb the excess gas, nor would any other major players be able to make a dent in the amount of gas used by NET until the pipeline connecting the Dublin Gas Company was completed. While the

⁸⁴ Ibid.

⁸⁵ O. O'Hara et al., 'Inter-Departmental Committee to Consider Options for the Future of Nitrigin Éireann Teoranta, Draft Terms of Reference', Department of the Taoiseach, 4 June 1981, National Archives of Ireland, TAOIS/2013/100/823, 1-3.

⁸⁶ Ibid, 2.

oversaturation of the ammonia and nitrate market by the boom in nitrate manufacturing meant it would have been just as expensive for NET to buy ammonia than to manufacture it, the committee saw NET's role as an anchor for the gas network as too important a sunk cost in the development of Ireland's new fossil energy regime.⁸⁷

The Department of Agriculture's representative also made their intentions clear. The representative expressed the priority to "ensure that Irish farmers had access to fertilisers at the cheapest possible rates while, at the same time, recognising the importance of security of supply" and circulated material on farmers' steadily growing demand for nitrogen fertiliser.⁸⁸ The Department's report on the market admitted that NET's projected sales over the next years were optimistic, but assured the committee that "the Company is actively marketing and promoting the product" and that nitrogen fertiliser sales were expected to be more resilient than other fertilisers as "nitrogen application gives an immediate financial return to the farmer whereas P and K application may be deferred for one or two years without any immediate [improvement]."⁸⁹ The Taoiseach and Department of Finance's statement to the committee emphasised the value of "NET itself and, in particular, its future prospects," showing that the government as a whole valued the fertiliser manufacturer for its contribution to the country's agricultural industry and, despite the Department of Energy's criticisms, sought to find a way for its future longevity.⁹⁰

The interlinking of gas and fertiliser with Ireland's national development was not only the purview of government ministers. In August of 1982, the *Irish Times* ran a four-page special report to announce the planned gas pipeline from Cork to Dublin. Exemplifying the report's commemorative tone, reporter Dick Ahlstrom described the "quiet revolution" of gas that was to "alter irrevocably a familiar source of energy for the Irish consumer," touting the Kinsale gas as "the purest in Europe, being almost wholly methane and free from pollutants."⁹¹ An advertisement for Bord Gáis within the report described natural gas as "Ireland's own energy" and illustrated the flow of Kinsale gas through the Irish landscape (Fig 3.4). The headline of the advertisement reads "Putting Natural Gas to work for Ireland," with a prominent illustration of a drilling platform in the centre. Other illustrations arc around the page, showing all the work natural gas would enable: an electrical turbine and a gas stove followed by an agricultural landscape with a fertiliser spreader being towed by a tractor, two cows grazing on a grassy hillside, and a creamery worker pumping

⁸⁷ John Blaney, 'Nitrogen Eireann Teo - Loan Agreements and Ammonia and Urea Marketing Contracts', 24 October 1983, National Archives of Ireland, AGO/2013/16/1087, 3.

⁸⁸ O'Hara et al., 'Draft Terms of Reference', TAOIS/2013/100/823, 2.

⁸⁹ *Fertilizer Market Situation in Ireland* (Department of Agriculture, 1981), National Archives of Ireland, TAOIS/2013/100/823, 2-3.

⁹⁰ O'Hara et al, Draft Terms of Reference, TAOIS/2013/100/823, 2.

⁹¹ Dick Ahlstrom, 'Gas: An Irish Times Special Report', *The Irish Times* (Dublin), 26 August 1982, 15-17

milk from a bulk-tank.⁹² The celebration of work and of labour connected across the island by the network of gas pipelines indicates just how profoundly natural gas remade the Irish landscape and, most prominently, its agricultural sector. The prominence of agriculture and fertiliser in the advertisement especially demonstrates the strong association of NET with the image of modern industrial Ireland in the 1980s, despite its insolvency.

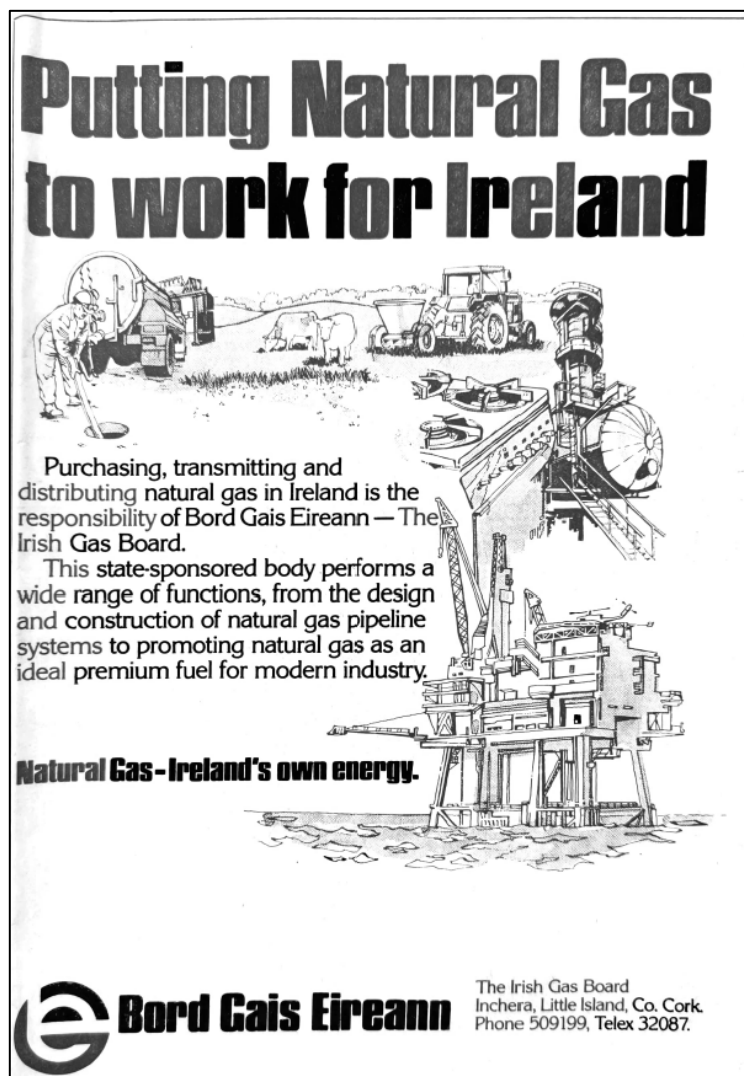


Figure 3.4: Advertisement from Bord Gáis which ran in the Irish Times as part of a 1982 spread commemorating the building of a gas pipeline between Cork and Dublin. The image prominently connects gas infrastructure, household appliances, industry, and agriculture. Source: 'Putting Natural Gas to Work for Ireland', *The Irish Times*, 18.

⁹² 'Putting Natural Gas to Work for Ireland', Advertisement, *The Irish Times* (Dublin), 26 August 1982, 18.

V. NET's Recovery and Globalisation

In the mid-1980s, the economics of the natural gas trade changed again, throwing yet another financial wrench in the development of Ireland's fossil-agricultural complex. After relatively high prices throughout the 1970s due to the series of crises and shortages in the energy market, oil prices fell in the early 1980s as supplies began to stabilise.⁹³ Gas prices followed oil prices in this decrease, threatening the profitability of Europe's burgeoning gas infrastructure. In the Danish case, construction of the natural gas grid finished in 1984 and was rendered economically useless at its debut by the price decline, only to be rescued by significant financial aid from the Danish government.⁹⁴ In Ireland, financial difficulties were further complicated by the specific agreements made between Bord Gáis and Marathon at the project's outset in 1975. Marathon's expenses in constructing the natural gas platforms and pipeline were paid in US dollars while Bord Gáis's payment for gas were to be made in Irish pounds. The initial agreement between the two bodies was that Bord Gáis, for the first ten years of operation, would pay for gas at a rate pinned to the dollar exchange rate in order to allow Marathon to recoup their initial investment.⁹⁵ However, not only did the price for gas decrease in the 1980s, the value of the American dollar increased significantly over the same period that the Irish pound was falling. Decreasing gas prices meant that Marathon was recouping less than expected from its operations in Ireland, but the increased relative value of the dollar meant that Bord Gáis had to pay Marathon more for gas from which it was not able to retain significant profits, especially when customers like NET were unable to pay more than a wholesale price for the gas.

This led to a conflict around the currency protection clause of BGE and Marathon's 1975 agreement. In order to stem its losses, Bord Gáis interpreted the clause as expiring in 1985, ten years after the agreement was made. Marathon insisted, through several documents and an affidavit sworn in Texas by the president of Marathon Ireland, that the ten-year period logically began "the year in which the First Delivery Date occurs" in 1979.⁹⁶ This meant that Marathon could expect another four years of currency protection in its payments from BGE. The barrage of documents submitted by Marathon to the court makes the company's case quite dramatically and, as an Irish subsidiary of a global fossil fuel corporation, the losses in currency protection from the Kinsale Field were certainly not the emergency the documents made it out to be. Regardless of the severity, BGE's earlier interpretation of the ten-year period would still have meant a loss of some degree if

⁹³ *Kinsale Head Economics*, 21 (Marathon Petroleum Ireland Inc., 1985), National Archives of Ireland, TAOIS/2015/21/1206.

⁹⁴ Rüdiger, 'The Natural Gas Controversy', 106.

⁹⁵ *Marathon Petroleum Ireland, Ltd. v Bord Gáis Éireann*, No. 778 (High Court 11 May 1985), 11.

⁹⁶ *Ibid.*

Marathon received the un-adjusted market rate in Irish pounds of an already weakened price for the natural gas.

While this dispute was being litigated in Ireland's High Court, Marathon retaliated by throttling the supply of gas from the Kinsale operation. Gas inputs from the Kinsale field peaked in 1985 with the energy equivalent of 1.75 million tons of gas being brought ashore, but fell the following three years to a low point equivalent to 947 thousand tons of gas.⁹⁷ Despite this decreased supply of gas, NET's operations were not severely affected, as gas sales used in primary energy production decreased 60.1 per cent in 1986, leaving adequate fuel to support NET's operations.⁹⁸ This decrease in gas for energy production corresponds with the introduction of ESB's coal-fired station Moneypoint on the Shannon estuary, which gradually began to come online from 1985 and was fully operational by 1987. Moneypoint allowed ESB to absorb Marathon's throttling of the gas supply by shifting its mix of energy to rely more heavily on imported coal, whose importance to Irish electricity generation remains today.⁹⁹

The shift in the use of Kinsale Head gas from a fuel used to generate electricity alongside industrial and heating uses to a primarily industrial feedstock in response to the introduction of coal is best understood within the framework of energy addition and intensification by Christophe Bonneuil and Jean-Baptiste Fressoz in their book *Shock of the Anthropocene*.¹⁰⁰ Bonneuil and Fressoz argue that the narrative of energy transitions, where oil is substituted for coal or wind and solar are substituted for oil, masks the underlying reality that sources of energy are rarely entirely substituted, but instead accumulate over time. The introduction of Moneypoint may have represented a transition to coal for the ESB's electricity production, allowing it to compensate for lower levels of gas being brought ashore, but NET's industrial use of the gas along with the expansion of BGE's gas network to Dublin and other cities meant that Moneypoint's coal demand did not displace but instead added to the existing supply of fossil energy from gas. As shown in the below graph from the Department of Energy's *Energy in Ireland* report (Fig 3.5), neither the introduction of natural gas to the Irish energy mix nor the ESB's switch to coal with the construction of Moneypoint displaced a previous energy source. Indeed, the ESB's Aghada plant in Cork still burns gas for electricity today.¹⁰¹ This twenty-year period represents an accumulation of additional energy sources that compounded over time. Returning to Jones's argument in *Routes*

⁹⁷ *Energy in Ireland 1985* (Department of Energy, 1986), 5; Alison Meyers, *Energy in Ireland 1980-1993: A Statistical Bulletin* (Department of Transport, Energy & Communications, 1994), 7.

⁹⁸ *Energy in Ireland October-December 1986* (Department of Energy, 1987), 3.

⁹⁹ 'Moneypoint', ESB Archives, 2023.

¹⁰⁰ Christophe Bonneuil and Jean-Baptiste Fressoz, *The shock of the Anthropocene: The Earth, History, and Us* (Verso, 2016), 100-101

¹⁰¹ 'Aghada', ESB Archives, 2022.

of Power, while the ESB and NET's continuous needs for large volumes of gas allowed Bord Gáis's network to gain a foothold, the cheap supply of natural gas had since allowed the gas network to create enough demand to keep the network functioning even without the ESB's demand and with Marathon throttling the supply.

Figure 1.1 Fuel mix in Total Primary Energy Requirement (1980-1993)

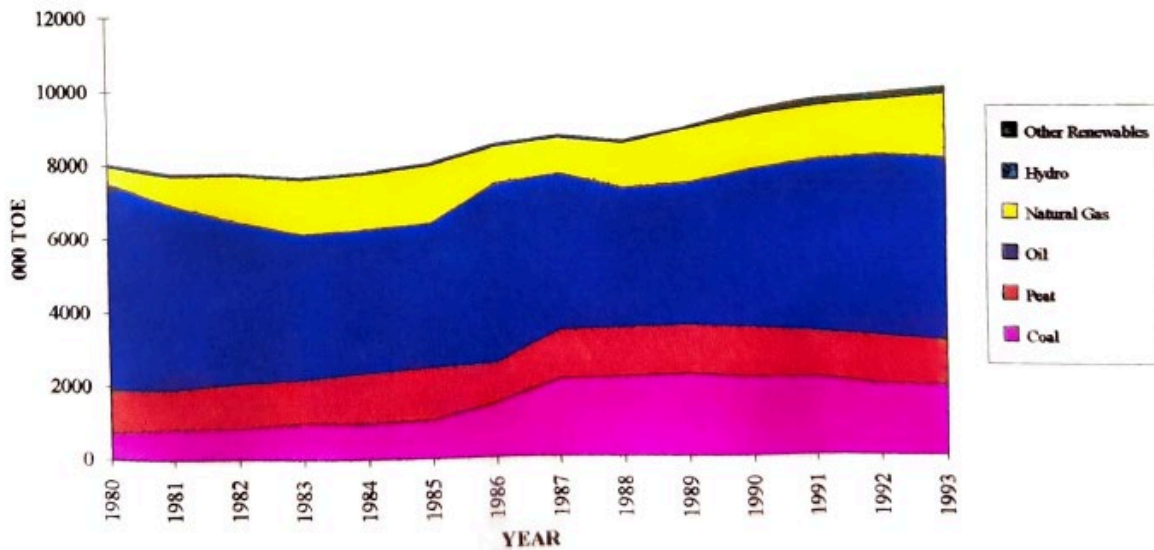


Figure 3.5: Graph from the 1994 *Energy in Ireland* statistical bulletin showing the mix of energy sources used across Ireland from 1980 to 1993. The decrease in natural gas use, shown in yellow and beginning in 1986 and continuing through 1988, is compensated for by an increase in coal over the same period, shown in pink. Source: *Energy In Ireland 1980-1993*, 5.

In order to improve its financial position, NET laid off almost 500 workers in 1981 and 1982 while working to sell as much fertiliser as it was possible for the still new Marino Point facility to manufacture.¹⁰² By 1984 these efforts to streamline operations resulted in a small profit for the company, prompting *Business and Finance* reporter Jim Dunne to ask if NET was “a white elephant no longer.”¹⁰³ This continued profit was contingent on more than its reduced workforce and more aggressive sales. As reported by Dunne, the decision of the Soviet Union, which had become the largest global producer of nitrate fertiliser, to increase fertiliser prices buoyed the whole market for nitrates and allowed NET to charge more favourable prices for its ammonia and CAN fertiliser. The most important factor of NET's success, however, was the continuation of the wholesale prices it was paying for gas from BGE, which led Dunne to wonder if NET would soon

¹⁰² Cyril Hardiman, ‘NET Trims Back Its Losses by £19m’, *The Irish Independent* (Dublin), 25 March 1982, 6.

¹⁰³ Jim Dunne, ‘Nitrogen Eireann - a White Elephant No Longer?’, *Business and Finance*, 21 February 1985, 44.

“become a victim of its success,” with its new profits making it more difficult to justify the low prices it was paying for its fossil fuel feedstock.¹⁰⁴ Even though the gas network was able to weather Marathon’s throttling of the supply, this dispute over the currency provision bears out Dunne’s trepidation, demonstrating Bord Gáis’s desperation to recoup as much as possible from the Kinsale field. With a lessened supply of gas from Marathon and the loss of payments from the ESB, Bord Gáis’s tighter finances led to an increased scrutiny on NET’s financial difficulties and its role in the natural gas market.

NET’s eventual financial solvency was not the result of the company’s steady sales in Ireland, but an improvement to the global market and increased demand for nitrogen fertiliser abroad. In anticipation of the construction of the Marino Point factory, NET had entered into two nested contracts to market the expected surplus from the factory outside of Ireland. In 1977, NET estimated that only fifty-eight per cent of its production would be used domestically, but that by the mid-1980s domestic demand would account for almost all of its production, though this was recognised by the government as overly optimistic.¹⁰⁵ The first contract, made with the English company CRC Chemicals Ltd., agreed that any surplus ammonia not allocated to the Irish market would be sold by CRC under its own name. CRC would also avail of a three per cent discount as recognition that NET “is availing itself of CRC’s marketing services and has access to CRC’s international marketing know-how.”¹⁰⁶ A second contract with the Dutch distributor International Resources B.V. (IRBV) to sell the surplus ammonia left “after NET’s requirements for product to satisfy demand for the Product in the Republic of Ireland and the United Kingdom including Northern Ireland have been covered” to IRBV. IRBV would market NET ammonia to its global customers, also availing of the three per cent ‘know-how’ discount.¹⁰⁷ Together these contracts mapped out NET’s nested responsibilities for fertiliser sales, first to satisfy the Irish market through its own sales, then the UK market through CRC, and finally to sell the remainder internationally via IRBV.

NET may have had a monopoly on ammonia and nitrate manufacturing in Ireland, but it was not the only company selling nitrogen fertiliser in Ireland. This meant that, though NET had a mandate to satisfy the fertiliser needs of Irish farmers, that did not exactly mean that NET needed

¹⁰⁴ Ibid.

¹⁰⁵ ‘Kinsale Head Information Memorandum’, TAOIS/2015/21/1206, 18; Justin Keating, ‘Memorandum for the Information of the Government: Utilisation of Natural Gas Deposit off Cork Coast’, Office of the Minister for Industry and Commerce, 12 March 1974, National Archives of Ireland, FIN/2016/20/213, 44.

¹⁰⁶ Nitrigin Éireann Teoranta and CRC Chemicals Ltd., ‘Ammonia Marketing Contract’, 30 September 1976, National Archives of Ireland, AGO/2013/16/1087, 1.

¹⁰⁷ Nitrigin Éireann Teoranta and International Resources B.V., ‘Ammonia Marketing Contract’, 30 September 1976, National Archives of Ireland, AGO/2013/16/1087, 1.

to actually supply every farmer with their fertiliser. Within the context of the Irish fertiliser market, the amount needed to satisfy Irish demand for nitrogen was more complicated to define, taking into account the price and demand for NET fertiliser in relation to other Irish and international companies selling in Ireland, along with the fertiliser price at any given moment. This represents yet another social enactment of nitrate fertiliser by the company itself, as a commodity whose price and distribution was best determined by a global market and its own bottom line. While NET's continued supply was seen by the state as essential in the midst of the oil crisis, it is unclear whether NET's fertiliser continued to be affordable for the average Irish farmer through the 1970s and 1980s. In fact, the Department of Agriculture's representative to the interdepartmental committee formed to help the company's finances openly acknowledged "that the prices of NET fertilisers to Irish farmers are significantly higher than current world prices."¹⁰⁸ Later in 1986, the Irish Farmers Association held a protest outside the Marino Point factory in 1986, claiming that NET's prices for calcium ammonium nitrate and urea were twenty pounds more expensive per ton than in the UK (Fig. 3.6).¹⁰⁹ In light of the conflict between financial and climate difficulties faced by Irish farmers throughout the 1980s and the consistent government pressure to modernise, farm operations would not have been helped by any increase in NET's prices.

¹⁰⁸ *Future of Nitrigin Éireann Teoranta (NET)* (Ministry of Finance, 1981), National Archives of Ireland, FIN/2016/16/342, 4.

¹⁰⁹ 'Fertiliser Prices Too High', *RTÉ News*, with Tom MacSweeney, Raidió Teilifís Éireann, 30 April 1986, 00:01:23, RTÉ Archives.



Figure 3.6: Still from an *RTE News* report on a 1986 protest of the Cork chapter of the Irish Farmers Association against NET's prices. The farmer pictured is holding a sign that reads "Duhallow IFA Don't forget if you go for NETT no cash will you be storing." Source: Tom MacSweeney, 'Fertiliser Prices Too High'.

Instead of sharing the government's enactment of fertiliser as an essential tool for modernisation, regardless of cost to the government, NET enacted their fertiliser as a financial product: a tool to maximise profit or, given the company's financial situation, minimise losses and pay down debt. This expectation was built into NET's incorporation as a semi-state entity that could avail of public money but was still expected to operate profitably. The flexibility in NET's responsibility to satisfy the Irish market gave NET greater license to enter international markets, but that too opened the company to criticism. As discussed earlier in the chapter, Barry Desmond's Dáil statement specifically criticised NET for using heavily subsidised Irish gas to manufacture fertiliser that was exported to European and Asian markets instead of keeping to the Irish market.¹¹⁰ Desmond's statement indicates that NET's structure opened it to criticism from both sides, that it was neither functioning as a profitable private enterprise, nor was it adequately serving the Irish public interest as a utility. Desmond criticised both that NET used discounted domestic fossil energy for international export rather than Irish agricultural development, and that its fertiliser

¹¹⁰ Barry Desmond. 'Gas (Amendment) Bill, 1980: Second and Subsequent Stages.' *Dáil Debates*, Dáil Éireann (21st Dáil). Vol. 325. No. 1. 126. 2 Dec 1980.

manufacturing operations operated at a loss.¹¹¹ In 1983, amidst the interdepartmental committee's efforts to find a profitable path for NET's future, these export contracts were seen as a potential barrier to closing or "mothballing" the Marino plant to cut losses, as NET would still be required to apportion some amount of ammonia to foreign contract holders if supplies were reduced.¹¹² However, the international market for ammonia proved to be the lifeline NET would need to remain profitable and pay back its debt. According to NET's CEO Tom Jago in 1985, the USSR's decision to raise prices and the growing markets for fertiliser in Asia made it "more profitable to sell to Indian and Chinese farmers than it is to Irish ones!"¹¹³

VI. Conclusion

The globalisation of NET's fertiliser, and by extension the gas from the Kinsale field, reflects the pattern of the Green Revolution explored by Jonathan Harwood, Michael Staub and others. Harwood's research show that fertiliser and tractor imports followed the spread of high-yielding crops throughout South America and Asia, causing a reciprocal flow of profits in the other direction.¹¹⁴ Staub's work adds that fossil energy companies actively participated in the promotion of this package of high yielding varieties, fertilisers, and irrigation and were thus eager to harvest their own revolutionary profits.¹¹⁵ Though the assemblage of methane and nitrogen flowing through NET, BGE, and Marathon was instrumental to Ireland's own kind of Green Revolution and agricultural modernisation, these companies were no exception in their pursuit of profit in exports to the Global South. At the same time, it is understandable for the IFA and TDs like Barry Desmond to feel some kind of betrayal upon hearing Tom Jago declare his preference for customers abroad after so much public money had been invested and lost in keeping this instrument of Ireland's agricultural industrialisation alive.

In the *Business and Finance* article, as well as reporting from *RTÉ News*, NET head Tom Jago alluded to a possible future merger with its former rival, the Belfast based ICI. ICI held a significant share of the fertiliser market across the island of Ireland and in the UK but lacked NET's European and global contracts for ammonia.¹¹⁶ The merger, which ultimately took place in 1987, formed Irish Fertiliser Industries (IFI) a joint venture with fifty-one per cent ownership by NET.

¹¹¹ Ibid.

¹¹² Owen J. Binchy, 'Letter to C. McGovern, Esq, NET Company Secretary', 21 February 1983, National Archives of Ireland, AGO/2013/16/1087.

¹¹³ Dunne, 'Nitrigin Eireann - a White Elephant No Longer?', 44.

¹¹⁴ Jonathan Harwood, 'The Green Revolution as a Process of Global Circulation: Plants, People, and Practices', *Historia Agrari* 75 (August 2018), 21-22.

¹¹⁵ Staub, 'Farming with Petroleum', 351.

¹¹⁶ 'NET in Profit', *RTÉ News*, with Patrick Kinsella, Raidió Teilifís Éireann, 11 July 1985, 00:01:35, RTÉ Archives.

NET would crucially retain its government ownership and lower price for gas, which it would sell to IFI at a profitable rate linked to the price of oil through 1999. NET and the Marino Point factory were both shuttered in 2000, with IFI and its Belfast factory remaining the only fertiliser manufacturer in Ireland.¹¹⁷

In both his statement to RTÉ and *Business and Finance* about the impending merger of NET and ICI in 1986, Tom Jago used the language of a “thirty-two county” fertiliser industry. In the midst of the Troubles, this Republican language boasts that the island of Ireland, though divided politically, could still be united through the industrial complex of natural gas, fertiliser, and agriculture sketched out in this chapter.¹¹⁸ Bord Gáis’s network of pipelines also reflected this idea of a thirty-two county industry, as it expanded over the southern part of the island and across the border to bring Kinsale gas to Belfast where ICI’s manufacturing took place. There is a deep irony in this industrial triumph over Ireland’s political divide, as nitrate’s material qualities also allowed it to act as a political weapon in border conflicts throughout the time period covered in this chapter. In 1972, the Irish government banned fertilisers with nitrate concentrations above seventy-nine per cent due to its potential use as an explosive, and *RTÉ News* reported on several fertiliser bombs discovered on farms along the border throughout the 1980s.¹¹⁹

The image of a united Ireland could be read as triumph over the island’s colonial legacy, but Jago’s evocation of this image carried with it an underlying coloniality when placed in Walter Mignolo’s CMP framework. While Chapter Two discussed how fertiliser nitrogen represented a kind of control over the productive capacity of pasture systems, this chapter has shown that fertiliser itself was the product of the extraction and precise control of ‘natural’ gas as a source of energy through BGE’s network of pressurised pipes. That this reunion of Ireland’s thirty-two counties came about through Bord Gáis’s network of pipelines and NET/IFI’s fertiliser was a kind of post-colonial liberation, not enabled by a dismantling of the colonial matrix of power, but by ascending to the top of the colonial hierarchy through the making and precise control of the island’s ‘natural resources.’ Tom Jago’s appointment to the presidency of the European Fertiliser Manufacturing Association in 1994 demonstrates NET’s success in forging a European industry in Ireland, even as its southern production was winding down.¹²⁰ But NET’s participation alongside

¹¹⁷ ‘NET To Merge With ICI’, *RTÉ News* (Dublin: Raidió Telefís Éireann, 26 June 1986), RTÉ Archive.; Cooper and Davis, *The Irish Fertiliser Industry*, 282.

¹¹⁸ Dunne, ‘Nitrogen Éireann - a White Elephant No Longer?’, 44; ‘NET in Profit’, *RTÉ News*.

¹¹⁹ Explosives (Ammonium Nitrate and Sodium Chlorate) Order, 1972, 191 (1972); ‘Explosives Find Near Omagh’, *RTÉ News*, with Gary Honeyford, Raidió Telefís Éireann, 18 October 1987, 00:01:07, RTÉ Archives; ‘Controlled Explosions in Down’, *RTÉ News*, with Fergal Keane, Raidió Telefís Éireann, 9 March 1988, 00:01:56, RTÉ Archives.

¹²⁰ *Moving Forward: 25 Years Meeting Europe’s Food Needs* (Fertilizers Europe, 2014), 2.

American fossil fuel companies in Green Revolution profit-seeking from the Global South reflects the racialised dimension of the CMP that followed the company's globalisation.

As stated in the introduction to this chapter, the history of Ireland's fertiliser manufacturing is inextricable from the state's fossil industry development. Viewing the two together allows for a new concept of nitrogen fertiliser as not just plant food but, as Barry Desmond put it before the Dáil, "natural gas fertiliser," a hybrid agri-industrial feedstock and energy product.¹²¹ This joined-up view reveals the ways in which the Irish state enacted the Kinsale field's fossil energy as a vehicle for its goals of economic expansion, going so far as to discount the Kinsale gas's financial value in order to provide its farmers with an abundant supply of nitrogen. Similar to Mimi Sheller's exploration of how aluminium's high-energy manufacturing process is embodied in the metal's material qualities, NET's nitrate fertiliser was a kind of embodied energy with material properties resulting from the combustion of Kinsale natural gas.¹²² Chapter Two explored the transition from a complex pasture assemblage with legumes as the primary source of nitrogen to a simplified monocultural assemblage dependent on fertiliser nitrogen. Viewing nitrogen fertiliser as a source of embodied fossil energy, this transition in species interactions also represents an energy transition from clover and other legumes as a solar-powered source of nitrogen to one that depended on the continuous burning of fossil fuels for fertiliser, similar to the fossil-fuelling of American agriculture through fertiliser and irrigation explored in Staub and Watson's respective research.¹²³ In 1980s Ireland, the new assemblage centred around the combination of ryegrass, drainage, and nitrate fertiliser supported this fossil energy regime, in which the high-energy and high stocking rates generated through these assemblages depended on an underlying source of domestic fossil-nitrogen. This fossil energy connection allows this thesis's interpretation of Ireland's metabolic rift to be read quite literally, as synthetic fertiliser served as a direct source of metabolic energy piped from beneath the Irish sea.

Thinking through embodied energy also enriches this thesis's ANT framing to the history of Ireland's agricultural and energy systems as more-than-human assemblages. This chapter has shown how the state's enactment of methane molecules as an energy source required a negotiation of natural gas's specific material qualities. The advertisement in the chapter's introduction (Fig 3.1), shows how both methane and nitrate, as chemical soldiers, were active collaborators in the fight to build an industrial and profitable agricultural economy in Ireland. Chapter Two discussed

¹²¹ Barry Desmond. 'Gas (Amendment) Bill, 1980: Second and Subsequent Stages.' *Dáil Debates*, Dáil Éireann (21st Dáil). Vol. 325. No. 1. Col. 126. 2 Dec 1980.

¹²² Mimi Sheller, 'Global Energy Cultures of Speed and Lightness: Materials, Mobilities and Transnational Power', *Theory, Culture & Society* 31, no. 5 (2014): 127–54.

¹²³ Staub, 'Farming with Petroleum'; Andrew Watson, "'The Single Most Important Factor'".

how the materiality of nitrate fertiliser could act as a partner in a profitable agricultural enterprise, being easily taken up and converted to biomass by pasture plants. But the materiality of nitrate fertiliser also allowed it to act as a political weapon, articulated in its use in bombings during the Troubles. Chapter Four returns to the more-than-human pasture assemblage in order to define the environmental impacts of the uncontrolled or unanticipated actions of this flood of fertiliser nitrates and their embodied energy.

Chapter 4 – “The Year of the Fish Kills”: Effluent, Slurry, and Eco-Efficiency

I. Introduction

In a 1992 educational volume published by the Joint Working Group on Applied Agricultural Meteorology or AGMET, Teagasc researcher O. T. Carton wrote that “1987 will be remembered as the year of the fish kills.”¹ A similar message from the introductory conference of ACOT’s Farm Environment Scheme in 1988 urged farmers to “avoid repeating the mistakes of 1987.”² Both the AGMET publication and the Farm Environment Service were intended to educate farmers as to the care that must be taken to avoid environmental damage, with Carton’s chapter additionally including a version of the government’s recently developed “Code of Best Practice” farmers were to adhere to when handling farm wastes and fertilisers.

1987 served as a public flashpoint memorialised by O. T. Carton and other Irish officials, but the fish kills of that year were not an isolated incident. Instead, 1987 served as a high-water mark of a rising tide of agricultural pollution incidents in rivers that steadily increased throughout the 1980s. In an issue of the *Limerick Leader* from April of the year, reporter Martin Byrnes described a white scum of whey on the River Arra as a foreboding announcement that “the pollution season had begun.”³ These destructive pollution events, according to Byrnes, had become an annual pattern in the preceding years, with any efforts made by conservation groups like the River Deel Anglers to remediate and restock polluted rivers being frustrated by the continuous dumping of waste. His reporting noted that as industrial pollution was being tackled piece by piece, agricultural pollution was only getting worse; due to a combination of “wet weather and imperfect holding tanks and pits [causing] the accidental discharge of silage effluent and of animal slurry.”⁴ In 1987, eighty per cent of the year’s 122 fish kills resulted specifically from silage effluent, but a year previous in 1986 local authorities investigated close to 3,000 pollution incidents, including fish kills and other events, with seventy per cent of those classified as agricultural pollution.⁵ In 1985, the Northern Fisheries Board reported that forty miles of river had been destroyed by

¹ O T Carton, ‘Farming and the Environment’, in *Irish Farming, Weather, and Environment*, ed. Tom Keane (AGMET Group, 1992), 196.

² ‘Anti Farm Pollution Service’, *RTÉ News*, with Michael Lally, Raidió Telefís Éireann, 26 November 1987, 00:02:26, RTÉ Archives.

³ Martin Byrnes, ‘Limerick Resumes War on Pollution’, *Limerick Leader* (Limerick), 25 April 1987, 9.

⁴ Ibid.

⁵ ‘New Water Pollution Bill’, *RTÉ News*, with Kevin McDonald, Raidió Teilifís Éireann, 19 January 1989, 00:01:49, RTÉ Archives; Michael Lally, ‘Anti Farm Pollution Service’.

pollution in the first half of the year alone.⁶ As this chapter will explore, the tide of agricultural water pollution extends even back further to the 1970s along with efforts to document the destruction and mitigate the damage.

This chapter argues that the pollution crisis of the 1980s was the combined result of inadequate investigative infrastructure, unfocused regulatory legislation, and a general under-resourcing of farmers and government actors alike in respect to managing the environmental impacts of Ireland's rapidly intensifying agricultural sector. The chapter further explores how, in the midst of European and global efforts to develop environmental policy frameworks, the Irish agricultural pollution crisis of the late 1980s cast the die for the state's regulatory apparatus. The focus on environmentalism and environmental policy in the Irish state expands upon the historical work of Bernadette Connaughton, sociological research by Hilary Tovey and others in the field, as well as Mary Daly's institutional history of the Department of Local Government, which preceded the Department of Environment.⁷ The chapter also situates the creation of Ireland's environmental regulatory state within larger European and global contexts, building on work by Jan-Henrik Meyer and Warde et al.'s *The Environment: A History of the Idea*.⁸

The focus on pollution in this chapter weaves another strand into the thread of decolonial theory that runs throughout this thesis, aided by concepts from Max Liboiron's *Pollution is Colonialism* and Juan Martinez-Alier's *Environmentalism of the Poor*.⁹ While the decolonial analysis in the first three chapters of this thesis has mostly focused on the construction and control of nature in agricultural systems as a manifestation of Walter Dignolo's colonial matrix of power, this chapter looks to the land and communities where that control of more-than-human agency was allowed to slacken and spill out of Ireland's new system of intensive pasture agriculture and the forms of resistance that emerged in the face of environmental harm.¹⁰

The analysis of NET and the fossil fuel feedstocks within Ireland's late-twentieth century fertiliser-dependent regime is expanded upon in this chapter by an explicitly energy-focused

⁶ 'River and Lake Pollution', *RTÉ News*, with Tommie Gorman, Raidió Teilifís Éireann, 24 July 1985, 00:04:32, RTÉ Archives.

⁷ Bernadette Connaughton, 'The Politics of Environmental Policy', in *Europeanisation and New Patterns of Governance in Ireland*, ed. Nicholas Rees et al. (Manchester University Press, 2010); Yearley Steven, 'The Social Shaping of the Environmental Movement in Ireland', in *Irish Society: Sociological Perspectives* (Institute of Public Administration, 1995); Mary E. Daly, *The Buffer State: The Historical Roots of the Department of the Environment* (Institute of Public Administration, 1997).

⁸ Jan-Henrik Meyer, 'Pushing for a Greener Europe: The European Parliament and Environmental Policy in the 1970s and 1980s', *Journal of European Integration History* 27, no. 1 (2021); Paul Warde et al., *The Environment: A History of the Idea* (Johns Hopkins University Press, 2018).

⁹ Max Liboiron, *Pollution Is Colonialism* (Duke University Press, 2021); Joan Martinez-Alier, *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuation*, (Northampton, MA: Edward Elgar Publishing, 2002).

¹⁰ Mignolo and Walsh, *On Decoloniality*, 154-160.

reading of the metabolic rift. While Marx's construction of the metabolic rift was concerned with the robbery of energy from the land and people, this chapter demonstrates how the simplification of the more-than-human assemblage of the pasture system also opened a rift in the imperfect way excess energy and nutrients were reintroduced to the soil and the system as a whole. The chapter's focus on the relationship between Ireland's rivers and pastures contributes additional links of energy and agency to the pasture's more-than-human assemblage.



Figure 4.1: Poster at the ACOT conference introducing the Farm Environment Scheme. Source: Lally, 'Anti Farm Pollution Service'.

II. Silage, Ecology Redux

The adoption of silage-making as a practice for winter feeding of livestock between the 1960s and 1980s was one of the primary drivers of intensification among Ireland's grassland farmers. Unlike drying hay, the fermentation of starches and sugars within grass during the silage-making process creates effluent, an acidic liquid high in organic matter. This chapter demonstrates

that the adoption of silage-making by significant numbers of Irish farmers to increase livestock carrying capacity was one of the primary causes of the fish kills in the 1980s.

The polluting potential of silage effluent did not take Ireland's agricultural experts by surprise. In 1970, the Department of Agriculture and Fisheries had published a brochure with the definitive title *Silage Effluent Kills Fish*, intended to inform farmers of the severity of mismanaging the emerging practice. The pamphlet explained the effects of silage on both fish-bearing waters and drinking waters, how silage effluent "kills fish by severely reducing or even eliminating the dissolved oxygen in streams and rivers and sometimes has a direct poisoning effect" on fish.¹¹ Silage effluent's high Biological Oxygen Demand (BOD) is what gives it such a destructive capacity when introduced to aquatic ecosystems. As explained by O. T. Carton in his AGMET chapter, bacteria in a river, lake, or aquifer break down the organic matter suspended in silage effluent, drawing oxygen from the water in proportion to the organic matter available. Silage effluent's BOD is incredibly high relative to other pollutants, with one litre of effluent allowing hungry bacteria to deoxygenate up to 10,000 litres of water.¹² The authors of *Silage Effluent Kills Fish* understood this, cautioning readers that effluent's BOD was "200 times as potent as domestic sewage." The pamphlet also warned that, though not poisonous, pollution of drinking water with silage effluent could cause livestock to "reject water which is polluted during spells of dry weather" and could taint water supplies intended for human consumption.¹³

The brochure was written to publicise research conducted by the Department of Agriculture into the polluting potential of silage for an interdepartmental working group on air and water pollution, also formed in 1970. This working group, combining staff from the Departments of Agriculture and Fisheries, Finance, Health, Industry and Commerce, Lands, Local Government, and Transport and Power, issued two separate reports, respectively focused on water and air pollution.¹⁴ The 1973 report on the working group's recommendations referenced the *Silage Effluent Kills Fish* brochure among the actions "taken [by the Department of Agriculture and Fisheries] through the agricultural advisory service and grant schemes to minimise the pollution risks."¹⁵ Though this early work by several government departments shows their awareness of pollution as a growing threat to Irish communities, but their work was more focused on spreading awareness of potential risks among farmers rather than proactively adjusting farm practices.

¹¹ *Silage Effluent Kills Fish*, Department of Agriculture and Fisheries, 1970, 1.

¹² Carton, 'Farming and the Environment', 169-97.

¹³ *Silage Effluent Kills Fish*, 1.

¹⁴ Inter-Departmental Working Group on Air and Water Pollution, *Report on Water Pollution*, Prl. 2939 (Stationery Office, 1973), 1.

¹⁵ *Ibid*, 24.

The Department did not recognise these risks as an immediate threat, but urged government action to address them nonetheless. A 1971 report authored by the Department of Agriculture and Fisheries to aid the pollution working group's assessment of silage and manure concluded that "although the overall extent of pollution from farm effluents is limited, the problem is likely to increase... Intensified grass farming necessitates the housing of more stock during the winter months and the adoption of silage making in preference to hay."¹⁶ The report cited the 4.5 million tons of silage made in 1971, an almost tenfold increase from 1961, as cause for concern. At the time of the report's publication, silage effluent pollution was only an issue in the flatter low-lying areas of the country in North Leinster but the Department cautioned that "unless proper measures are taken to deal with it, silage effluent is the form of farm waste which could cause the most trouble."¹⁷ This potential for silage to become a severe environmental problem flew in the face of government efforts to grow the economy through agricultural intensification.

The authors of *Silage Effluent Kills Fish* made several recommendations to farmers to reduce the polluting potential of their operations. These recommendations showed the conflicting enactments of silage as both a tool for industrialisation and a pollution risk by different actors within the Irish state. The re-enactment of silage as a source of pollution in the 1970s conflicted directly with the research and advocacy of Roger McCarrick and others at FT, who saw silage as a catalyst for economic growth by way of intensification. The brochure acknowledged the growth of silage-making in the previous decade, forecasting that "increase in silage-making and the ensiling of young high quality grass will increase the quantity of effluent to be disposed of."¹⁸ In order for farmers to reduce effluent levels, the brochure's authors suggested, not a return to hay, but modifications to the process like wilting and pre-processing of grass before ensiling, the same methodologies that interested McCarrick as potential opportunities to increase the productivity of silage fermentation.

According to *Silage Effluent Kills Fish*, allowing grass to wilt for 10-12 hours before ensiling "reduces the moisture content and cuts down the amount of effluent" by allowing some of the water in the grass to evaporate. In contrast, "chopping and bruising the material before ensiling speeds up the rate at which the effluent is discharged in the first few weeks" causing a greater risk of excess effluent polluting bodies of water.¹⁹ In 1960, a decade before the brochure's publication, the paper Roger McCarrick presented at the Salesian Agricultural College in Warrenstown

¹⁶ Ibid, 15.

¹⁷ Ibid, 24.

¹⁸ *Silage Effluent Kills Fish*, 1

¹⁹ Ibid, 2.

discussed reduced effluent as one of the advantages of wilting grass before ensiling, along with greater food consumed by livestock and ease of transport. However, his paper also listed the disadvantages of wilting as loss of sugars from the grass through respiration and greater difficulty in compressing the drier grass within the silo which “can be very serious as this gives rise to overheating from which a very indigestible silage is often produced.”²⁰ The two studies McCarrick cited regarding the processing of silage material found that chopping and lacerating silage material “consistently made better silage” than unchopped material, fermented quicker, was more easily compressed and fed to animals, was more uniform, and had higher preserved starches. McCarrick did note the disadvantage of chopped grass was that “in some cases appreciable quantities of volatile acids and bases were produced.”²¹ The 1970 Department of Agriculture brochure adds further context to these volatile acids produced in the fermentation process, saying that “the acid nature of the effluent will cause damage to concrete, tank surfaces and other handling equipment,” making its long-term storage more complicated.²²

Contrasting the recommendations from McCarrick’s research with those in the brochure shows that the same wilting and processing methods researched by An Foras Talúntais to make silage more productive and efficient also made silage more dangerous to waterways by causing more effluent to be released at a faster rate. Framing the relationships between grass, bacteria, and farmers as an active assemblage shows that these researchers were not precisely controlling non-human variables but reacting to and interacting with the actions and behaviours of the grass and bacteria. AFT researchers saw silage as a way to efficiently salvage the work of bacteria and grass for economic gain, but like clovers and cattle, farmers would have to contend with the uncontrolled aspects of bacterial action. The environmental problems that began to emerge in 1970 complicated the productivist enactment with which silage would have been introduced to farmers since the 1960s. Instead of simply preserving biomass, the same grass-bacteria interactions that allowed farmers to increase stocking rates were necessarily re-enacted as a potential risk to Ireland’s aquatic ecosystems. As Chapter Two demonstrated, the shift from silage and hay was more than the collective whims of individual farmers, but a state project of agricultural intensification underpinned by the research and labour of AFT researchers like Roger McCarrick. The enactment of silage as a tool for increased productivity made it central to this state project. This made Department of Agriculture and Fisheries’ commitment to using “the agricultural advisory service and grant schemes to minimise the pollution risks” difficult, as it required these state instruments

²⁰ Roger J. McCarrick, *Considerations in Conservation and Feeding of Silage*, 3.

²¹ *Ibid*, 5-6.

²² *Silage Effluent Kills Fish*, 2.

to contradict the expansionist frame they had previously been tasked with supporting.

The emerging issue of silage pollution was further complicated by the imperfect on-farm infrastructure, and the advisory and financial support farmers were given when switching from making hay to silage. Before “the year of the fish kill” in 1987, came 1980’s “year when nothing went right,” when many farmers adopted silage-making in a last-minute effort to save their hay crops from rotting in the wet weather and their finances from collapsing farm prices.²³ In Pat O’Brien’s oral history interview in Galway, O’Brien described his father and uncle making silage when silage harvesters were introduced: “they used to make the silage pits on the field which had to be phased out due to the runoff from the silage that... effluent that used to run off the silage and it used to burn part of the field. It was pollution and was not great when it got into streams or lakes or anywhere for water quality.”²⁴ Crucially, these methods were not simply ad-hoc solutions developed by farmers to cut corners, they had been actively promoted by government research publications as best practice.

The 1966 *Telefís Feirme* episode on silage-making, for instance, had reassured farmers that “cheap waterproof materials, plastics etc., can now take the place of rooves... At the Agricultural Institute in Moore Park in Co. Cork they have scraped the surface soil from part of a field and outwintered the cattle successfully on self-fed silage. The silage was made in a clamp in the field, covered with plastic and weighted to exclude rainwater and air.”²⁵ Though these clamps, illustrated below (Fig 4.2), would have kept rainwater out, it was clear to Pat O’Brien that they were not intended to keep effluent in. The environmental risk was also immediately apparent on the O’Brien farm through its burning of the plants, but it wasn’t until receiving a grant to build a concrete silage slab that the family was able to stop making silage directly on the field.²⁶

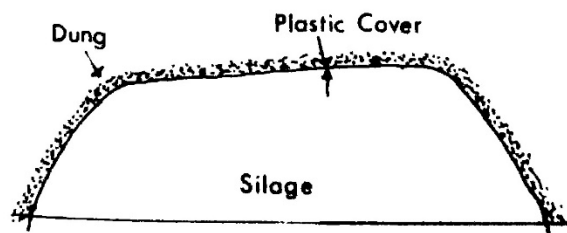
²³ Maguire, ‘The Year When Nothing Went Right’, 9.

²⁴ O’Brien, ‘NuReCycle Oral History’, 00:18:45.

²⁵ *Telefís Feirme*, episode 31, ‘Silage’, with Justin Keating, aired 22 November 1966, on Raidió Teilifís Éireann, RTÉ Archives.

²⁶ O’Brien, ‘NuReCycle Oral History’, 00:18:45.

**Is it necessary to have a haybarn or covered house
for silage ?**



No, cheap waterproof materials, plastics etc., can now take the place of rooves and this also means that the site for silage can be changed around to suit the farm's requirements. At the Agricultural Institute in Moore Park in Co. Cork they have scraped the surface soil from part of a field and outwintered the cattle successfully on self-fed silage. The silage was made in a clamp in the field, covered with plastic and weighted to exclude rainwater and air.

Figure 4.2: Diagram for the construction of a silage clamp included in the group leader's booklet for RTÉ's *Telefís Feirme* episode on silage. Source: *Telefís Feirme*, 'Silage'.

The O'Briens were not alone in this situation, as a 1988 broadcast from RTÉ categorised fifty per cent of farms as pollution risks due to lack of proper infrastructure.²⁷ The combination of farmers adopting silage quite suddenly to mitigate desperate weather and financial risks, contradictory or even harmful advice, and lack of financial support to eliminate or mitigate the effects of pollution created the conditions for the widespread fish kills of the 1980s. Adding to this was silage's framing within the state's efforts to intensify Ireland's agriculture, which ultimately meant that the message that *Silage Effluent Kills Fish* would have difficulty reaching a receptive audience without such a crisis.

III. Developing Fish Kill Research: An Foras Forbartha

While the first three chapters primarily focused on a single institution like An Foras Talúntais or Nítrigin Éireann Teoranta, the piecemeal and fractured nature of Ireland's environmental management before the formation of the state's EPA requires this chapter to trace the role of several institutions that formed a loosely connected network of Ireland's early environmental monitoring and governance apparatus. As Warde et al. argue in *Environment: A*

²⁷ 'Scheme to Stop Farm Pollution', *RTÉ News*, with Maggie O'Kane, Raidió Teilifís Éireann, 24 June 1988, 00:01:29, RTÉ Archives.

History of the Idea, Ireland's retooling of preexisting government bodies to establish programmes of environmental regulation reflects an international pattern of governance that first emerged in the 1960s.²⁸

One of the primary nodes of Ireland's environmental regulatory network was An Foras Forbartha, the development institute (AFF), which took on the work of monitoring and reporting environmental conditions across Ireland. AFF was originally established in 1964 by the Department of Local Government with aid from the United Nations to provide planning research to shape the economic development projects of local authorities and the national government.²⁹ Similar to AFT, AFF was established as an independent research institute located under and funded by the Minister for Local Government. By the 1980s, AFF's responsibilities had changed and expanded to a focus on planning, development, and monitoring of the environment, as well as the provision of research for the building industry.³⁰ AFF was not a regulatory, enforcement, or conservation body and had no power to bring legal suit for violation of any pollution laws. However, as the Department of Local Government was reorganised as the Department of the Environment in the 1970s, AFF was tasked with the environmental research work needed to support the department's new suite of responsibilities.³¹ The Institute's primary function was to conduct research in partnership with and in service to other parties like local authorities, regional fisheries boards, and private businesses, providing research background for development projects and permits for industry and sanitation. It was through these partnerships that their environmental research emerged, encompassing water monitoring along with waste disposal, landfill design, air pollution, acid rain, and public environmental education.³²

Research conducted by An Foras Forbartha's Water Resources Programme through the 1980s was not solely focused on monitoring water quality, but modelling the dynamics of various pollutants in Ireland's rivers and lakes in order to improve the standards set by the government and local authorities when issuing licenses and enforcing the 1977 Water Pollution Act.³³ One such model, developed in the 1980s, was designed to assess the impact of effluent spills on dissolved oxygen in rivers to help local authorities predict the effects of their own sanitary services and wastewater permits granted to industrial users. Data for the model was gathered in collaboration with local authorities from the rivers Nore, Slaney, Suir, and Ara in 1984, and twenty-five

²⁸ Warde et al., *The Environment: A History of the Idea*, 141-145.

²⁹ *Review of An Foras Forbartha: Submission of Inter-Departmental Review Group to the Minister for the Environment* (Inter-departmental Review Group on An Foras Forbartha, 1981), 13-14.

³⁰ *Ibid.*, 15.

³¹ Daly, *The Buffer State*.

³² An Foras Forbartha, *Review 1984* (An Foras Forbartha, 1985).

³³ K J Clabby, J Lucey and M McGarrigle, *Review 1984*, (Dublin: An Foras Forbartha), 1985, 52.

engineers from local authorities in the southeastern region were trained to apply it in their own areas.³⁴ An Foras Forbartha developed a similar water quality model to track the dynamics of effluent in Ireland's estuaries, and local authorities also enlisted AFF's Water Resources Programme in developing water quality management plans on the River Liffey, the Upper and Lower Shannon, the lakes of County Cavan and the estuaries of the Suir, Barrow, Shannon and the Nore.³⁵

An Foras Forbartha's research was framed within an effort to enable the balanced development of Ireland's water resources, reflecting again the government's expansionist goals explored in previous chapters in relation to agriculture. In relation to water quality monitoring, this expansionism emphasised the finite nature of water as a resource, modelling how the economic growth enabled by the assimilation of industrial waste could be balanced with a river's importance for fishing, drinking water, and other uses. As Patrick Kenny, head of AFF's Water Resources Programme, stated in AFF's 1984 Review, "there is an increasing necessity to plan and manage our water resources in order to achieve a balance between the various water uses — which include water supply for domestic, industrial and agricultural use, fisheries, tourism and recreation — and also the assimilation of domestic and industrial waste discharges."³⁶

Warde et al. explain that environmental modelling efforts, such as those taken up by AFF and others in earth systems science, represented an effort to make the environment 'governable.'³⁷ Underlying the attempt to map out the interactions of different species and systems was a notion similar to Law and Mol's mapping of assemblages of actors. Instead of searching for expressions of more-than-human agency, these modelling efforts reduced these interactions to metrics and flowcharts in order to better understand and govern them.³⁸ Still, these efforts were distinct from AFT's Lemass era research into reengineering pasture environments for efficiency and productivity, increasing carrying capacity and profit. Instead, they reimagined carrying capacity as a hard limit or a combination of different limits within an environmental system, whether a river or the planet as a whole, and sought to govern and negotiate different uses for that system's capacity. While this explicit acknowledgement of limits marked a shift away from overt extractivism, this distinction disappears when considering Mignolo's framework for decolonial analysis. Earth science model like the Bretherton diagram and the Irish water quality models

³⁴ Ibid, 54.

³⁵ M. Mansfield, P Toner, and L Kelly, *Review 1984*, (Dublin: An Foras Forbartha), 1985, 58-9; L. Stapleton, M. McGettigan, *Review 1984*, (Dublin: An Foras Forbartha), 1985, 64-5.

³⁶ P. Kenny, *Review 1984*, (Dublin: An Foras Forbartha), 1985, 48.

³⁷ Warde et al., *The Environment: A History of the Idea*, 158-63.

³⁸ Law and Mol, 'The Actor-Enacted: Cumbrian Sheep in 2001'.

discussed below (Fig 4.4 and 4.5) still drew a clear hierarchy between the human and non-human, assuming that human scientists and farmers needed to manage and master the nonhuman.³⁹ The distinction between the researchers in previous chapters and AFF is not one between the extractive and the environmental, but between the industrial mine where control comes by pickaxe, and the industrial factory, where control comes through gauges and dials.

As part of this loose network of organisations involved with building an understanding of Ireland's environment, AFF was enlisted by the 1970 Interdepartmental Working Group on Air and Water Pollution to conduct a survey on the pollution of Ireland's rivers. Their survey, concluded in 1971, found seven per cent of the Republic's rivers to be seriously polluted and a further ten per cent considered in doubtful condition. Most of these polluted areas were located downstream of cities and industrial facilities to which the pollution was attributed.⁴⁰ These survey results seemed to support the conclusion of the Department of Agriculture and Fisheries' report for the same working group that, though agricultural pollution presented a potential risk, the majority of polluted waters resulted from industrial and domestic sources. In 1983, just ten years after this first survey, a similar report compiled by An Foras Forbartha for the Water Pollution Advisory Council showed that the proportion of pollution attributed to agriculture had inverted. According to the report, ninety per cent of BOD from polluting wastes into Irish waters originated from the agricultural sector, with only four and six percent resulting from domestic and industrial sources respectively.⁴¹ By the early 1980s, the effects of expanded agricultural production over the previous twenty years were having a publicly visible effect on Ireland's rivers.

Efforts at broad instrumental documentation of Ireland's fish kills started in 1982 with an instructional guide on the investigation of fish kills published by the Environmental Services Division of the Institute for Industrial Research and Standards (IIRS). Established in 1946, this was Ireland's first research institute, tasked with industrial research and development.⁴² The guide made it clear that the prominence of fish kills had been rising over recent years, but that without proper monitoring the full scope of that prominence was unclear. As the pamphlet's authors write, "major kills make newspaper headlines on at least half a dozen occasions during the average Summer but many smaller outbreaks are witnessed at local level."⁴³ The guide outlined each step to be taken to properly document a fish kill: taking water samples, testing temperature and dissolved oxygen,

³⁹ Mignolo and Walsh, *On Decoloniality*, 138-145.

⁴⁰ Inter-Departmental Working Group on Air and Water Pollution, *Report on Water Pollution*, 28.

⁴¹ William McCumiskey et al., *A Review of Water Pollution in Ireland* (Water Pollution Advisory Council, 1983), 111.

⁴² Industrial Research and Standards Act, 1946, No. 25 (1946).

⁴³ R.G. Boelens and C.M. O'Sullivan, *A Guide to the Investigation of Fish Kills* (Institute for Industrial Research and Standards, 1982), 4.

interviewing witnesses, and mapping the site. It also provided a sample sheet that could be used to compile necessary information.⁴⁴ These instructions were not intended for staff at the IIRS nor AFF, but to train engineers and other staff at local authorities and fisheries boards that shared joint responsibility for investigating and enforcing water pollution incidents like fish kills. The guide advised that these agencies should have one or two people on staff with the ability to investigate fish kills and 24-hour availability to do so, as “the lethal condition [causing fish to die] is often transitory and the best chance of a successful identification exists at the time the fish are dying.”⁴⁵ According to the IIRS guide, the most common organic wastes involved in fish kills were “improperly treated sewage, animal slurry, cannery and milk processing wastes,” cementing agricultural waste and the biproducts of agriculture as primary causes of pollution, just as AFF would in their report to the Water Pollution Advisory Council the following year.⁴⁶



Figure 4.3: An instructional image showing proper technique and river position for measuring dissolved oxygen at the site of a fish kill. Source: Boelens and O’Sullivan, *A Guide to the Investigation of Fish Kills*, 6.

An Foras Forbartha’s Water Services Division also coordinated with local authorities, empowering them to investigate fish kills using its three regional water laboratories. These water

⁴⁴ Ibid, 20.

⁴⁵ Ibid, 2-3.

⁴⁶ Ibid, 5.

laboratories were operated by AFF on behalf of local authorities and allowed local authorities without their own equipment or laboratory space to gather and analyse data to determine the severity and cause of pollution events.⁴⁷ This infrastructural partnership between AFF, local authorities, and regional fisheries boards also allowed AFF's own researchers to aggregate and analyse the data on a national scale. As fisheries boards and local authorities began systematically investigating and reporting on fish kills in the 1980s, these reports were collected by An Foras Forbartha and analysed by Edward Fahy, a fisheries researcher of the Department of Fisheries and Forestry, in two leaflets spanning the years 1983 to 1985. Similar to scientists at the National Soil Survey and An Foras Talúntais discussed in previous chapters, Fahy's evaluation of fish kills was modelled on methodologies from abroad, in this case a 1975 fish kill analysis undertaken by the Environmental Protection Agency in the United States.⁴⁸

The 1983 leaflet documented eighty-nine fish kills across Ireland in 1983 and 111 in 1984, with the majority taking place in summer months. The most common cause of fish kills in 1983 was reported to be agriculture, with sixty-nine cases, the second being 'natural conditions' including high temperature and low oxygen, with twenty-eight cases, and the third being agricultural industry like creameries and slaughterhouses with fourteen cases. Fourteen cases were also attributed to sewerage pollution by local authorities and nine to non-agricultural industries.⁴⁹ In light of this documentation, 1987 appears to have been far from an isolated "year of the fish kills," but part of a larger pollution crisis that stretched across the 1980s. Fahy also noted that many fish kills were the result of multiple compounding factors instead of a single isolated cause. This meant that while a fish kill may be primarily attributed to low oxygen, agricultural pollution may have been a contributing factor or vice versa. The leaflet also listed "agricultural industry" as a separate category of causation, distinguishing it from what counted as general agriculture. However, within the broader Irish economic and political context, pollution from agricultural industries, such as creameries, and pollution directly from farm run-off can both be attributed to the same underlying intensification of Ireland's agricultural sector.

The following year, Fahy compiled the number of fish kills in 1985 into a second leaflet. The report showed only thirty-seven fish kills, a sharp decrease from the previous years. Fahy attributed this change to a significant increase in rainfall during the summer months, which would have diluted any organic waste from agriculture or other sources and mitigated its oxygen demand.

⁴⁷ P. Kenny, *Review 1984*, 48.

⁴⁸ Edward Fahy, *Fish Kills in Ireland - an Analysis of Incidents in 1983 and 1984*, 128, Fishery Leaflet (Fisheries Research Centre, 1985), 2.

⁴⁹ *Ibid.*, 6.

As Fahy discussed, “this is generally in keeping with the conclusions of the previous report which suggested that a large proportion of fish kills [result] from a temporary imbalance between the capacity of waters to absorb waste and the effluent loads received.”⁵⁰ This increase in precipitation makes it difficult to determine whether the pollution of Ireland’s freshwater systems worsened or improved in 1985. However, one detail within the fisheries pamphlet indicating that the crisis was far from over was the relative size of fish kills compared to previous years. As Fahy reported, the average channel length of 1985’s thirty-seven fish kills, meaning the length of river affected by the kill, more than doubled from the previous year’s average of 2.7 km to 6.8 km. Additionally, the average mortality increased tenfold. While around half of fish kills in the 1983-84 report killed between ten and one-hundred fish, half of the 1985 report’s fish kills caused between 100 to 1000 deaths.⁵¹ Though the higher rainfall in 1985 decreased the incidence of fish kills, the severity of the events that did happen significantly increased, a trend that would continue through the end of the decade.

The dilution of pollutants was not the only effect of 1985’s increased rainfall. In an *RTE News* broadcast on river and lake pollution, reporter Tommie Gorman cited the unusually high moisture content of soil and silage caused by large amounts of rain as an added factor in pollution issues faced by farmers.⁵² The saturation of soil and additional rain flowing into silage pits made it more difficult to prevent effluent and slurry from running off the farm into drainage ditches and streams.⁵³ Though the additional rain may have diluted smaller pollution events, making them less lethal, higher rainfall could have also worsened larger pollution events by making it more likely for large amounts of silage and other farm effluents to flow uncontrolled into bodies of water. Therefore, Edward Fahy’s conclusion that the year’s fish kills resulted from a “temporary imbalance between the capacity of waters to absorb waste and the effluent loads received” was not as simple a calculation as higher precipitation resulting in rivers’ greater ability to absorb pollutants.⁵⁴

An Foras Forbartha’s efforts to model the effects of effluent spills on dissolved oxygen in Ireland’s rivers were motivated by an effort to incorporate precipitation in the calculation for the nation’s water quality. In AFF’s 1984 annual review, senior researchers G. McHugh and P. Coleman reported on the low river levels which coincided with the then record of 111 fish kills

⁵⁰ Edward Fahy, *Fish Kills in Ireland in 1985*, 132, Fishery Leaflet (Fisheries Research Centre, 1986), 4.

⁵¹ *Ibid.*, 3.

⁵² ‘River and Lake Pollution’, *RTE News*, with Tommie Gorman, Raidió Teilifís Éireann, 24 July 1985, 00:04:32, RTE Archives.

⁵³ *Ibid.*

⁵⁴ Fahy, *Fish Kills in Ireland in 1985*, 4.

reported in Edward Fahy's fisheries leaflet. McHugh and Coleman reported the Institute's ongoing efforts to compile flow data to inform the adjustment of pollution standards for licenses under the 1977 Water Pollution Act. This would allow the licences to conform to actual stream flow variance instead of a blanket assumption of regular river flow across Ireland.⁵⁵

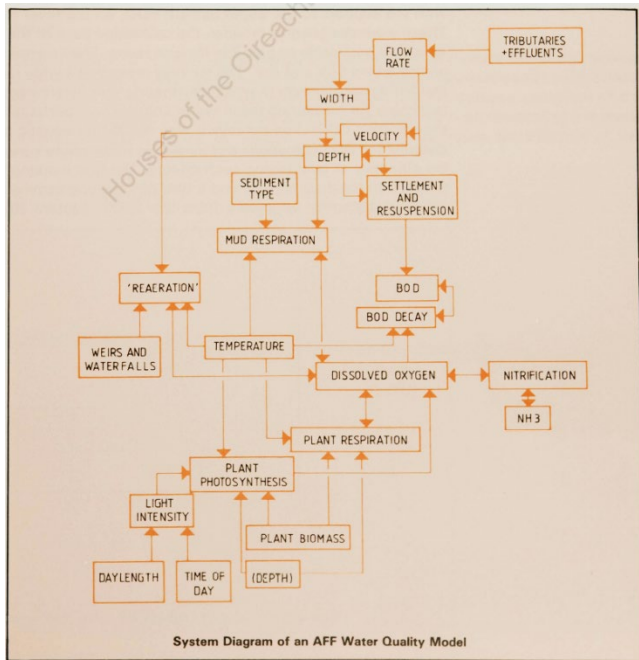


Figure 4.4 (left): Water quality model included in An Foras Forbartha's *Review 1984* describing the interaction of different factors within rivers affecting dissolved oxygen. Source: K J Clabby et al., *Review 1984*, 53.

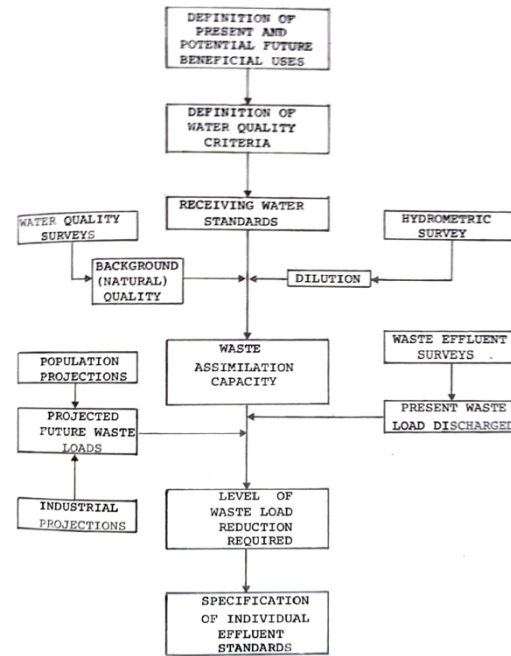


Fig. 8.1 A scheme for water quality management.

Figure 4.5 (right): Water quality management model from the Water Pollution Advisory Council showing how scientific analysis is used to set enforceable pollution standards. Source: McCumiskey et al., *A Review of Water Pollution in Ireland*, 93.

As seen in the figure above left (Fig 4.4), AFF provided an example of this water quality model in their annual review. The model focused on mapping the links between various aspects of the biochemical cycling of a river system and therefore did not include pollutants directly. The 'tributaries and effluents' variable is placed at the top of the diagram affecting the flow rate variable but not the BOD or dissolved oxygen in the system, the underlying assumption being that these effluents were of the same unpolluted character as the river itself. Likewise, the model's references to NH₃ and BOD are understood to be background 'natural' levels, those of a healthy, unpolluted river.⁵⁶ The figure above right (Fig 4.5) shows a related model developed by the Water Pollution

⁵⁵ G McHugh and P Coleman, *Review 1984*, (Dublin: An Foras Forbartha), 1985, 50.

⁵⁶ Clabby et al., *Review 1984*, 53.

Advisory Council in 1983, indicating how water quality standards were to be developed through scientific analysis conducted by AFF's researchers. The AFF water quality model (Fig 4.4) nests into this second model (Fig 4.5) in the space labelled 'background (natural) quality.' This 'natural' water quality was used to calculate the 'waste assimilation capacity' of the model, forming the baseline for pollution standards incorporated into industrial permits and enforced by local authorities.⁵⁷

In their book *Pollution is Colonialism*, Red River Métis decolonial researcher Max Liboiron writes that the idea of rivers having an assimilative capacity for waste originated from the work of sanitation engineers Earle B. Phelps and H.W. Streeter in the 1930s, originally as an effort to prevent deleterious ecological effects of pollution in the Ohio River.⁵⁸ As Liboiron points out, this idea, emerging as it did from settlers on unceded land, assumes not only that rivers will self-purify below a certain threshold but that rivers with their self-purifying capabilities exist to be used by settlers as sinks for some amount of pollution regardless of the desires of indigenous peoples or the agency of nonhuman actors.⁵⁹ Edward Fahy's reports show that this understanding of pollution and its underlying assumptions came to Ireland from the methods of the American EPA. With this framing to hand, the focus of both AFF and the Water Pollution Advisory Council's standard setting became not the elimination of pollution but the judicious use of Ireland's rivers as an exploitable resource used to assimilate pollutants from industrial and agricultural actors while still remaining productive fisheries and sources of drinking water. The same assumptions appear in Fahy's attribution of fish kills to an 'imbalance' between the amount of pollutants and the river's capacity to 'absorb' them. This development-focused frame did not come wholly from the use of a flawed colonial model appropriated from the US, but emerged from the coloniality underlying Ireland's economic model following the Second World War.

The expectation that a river has some capacity to absorb pollutants calls back to the idea of carrying capacity explored in previous chapters. If the incorporation of additional fertiliser nutrients and more intensive fodder operations like silage rendered the carrying capacity of Irish pastures more plastic, recognising the limited capacity of a river to 'assimilate' farm wastes like effluent and slurry introduced a hard cap on the amount of effluent a farming system could generate. This, by extension, would limit the number of livestock units that could be reared, complicating the state's attempt to use the technological package of ryegrass, silage, and nitrogen fertiliser to push the carrying capacity of Ireland's pasture systems ever upwards. However, just as the

⁵⁷ McCumiskey et al., *A Review of Water Pollution in Ireland*, 93.

⁵⁸ Liboiron, *Pollution Is Colonialism*, 9.

⁵⁹ Ibid.

awareness of silage effluent's ability to kill fish complicated but did not contradict An Foras Talúntais's 1960s research into productive and efficient silage production, the modelling of river water quality did not entirely destabilise Ireland's expansionist farming model. In the context of Warde et al.'s observation that environmental modelling projects sought to make ecological systems governable, the calculation of a river's assimilative capacity shifted the role of carrying capacity from a justification for continuous expansion of the throughput of an agricultural system to a mandate to improve the efficiency of that system. As 'dilution is the solution to pollution' was the underlying assumption of assimilative capacity, some degree of pollution was expected and permitted as part of this efficiently governed system, especially effluent and slurry resulting from farmers who endeavoured to increase the carrying capacity of Ireland's pasture systems.

In the fisheries pamphlet on the 1983 to 1984 fish kills, Edward Fahy noted that the majority of fish reported in these fish kills were trout and salmon, which he attributed primarily to the sensitivity of these species to oxygen depletion. He also noted that "trout is also a species of greater interest to the angler and it is probable that a kill involving this species would stand a greater chance of being officially recorded. It is recognised here that fish kills are under-recorded anyway."⁶⁰ Another probable source of under-reporting Fahy noted, was the fact that the majority of fish kills reported took place in waters already monitored by An Foras Forbartha, "who acknowledge that their surveys are initiated by concern over water pollution rather than being spontaneous checks on water quality," implying that kills occurring in seemingly unproblematic waters could have gone unreported.⁶¹ Similar to Latour's analysis of soil science methodologies, Fahy's assessment attempts to account for the inaccurate translation of the complicated world of a river into a 'sign' through the methodologies used by AFF to monitor water quality.⁶² The issue of under-reporting allows for another critique of the developmentalist focus of AFF's attempt to establish pollution standards. If fish kills were under-reported because anglers were focused on specific charismatic species and research focused on specific problematic waterways, there could have been other ecosystem effects not as visible or widely reported in newspapers and television as fish kills, such as a reduction of invertebrates and other food sources for fish and other charismatic species. An alternative to the development-oriented idea of environmental management that incorporated these methodological uncertainties would later emerge as the 'precautionary principle' in the 1992 Maastricht treaty.⁶³ According to legal scholar Peter Sand, with the exception of Scandinavian

⁶⁰ Fahy, *Fish Kills in Ireland - an Analysis of Incidents in 1983 and 1984*, 7.

⁶¹ Ibid, 8.

⁶² Latour, *Pandora's Hope: Essays on the Reality of Science Studies*, 48.

⁶³ *Treaty on European Union*, Official Journal C 191 (1992), Article 130r.

countries, this multiple-use development model, not the precautionary principle, was the globally dominant form of environmental policymaking through the 1980s.⁶⁴

The conflicting political and scientific motivations behind AFF's research reflect a larger tension between the growing awareness of agricultural pollution and the expansionist agricultural policy embraced by both Ireland and the EEC through the Common Agricultural Policy during the 1980s. This is reflected in AFF's environmental communications work. Indicative of this tension, a three-day EEC symposium titled "Environment and Chemicals in Agriculture" was organised by the institute in October 1984.⁶⁵ The first of the three sessions was devoted to "Unintended and Undesirable Environmental effects of Chemicals used in Agriculture," followed directly by a session on the "Need for and Benefits from Fertilisers and Pesticides" featuring a speaker from ICI, the company that would merge with NET just two years later.⁶⁶ The third session endeavoured to find a middle path of "Economical and Ecological Optimisation of the Use of Fertilisers and Pesticides." This panel featured the only Irish presenter, AFT researcher Hubert Tunney, who presented a paper on the different agricultural efficiency practices that could reduce dependence on synthetic fertilisers, including judicious reintroduction of manures for phosphorus and potassium and the use of legumes to fix nitrogen.⁶⁷

The most intriguing talk of the conference for the purposes of this chapter was the opening address given by Liam Kavanagh, the Minister for Ireland's Department of the Environment, which had been reorganised from the Department of Local Government in 1977. Kavanagh recognised "that nutrient enrichment of bodies of water has become a serious problem in many parts of Europe" and discussed the need for research to understand how fertilisers ended up in waters. The direction he proposed for the future, however, was "to develop fertiliser products at realistic prices which maximise the availability of nutrients to plants over the necessary time-span, while at the same time minimising the possibility of nutrients being removed in drainage water," essentially a silver bullet fertiliser that perfectly nourishes a plant, does not run-off, and is cheap enough for wide adoption.⁶⁸ His talk represented the end goal of the developmentalist perspective on environmental issues. According to Kavanagh's approach, further research should not aim toward Tunney's recommendations of reducing the need for fertilisers, but toward the development of

⁶⁴ Peter Sand, 'The Precautionary Principle: A European Perspective', *Human and Ecological Risk Assessment* 6 (May 2000): 453-54.

⁶⁵ F.P.W. Winteringham, ed., *Environment and Chemicals in Agriculture: Proceedings of a Symposium Held in Dublin, 15-17 October 1984* (Elsevier Applied Science Publishers, 1985).

⁶⁶ Ibid, viii.

⁶⁷ Hubert Tunney, 'Can Agricultural Practice Reduce the Amount of Chemical Fertiliser?', Elsevier Applied Science Publishers, 16 October 1984, 285-306.

⁶⁸ Liam Kavanagh, 'Opening Address', Symposium on Environment and Chemicals in Agriculture, Dublin, 15 October 1984, xviii.

fertiliser systems that allowed intensification while minimising, though not necessarily eliminating, its ecological costs. The same language is used today in relation to the development of ‘smart’ fertilisers, despite the worsening global pollution crisis.⁶⁹

Kavanagh’s view on Ireland’s agricultural sector was optimistic and expansionist. He discussed the growth of nitrogenous fertiliser use over the previous decade and forecast that the trend would continue “until there is a general achievement of optimum application rates.”⁷⁰ He also attempted to show that Ireland’s agricultural intensification bore little cost to the environment, claiming that “nitrate levels in surface and groundwaters are generally low and well within the limits set in the EEC Surface Water Directive.” However, he introduced a note of caution that “we must ensure that, not only does the position not deteriorate, but that subsequent surveys will show an improvement.”⁷¹ These claims painted over the contemporary accounts of regular severe pollution incidents discussed earlier in this chapter, but they were not strictly incorrect. The fish kills reported and investigated across Ireland in the 1980s were not primarily caused by nitrate levels but by a combination of severe BOD from silage effluent, creamery waste, and other agricultural pollutants. Though, as previous chapters demonstrate, the increasing use of nitrate fertiliser on grassland directly enabled the switch from hay to silage and increased stocking rates on farms, the fish kills resulting from that intensive system were different from the nitrate eutrophication that was the primary agri-environmental concern of other European nations at the time. This allowed Kavanagh to paper over the uniquely Irish pollution crisis building across the island. Where researchers like Edward Fahy were quick to acknowledge the uncertainty and under-reporting of the extent of water pollution in official research documents, the expansionist rhetoric came to dominate when research was brought into a political context, just as in the case of AFT’s research.

It is also notable that Kavanagh focused on the pollution of rivers but avoided discussing Ireland’s lakes and estuaries. Despite all the work into modelling river water quality in the 1980s, Ireland’s rivers were not the first nor the only source of concern regarding agricultural pollution. Because lakes do not benefit from a continuously replenishing flow of water like rivers do, deterioration of the island’s lakes happened much earlier and more intensely than other bodies of water. According to AFF’s 1984 review, Lough Ennell in Co. Westmeath deteriorated severely in

⁶⁹ “The production of these fertilizers requires significant amounts of energy and resources, which can contribute to greenhouse gas emissions and other environmental problems. Additionally, the use of smart fertilizers can lead to the accumulation of nutrients in soil and water, which can cause eutrophication.” Divya Shanmugavel et al., ‘Sustainable SMART Fertilizers in Agriculture Systems: A Review on Fundamentals to in-Field Applications’, *Science of The Total Environment* 904 (December 2023): 16.

⁷⁰ Kavanagh, ‘Opening Address’, xix.

⁷¹ Ibid.

the mid-1970s, while phosphorus-driven algal growths in Lough Owel became a concern for the people of Mullingar, Co. Westmeath, who used the lake as a source of water, from the late 1970s. Though not under the jurisdiction of the Republic of Ireland, Lough Neagh in Northern Ireland was identified as one of the most eutrophic major lake in the world as early as 1974.⁷² An Foras Forbartha had been conducting research to ascertain baseline nutrient levels in Irish lakes since 1976, along with an EEC-wide effort to calibrate a model to use LANDSAT data to monitor lake quality.⁷³ In light of this public and decade-long research, Liam Kavanagh's specific highlighting of the nitrate levels of Ireland's rivers concealed more than it showed. Kavanagh's focus on the cleanliness of Ireland's rivers was calculated to add credence to their enactment by the government as efficient assimilators of agricultural waste.

The last and least visible environmental issue emerging the intensification of Ireland's pasture agriculture was groundwater pollution. In a 1985 information circular of the Geological Survey of Ireland, hydro-geologist Donal Daly alluded to the issue of groundwater's lack of visibility: "Unlike streams, in which fish-kills and algal blooms draw attention to the problems of pollution, groundwater is all too easily forgotten, because it is out of sight."⁷⁴ Daly agreed with Kavanagh's assessment that Ireland's groundwater was relatively unpolluted, "due to our high rainfall, high acreage of grassland relative to tillage land and the relatively low usage of inorganic fertilisers." He warned, however, that if pollution was not checked, Ireland would follow the pattern of "developed countries" like the Netherlands, England, and Czechoslovakia whose groundwater contained high levels of nitrate due to the use of artificial fertiliser.⁷⁵

Daly did, however, point to the intensification of agriculture and specifically the reorganisation of cattle, manure and silage, all sources of pollutants, around the farmyard: "In the past, cattle were more generally overwintered in fields and their density was less than today's so farmyards weren't important sources of pollution. However, with the increased intensification and the tendency to overwinter in farmyards, the quantity of waste has increased and is concentrated in small areas."⁷⁶ The construction of silage clamps directly on clean-scraped fields discussed earlier in the chapter serve as a poignant example of these groundwater pollution risks.⁷⁷ Concentrated liquid farm wastes like effluent and slurry could seep through the soil into groundwater sources, as

⁷² M. Vighi and G. Chiaudani, 'The Impact of Agricultural Loads on Eutrophication in EEC Surface Waters', *Session I: Unintended and Undesirable Environmental Effects of Chemicals Used in Agriculture*, Elsevier Applied Science Publishers, 15 September 2024, 73.

⁷³ M McGarrigle et al., *Review 1984*, 56.

⁷⁴ Donal Daly, *Groundwater Quality and Pollution*, Information Circular 85/1 (Geological Survey of Ireland, 1985), 5.

⁷⁵ *Ibid*, 14.

⁷⁶ *Ibid*, 12.

⁷⁷ *Telefis Feirme*, 'Silage'.

they did in 1983, when a spring in Co. Sligo was found to be polluted with coliform bacteria and high levels of biological oxygen demand from silage effluent and slurry originating at a farm 500 metres away.⁷⁸ This forecast of nitrate pollution as a looming future threat is similar to the warnings of the Water Pollution Advisory Council and others about the potential deterioration of Ireland's rivers, writing of Ireland's seemingly exceptional status among European countries as only temporary.

Despite the distributed and unfocused nature of efforts to monitor water quality across Ireland in the 1970s and 1980s, research conducted by this network of institutions gives a clear picture of a burgeoning pollution crisis that resulted from the intensive agricultural practices of silage-making and concentrated winter animal housing. The close partnership of AFF and the IIRS with local authorities allowed for a geographically expansive, though incomplete, fish kill investigation network whose work could be aggregated through regional water laboratories to give a national picture of water quality. However, that the primary organisation tasked with environmental research was Ireland's 'Development Institute' betrays the expansionist and resource-focused view of the government toward its waterways. As demonstrated by the organisation of the Symposium on Environment and Chemicals in Agriculture and the opening address given by Liam Kavanagh, the perspective of the Irish state was that the proper application of research into Ireland's waterway health was to enable more efficient 'use' of the capacity of rivers to assimilate the emissions of Ireland's intensifying agricultural sector. But unlike agricultural development efforts discussed in previous chapters, this research and innovation focus would face strong opposition from both the public and the press.

IV. Environmentalism of the Poor in the Fish Kill Crisis

In his book *Environmentalism of the Poor*, Joan Martinez-Alier describes three conflicting "streams of environmentalism" that emerge at different times and places across the globe: the "cult of the wilderness," "gospel of eco-efficiency," and the environmentalism of the poor."⁷⁹ In outlining the idea of eco-efficiency, Martinez-Alier quotes Shiv Visvanathan's critique of Garret Hardin's *Tragedy of the Commons* where "ecology becomes a managerial science rather than a cosmic view of the world, mopping up the ecological degradation after industrialisation."⁸⁰ This resonates with Warde et al.'s observation that the modelling of ecological processes, both the

⁷⁸ Daly, *Groundwater Quality and Pollution*, 13.

⁷⁹ Martinez-Alier, *The Environmentalism of the Poor*, 5-6.

⁸⁰ Shiv Visvanathan, *A Carnival for Science: Essays on Science, Technology, and Development*, (Delhi; New York: Oxford University Press, 1997), 37.

human and nonhuman, represented an attempt to make them governable and operable. Further, the idea of ecology as a managerial science evokes Liboiron's critique of assimilative capacity as re-enacting living ecosystems as self-purifying sinks for pollution.

The focus on governance, modelling, and efficient use of waterways within the research of AFF and organisations in Ireland's environmental monitoring network clearly reflects this 'gospel of eco-efficiency' stream. The idea of ecological interactions as a series of instrumentalised mechanical processes "mopping up" after industry is clearly demonstrated through the modelling of Ireland's rivers by AFF and the Water Pollution Advisory Council and the assumption of their 'assimilative capacity' to absorb waste illustrated above (Figs. 4.4 and 4.5).

Martinez-Alier contrasts this 'gospel of eco-efficiency' stream, and the 'cult of wilderness' with a third stream, an 'environmentalism of the poor.' An environmentalism of the poor paradigm, known in other contexts as popular environmentalism or environmental justice, emerges where environmental inequalities result from economic growth, such as restricted access to and use of forests and bodies of water and the livelihood effects of pollution.⁸¹ As indicated by the name, an environmentalism of the poor focuses on the environmental impacts of economic growth on the global poor: postcolonial states, rural communities in the Global South, and targets of demographic segregation and discrimination. Participants within these movements are not necessarily motivated by a spiritual connection with an idea of 'nature' or a desire to efficiently manage 'natural resources,' rather their actions are motivated by a desire to protect the more-than-human assemblages on which their livelihood or well-being may rely, assemblages that are threatened by colonial or capitalist exploitation.⁸²

The idea of environmentalism of the poor emerged from an analysis of rural Indian and Latin American movements like the industrial action of Brazilian rubber tappers led by Chico Mendez.⁸³ The concept's impact has grown through the years as it has been used to analyse a variety of movements among poor people around the globe, from environmental justice movements against air and water pollution started by US racial minorities and battles against enclosure of water and land by peasants in southern Europe across the eighteenth and nineteenth centuries.⁸⁴ Historian Stefania Barca has pointed to the pioneering use of environmental justice analysis in southern and eastern Europe in order to call for further research into the histories of environmental injustices

⁸¹ Martinez-Alier, Joan. *The Environmentalism of the Poor*, 14.

⁸² Ibid.

⁸³ Joan Martinez-Alier, 'The Environmentalism of the Poor: Its Origins and Spread', in *A Companion to Global Environmental History*, Wiley-Blackwell Companions to History (John Wiley & Sons, 2012), 514.

⁸⁴ Ibid, 516-8.

and environmental justice movements across the continent.⁸⁵ In looking at the 1980s pollution crisis in Ireland through Martinez-Alier's framework, this thesis attempts to strengthen, rather than dilute, existing studies on environmentalism of the poor. By instrumentalising Ireland's position as both postcolonial and part of Europe this chapter helps answer Barca's call to give voice to European histories of environmental injustice.

Research into the deterioration of Ireland's waters in the 1980s was peppered with references to public awareness of the very visible symptom of fish kills. The IIRS 1982 training pamphlet for local authorities mentioned "major kills [making] newspaper headlines on at least half a dozen occasions during the average Summer."⁸⁶ In his fisheries pamphlets, Fahy suggested that the visibility of fish kills had both advantages and disadvantages. As discussed earlier, Fahy mentioned public awareness of fish kills as a source of uncertainty, positing that trout and salmon were possibly over-represented in fish kill reports compared to other possibly vulnerable species, as they were "species of greater interest to the angler."⁸⁷ But Fahy also credited visibility and public concern around fish kills with the ability to catalogue water pollution so widely, given that "fish kills attract much public attention and they are often reported in the press and on television."⁸⁸

Television reports from RTÉ on water pollution washed across Ireland's television screens regularly through the 1980s. These reports share a common visual language: an opening shot shows one or several fish lying belly-up in a river or piled on shore, often with a voice-over of a fisheries officer or a local angler describing the devastation. The camera then cuts to the culprit, in most cases a silage heap. The silage is not sequestered, but in plain view, rectilinear and wrapped in black plastic with tires or sandbags on top to keep air out. In some cases, the television camera follows a stream of light brown silage effluent from the silage heap down several feet to where it enters the water. The reporter asks whether the river or lake can be salvaged, and the interviewee, an angler, researcher, or local resident, responds dejectedly that nothing is left, that only with expensive restocking effort can any sort of recovery begin. In the Foyle, Bunnoe, Feale, Ballyhards and White Rivers, in Lough Sheelin, Killkee beach, and elsewhere, these same scenes were repeated over and over in news reports between 1985 and 1990.⁸⁹

⁸⁵ Stefania Barca, 'Telling the Right Story: Environmental Violence and Liberation Narratives', *Environment and History* 20, no. 4 (2014). 540.

⁸⁶ Boelens and O'Sullivan, *A Guide to the Investigation of Fish Kills*, 4.

⁸⁷ Fahy, *Fishery Leaflet* 128, 7.

⁸⁸ Ibid.

⁸⁹ Gabriel Coleman, *Handiwork*, 2023.



Figure 4.6: Still from a 1985 *RTE News* report on pollution of lakes in Cavan showing a silage clamp in rear with a pool of effluent draining from the heap in foreground. Source: Tommie Gorman, 'River and Lake Pollution', *RTE News*.

In his opening address to the EEC symposium, Liam Kavanagh cautioned against taking media reports and public discourse around pollution too seriously, saying that “decisions cannot be made on the basis of emotive, unsubstantiated and exaggerated claims or reports which too often receive wide publicity. The scientific community has a major role to play in counteracting such reports and in educating the public and communicators, as well as the decision-makers, on the true effects of chemicals.”⁹⁰ But despite Kavanagh’s attempt to question the veracity of public outcry against environmental harm, it is clear that the visibility of fish kills in 1980s Ireland and the public alarm triggered by the deterioration of sources of drinking water and recreation within local populations played a large role in the development of regulatory frameworks to limit pollutants and attempts to seek justice for the destruction of Ireland’s waterways. As Jan-Henrik Meyer has shown in his analysis of how the European Parliament used public scandals like the Soveso incident and fish kills on the Rhine to push European environmental policy, public outcry was an important catalyst in building legal frameworks for the environment in the second half of the twentieth

⁹⁰ Kavanagh, ‘Opening Address’, xviii.

century in Europe.⁹¹

Despite the demonstrable use of public outcry over pollution to the enforcement of environmental policy, organisations in Ireland tasked with environmental management and education largely dismissed this kind of concern as improper environmentalism. A study commissioned by An Taisce and carried out by researcher Ann C. M. Quinn on environmental education in Ireland between 1981 and 1983 reported that the issue of pollution was well-recognised by the Irish public, with eighty-seven per cent of respondents listing it as a concern. The study found that people in urban areas were more acutely concerned with air pollution and leaded petrol, while rural agricultural communities were acutely aware of water pollution.⁹² In one manifestation of public initiative around pollution issues, ECO-UNESCO galvanised a network of youth clubs and organisations like the Tallaght Youth Service, aimed at young people from the working-class area of Dublin, to form River Watch '87, a youth-led survey of water quality and pollution in their area. The youth network worked to compile these surveys into an island-wide map of Ireland's river health and pollution causes which would be submitted to the government.⁹³ This distributed survey attempted to mirror the work coordinated between AFF, local authorities, and fisheries services in order to supplement the inadequate monitoring capacity of that system through the voluntary work of young people.

Between River Watch '87, the results of the An Taisce study, and the wide reporting of pollution events through newspapers and television, there was clear public awareness and concern for the environment across the Irish population in the 1980s. But in the eyes of organised environmental institutions, the concern and initiative specifically around pollution was not the right kind of environmentalism. As the conclusion of Ann Quinn's An Taisce study read:

In Ireland, environmental protection and improvement is not regarded as a good thing and not as an issue on which to take action. The main sources of information are from the mass media more than from environmental organisations, which mean that environmental information is non-selective, passively interpreted and of limited educational value. "Environmental problems" mean pollution, litter and waste - all visible symptoms of a society lacking in awareness or concern. Perception is confined to what is seen, immediate

⁹¹ Meyer, 'Pushing for a Greener Europe: The European Parliament and Environmental Policy in the 1970s and 1980s', 21.

⁹² Ann C. Quinn, *Environmental Education in Ireland* (An Taisce, 1987), 21.

⁹³ 'ECO-UNESCO Photography Exhibition', *RTÉ News*, with Andrew Kelly, Raidió Teilifís Éireann, 7 November 1986, 00:02:09, RTÉ Archives; 'Pollution River Watch', *Pollution River Watch*, directed by Andrew Kelly, Raidió Teilifís Éireann, 23 October 1987, 00:03:46, RTÉ Archives.

and to what affects people directly through their senses and everyday life.⁹⁴

This sentiment was echoed in a statement by a E. Ní Lamhna, a senior researcher within An Foras Forbartha's Environmental Education Programme, who wrote that "current environmental standards, characterised by vandalism, litter, graffiti and a general lack of public concern, can only be changed by a long-term programme aimed at increasing public awareness about environmental matters. The objective of [AFF's education] programme (which is conducted as part of the activity of the Irish Biological Records Centre) is to develop an awareness of and concern for the environment in the citizens of tomorrow."⁹⁵ Some Dublin participants in the River Watch '87 project interviewed by RTE reflect an internalised view of the same sentiment, interpreting the dumping of burned-out cars and rubbish into the Tolka and Dodder rivers as indicating that young people beyond themselves don't seem engaged in the environmental work ECO-UNESCO represented.⁹⁶

The dismissal of public concern over pollution as a misguided form of environmentalism can be characterised as a conflict between Martinez-Alier's streams of environmentalism.⁹⁷ In addition to the organisation's emphasis on pollution management work, the public education issues deemed relevant to AFF, "chemicals, diseases, resources, energy, population growth and food production," fit neatly within the gospel of eco-efficiency's focus on global-scale paradigms like sustainable development and wise-use of resources.⁹⁸ That both Ní Lamhna and Quinn dismissed widespread public environmental concern as improper and uninformed shows the dominance of eco-efficiency as the most well-understood manifestation of environmentalism at the time. More importantly, this dominance allowed AFF and An Taisce to discount public concern over pollution as improper, not just unhelpful, to their institutional efforts to model and mitigate harm in name of development.

Concerns about "what affects people directly," demonstrated by Quinn's findings that air pollution was of high concern in urban areas and water pollution's importance to environmental perception in rural areas, fit the characteristics of an environmentalism of the poor in that concern evolves out of people's everyday experiences and the impacts of environmental harm on human livelihoods and well-being. Ní Lamhna and Quinn focused on vandalism and litter as "symptoms"

⁹⁴ Quinn, *Environmental Education in Ireland*, 31.

⁹⁵ É Ní Lamhna, *Review 1984*, (Dublin: An Foras Forbartha), 1985, 74.

⁹⁶ Andrew Kelly, 'Pollution River Watch'.

⁹⁷ Martinez-Alier, *The Environmentalism of the Poor*, 5-6.

⁹⁸ Ní Lamhna, *Review 1984*, 74.; Quinn, Ann C. *Environmental Education in Ireland*, 31; Martinez-Alier, Joan. *The Environmentalism of the Poor*, 5-6.

indicating a lack of societal environmental concern, while these symptoms would be more accurately attributed to poverty and under-resourcing.⁹⁹ One in five working people in Ireland were unemployed in 1985 and 22.9 per cent of Irish people fell below the poverty line, a higher rate than all European countries save for Greece and Portugal.¹⁰⁰ Moreover, only twenty per cent of households in Ireland had drinking water from groundwater sources in 1988, meaning that the pollution of surface waters had a significant effect not only on Irish people's experience of the world, but on their health.¹⁰¹ This institutional dismissal of broad public concern around water and air pollution while holding up crimes of poverty like vandalism and littering as indicating, in Quinn's words, "a citizenry that is environmentally illiterate" demonstrates a clear divergence in environmentalist streams.¹⁰²

The paradigm of eco-efficiency was not limited to what organisations like AFF and An Taisce conceived of as proper environmental attitudes, but the very efforts of the Irish state to manage the pollution of Irish water. Ní Lamhna's focus on resources, energy, and food production in environmental education is not the sole manifestation of an eco-efficient attitude within AFF. Instead, it is a rhetorical articulation of the same eco-efficient understanding articulated by her colleagues in AFF's Water Services Division and across the government. The environmentalism of the poor in 1980s Ireland, emerging from public news reports of fish kills and a shared concern for the wellbeing of people living with polluted waters, was in direct opposition to the idea that rivers should, or even could, mop up the ills of agricultural industrialisation. The eco-efficiency espoused by Ní Lamhna, Quinn, and the Irish state's cobbled-together environmental monitoring apparatus, saw rivers as abstract parts of an environmental system that should be mechanically managed and calibrated to support Ireland's economic development.

Reporter Andrew Kelly's interview with two River Watch participants from Finglas, a working-class area outside of Dublin city, demonstrates the internalisation of eco-efficiency even by young people galvanised by an environmentalism of the poor. The two interviewees demonstrate disappointment over the pollution of the Tolka and their participation in the program emerges from their personal care for it. However, when asked by Kelly whether other young people from the area showed concern for the state of the river they responded, "not much, there would be a few but not much," pointing to the pollution itself as evidence that young people like themselves wouldn't

⁹⁹ Quinn, *Environmental Education in Ireland*, 22.

¹⁰⁰ Tim Callan and Brian Nolan, 'Income Inequality and Poverty in Ireland in the 1970s and 1980s', ESRI, December 1993, 43, 21.

¹⁰¹ *Working Document of Proposed Community Measures Concerning the Protection of Freshwater and Internal Coastal Waters against Pollution from Livestock Manure and from the Overuse of Nitrogenous Compounds* (European Commission, 1988), BAC 125/2005 No. 1, Historical Archives of the European Commission, 5.

¹⁰² Quinn, *Environmental Education in Ireland*, 22.

share their concern.¹⁰³ As these statements demonstrate, the dominant eco-efficiency paradigm discounted the harm of the industrial and agricultural pollution that AFF and the state sought to manage and mitigate. Instead working people were made to bear the blame for damage to their own environment, creating a barrier to more organised environmental efforts.

This brief look at Irish popular environmentalism and its reception by environmental institutions in the context of the 1980s water pollution crisis reveals a significant opportunity for further research into ideas of environmental justice and environmentalism of the poor within the field of Irish history. Sociologists like Hilary Tovey, Susan Baker, and Steven Yearley have long held that these movements more closely mirror environmental movements of the developing world, characterised in part by a focus on private industrial actors and pollution rather than state programmes of planning and conservation.¹⁰⁴ Alier holds that environmentalism “in most eras in history, is more often than not the environmentalism of the poor,” but historical Irish narratives of environmentalism of the poor, or environmentalism of any stream, has often been discounted.¹⁰⁵

In the conclusion to *The Buffer State*, historian Mary Daly’s volume on the precursor to the Department of the Environment, Daly claims that Irish environmental concern is of a very recent origin. Daly cites a lack of documentation of public concern over pollution of the south of Dublin Bay in the 1930s as evidence that care for the more-than-human world wasn’t highly prioritised at the time.¹⁰⁶ Elsewhere in *The Buffer State*, Daly cites a 1958 government committee which concluded that “few people are sufficiently aggrieved by water pollution to take action” despite widespread dumping of sewerage into rivers and lakes by local authorities. In her discussion of this report, Daly notes that both rural and urban local authorities could not have afforded better sanitation services, but still questions the lack of public action, citing the polio epidemic as being worsened by a lack of sewerage.¹⁰⁷

Martinez-Alier’s analysis shows that human interdependence on ecosystems always allows for a kind of environmentalism to emerge, but that these environmentalisms are always contingent on their respective sociopolitical and historical contexts. Rather than attempting to transpose contemporary and Western ideas of environmentalism, be they ‘cults of wilderness’ or ‘gospels of eco-efficiency,’ onto other places and times, an environmentalism of the poor framing asks researchers to embrace the contingency of environmental expression and action. Even the interlinking of biodiversity and livelihood in the ‘organic resistance’ of the Roches and O’Briens,

¹⁰³ Kelly, ‘Pollution River Watch’.

¹⁰⁴ Yearley, ‘The Social Shaping of the Environmental Movement in Ireland’, 661.

¹⁰⁵ Martinez-Alier, ‘The Environmentalism of the Poor: Its Origins and Spread’, 514.

¹⁰⁶ Daly, *The Buffer State*, 534.

¹⁰⁷ Ibid, 482-83.

maintaining turloughs and haymeadows to preserve their operations in the face of pressures to modernise, reflects kind of environmentalism of the poor. Considering the case of An Taisce and AFF's report, as well as the 1958 committee report cited by Daly, it is important not to simply take these authorities at their word that Ireland is not a place for the environmentally-conscious, but to seek new archives and histories of where and how poor and working people create environmentalism on their own terms.

V. The Growth of Ireland's Environmental Regulatory State

While this chapter has, so far, focused on the shaping of environmental research and monitoring programmes by state priorities, this section shows how research and the public visibility of the fish kill crisis shaped the government's environmental management structures through the research of multiple interdepartmental groups, a series of laws meant to regulate pollution, and several battles over the interpretation and enforcement of those laws across national and local governments. The first proper legislation against water pollution in Ireland was the Rivers Pollution Prevention Act of 1876, which made dumping of sewerage and other pollutants into rivers illegal. However, as Daly notes, the responsibility for enforcement of this law was given to the same local government sanitary authorities whose insufficient infrastructure was prone to cause pollution events.¹⁰⁸ The prominence of local authorities as polluters within Daly's examples from *The Buffer State* speaks to the long history that connects pollution and environmental regulation in Ireland with issues of local government.

As discussed earlier, the 1958 committee on sanitary services found pollution to be a common problem caused by sewerage, though not severe enough to warrant immediate action. The next government assessment of water resource utilisation was carried out by an interdepartmental committee formed by the Minister for Local Government in 1963. This committee similarly did not find water pollution to be a problem on the national level, but cautioned that local pollution issues did exist and action should be taken to make sure pollution crises of more developed countries did not repeat themselves in Ireland.¹⁰⁹ The 1963 Local Government (Planning and Development) Act, addressed this in some part, providing local authorities with certain conservation powers within the planning process, including the protection of flora and fauna as well as unpolluted water.¹¹⁰ This act enabled public participation in the planning process, opening a previously closed avenue for the public to express environmental concern. An Taisce was also

¹⁰⁸ Ibid.

¹⁰⁹ Inter-Departmental Working Group on Air and Water Pollution, *Report on Water Pollution*, 11.

¹¹⁰ Local Government (Planning and Development) Act, 28 of 1963, 28, Dáil Éireann (17th Dáil), 13.

formally included in planning procedures, compelling local authorities to consult with the organisation “in areas of scenic beauty and heritage.”¹¹¹ However, according to Bernadette Connaughton, the powers of environmental governance, despite participation from the public and An Taisce, were not clearly outlined in the act, allowing the use of ad-hoc and voluntary codes of practice in terms of environmental governance to continue.¹¹² Local authorities were required to consult An Taisce and the public but were not bound by their recommendations within the planning process.¹¹³ Most importantly, agriculture and forestry were both omitted from the purview of the act’s regulatory powers.¹¹⁴

The Irish government’s first major move toward legislation to prevent pollution of Irish waters came with the formation of the interdepartmental working group on air and water pollution in December of 1970. In the introduction to their 1973 report on water pollution, the interdepartmental working group wrote that “as most public disquiet appears to be caused by the effects of development on the quality of our water resources, the working group decided, at the request of the Minister for Local Government, to give prior attention to problems associated with that aspect for the environment.”¹¹⁵ Evidently, the local pollution issues cited by the 1963 working group’s report had become more dire by 1970. Public sense of the decline of Irish waterways was strong enough by this time to prompt the Minister for Local Government James Tully to direct the initial research into environmental health commissioned by this committee to the nation’s waters. An additional source of pressure on the Irish government was the European Commission’s draft framework on environmental protection. As discussed in the introduction to the working group’s report’s, this draft advocated for the elevation of the ‘polluter pays principle’ to the scale of a European standard and the introduction of a common harmonised standard for measuring pollutants and their affects.¹¹⁶

A decade later, in 1980, the Minister for the Environment would form the Water Pollution Advisory Council. The council included representatives from fifteen different departments and agencies as wide ranging as the ESB, An Foras Talúntais, and the Shannon Free Airport Development Company. It was this body that commissioned An Foras Forbartha to undertake the review of Irish water pollution discussed earlier in the chapter. Edward Fahy of the Department of Fisheries and Forestry was also co-opted to join the surveying sub-committee, connecting his

¹¹¹ Connaughton, ‘The Politics of Environmental Policy’, 125.

¹¹² Ibid, 124.

¹¹³ Aidan O’Boyle et al., *Joint CII - An Taisce Study on Industry and the Environment*, (An Taisce and the Confederation of Irish Industry, 1988), 18.

¹¹⁴ Connaughton, ‘The Politics of Environmental Policy’, 124.

¹¹⁵ Inter-Departmental Working Group on Air and Water Pollution, *Report on Water Pollution*, 2.

¹¹⁶ Ibid, 9.

fisheries leaflets to the work of the Advisory Council as well.¹¹⁷ A 1981 report reviewing the scope of AFT's work also noted that meetings of "senior officials of the Institutes and Departments have been held in recent years to promote liaison and co-operation in work relating to environmental services, and that these meetings have been useful."¹¹⁸ Much of the energy behind monitoring and enforcement through Ireland's patchwork environmental legislation at this time can be attributed to this kind of interdepartmental cooperation; in the 1970 working group, the 1980 Advisory Council, and beyond. For its contribution to the 1970 working group, the Department of Agriculture and Fisheries published its 1970 *Silage Effluent Kills Fish* pamphlet. As laid out on the final page of the pamphlet covering 'The Law,' the pamphlet cited the Fisheries (Consolidation) Act of 1959 as the source of environmental law protecting fish-bearing waters instead of the 1963 Planning and Development Act. The pamphlet clarified that "if any person fails to protect waters from pollution he shall be guilty of an offence and shall be liable on summary conviction to heavy penalties."¹¹⁹ This final section of the pamphlet, in its direct warning to farmers, shows that legal backing for the prosecution of agricultural pollution existed as far back as 1959.

Despite the existence of this body of law, the 1970 working group significantly emphasised the inadequacy of existing legal frameworks in their report, writing "their combined effect has not sufficed to curb the gradual spread of water pollution or to offer a reasonable hope of controlling the continuance of this trend as a result of industrial expansion, developments in intensive agriculture and the increasing scale of housing activities."¹²⁰ In response to this report and the growing visibility of public interest in pollution, Minister Tully proposed a water pollution act that would empower local governments to more comprehensively regulate, permit, and prosecute water pollution.¹²¹ The dilemma that local authorities would effectively be regulating pollution caused primarily by their own sanitary authorities was present in the drafting of the act. Augustine Martin, a senator representing Ireland's national university system, spoke in the Seanad about the need to take a more powerful stance by establishing a department of the environment rather than leaving the power of pollution enforcement with the local authorities.¹²²

As Martin predicted, once this new 1977 Local Government (Water Pollution) Act came into force, the reliance on local authorities to regulate, permit, and prosecute pollution became an

¹¹⁷ McCumiskey et al., *A Review of Water Pollution in Ireland*.

¹¹⁸ *Submission of Inter-Departmental Review Group to the Minister for the Environment*, 40.

¹¹⁹ 'Silage Effluent Kills Fish', 5.

¹²⁰ Inter-Departmental Working Group on Air and Water Pollution, *Report on Water Pollution*, 39.

¹²¹ James Tully. Local Government (Water Pollution) Bill, 1976: First Stage. Seanad Éireann (13th Seanad). 25 February 1976. Vol 83. No. 11. Col. 777-8.

¹²² Augustine Martin. Local Government (Planning and Development) Bill 1973: Second Stage. *Seanad Éireann debates*, Seanad Éireann (13th Seanad). Vol. 83. No. 18. Col. 1662-6. 1 April 1975.

immediate issue. According to Kerry County Council's interpretation of the act, one shared by most counties, those who polluted waterways without a license could be prosecuted under Section 3, which forbade any person to "cause or permit any polluting matter to enter waters."¹²³ However, the act included an exception to this clause for unlicensed, so called "trade-effluent," that was piped rather than dumped, into a body of water. The harnessing of this specification by local authorities amounted to a de-facto exemption of farmers from the law, as waste draining from their land into the river was not considered licensed effluent like wastewater from a factory, nor was it considered a discreet instance of dumping waste. In order to prosecute the dumping of unlicensed trade effluent, the polluter would first need to be served with a notice by the Council directing them to prevent further pollution. Only when a second offence was recorded after this initial warning could the polluter be prosecuted for this second offence.¹²⁴ This meant that any farmer without a discharge permit could discharge piped pollution into Irish waterways until they were caught without being penalised. This loophole in the Water Pollution Act was cited by local authorities as an impediment to properly tackling pollution due to the act's inability to take into account pre-existing agricultural drainage infrastructure as a legitimate environmental threat. Council officers would have to meet with each one of these farmers and tell them how their systems would need to be improved before imposing any fines or prosecution. The scale of this loophole was significant. Limerick County Council's engineering staff found "300 pollutant outfalls along Limerick's river banks... almost all of them farm outflows."¹²⁵

This interpretation of the act was not universally shared. The 1983 report of the Water Pollution Advisory Council argued that the exemption of "one-off" pollution events" impacted upon the public's perception of the bill, pointing at the same time to Sections 12 and 13 of the bill, which regulated the storage and disposal of waste, as a possible framework to address the problem.¹²⁶ Specifically, Section 12 of the Act empowered local authorities to serve a notice to anyone storing polluting matters directing them to take preventative measures within a specific time frame under penalty of a fine. Section 13 further enabled local authorities to take urgently needed action to prevent or remove pollution from its waters and to take polluters to court to "recover the cost... [from] the person whose act or omission necessitated such steps."¹²⁷ "Rigorous application" of these sections would have allowed local authorities to properly prosecute these one-off agricultural pollution events. Still, the report's authors recognised "that such action would

¹²³ Paschal Sheehy, 'Pollution in Kerry: Cuts to Cause Crisis', *The Kerryman* (Tralee), 18 September 1987, 18.

¹²⁴ Ibid.

¹²⁵ Byrnes, 'Limerick Resumes War on Pollution', 9.

¹²⁶ McCumiskey et al., *A Review of Water Pollution in Ireland*, 112.

¹²⁷ Local Government (Water Pollution) Act, 1977, 1963, No. 1, Dáil Éireann (20th Dáil), Sec. 10.

require a significant expansion of the resources available to local authorities for such purposes.”¹²⁸

The legal cost and staff required to prosecute polluters appears to have been at the root of local authorities’ reluctance to prosecute agricultural pollution under the 1977 Water Pollution Act. An Foras Forbartha specifically stated that “failure to provide... resources is the main reason for the apparent ineffectiveness of this legislation” and that prevention of acute pollution incidents requires the “manpower and expertise to mount a systematic and continuing inspection of locations at which wastes are stored and the mode of disposal of such wastes.”¹²⁹ Similar to the lack of finances to invest in proper sewerage treatment facilities, local authorities did not command the personnel required to inspect unlicensed effluent outflows, issue warnings to polluting farmers, or even to inspect farm waste storage to bring a case against a farmer. Prosecuting a polluter under the 1977 Act was also a financial burden on local authorities. Kerry County Council, for instance, spent £4,000 to bring charges against fourteen offenders while only recouping a maximum of £100 per case. In the midst of the 1987 crisis, the Department of Environment and members of the public called for these fines to be increased significantly, with a directive from the Minister calling on local authorities to include legal costs as part of court action as well as the cost of remedial measures like restocking damaged fisheries.¹³⁰

In November 1987, under the shadow of the public fish kill debacle, the Department of Environment sought a solution to this loophole in the legislation by clarifying Section 10, which allowed a local authority or fisheries board to “apply to the District Court for an order directing [the polluter] to mitigate or remedy any effects of the [pollution],” with a daily fine of up to £100 for ongoing non-compliance.¹³¹ This was a stopgap measure and did not change the actual legislation, but the ability of local authorities to apply for a court order with financial consequences would have significantly decreased the to curb pollution. The loophole was fully closed in 1989, when the new Minister for the Environment Pádraig Flynn introduced the Pollution Control Bill. The bill narrowed the definition of exempted trade effluent to only apply to licensed effluent and sewers managed by a local authority, closing the trade-effluent loophole. The amended act also allowed courts to compel polluters to terminate the discharge of pollutants and to pay for any costs of investigation or mitigation from the pollution itself, including restocking and remediation of the water body and legal fees accrued by the prosecuting authority.¹³²

¹²⁸ McCumiskey et al., *A Review of Water Pollution in Ireland*, 112.

¹²⁹ Ibid, 114.

¹³⁰ Sheehy, ‘Pollution in Kerry’, 18.

¹³¹ Local Government (Water Pollution) Act, 1977, Sec. 10.

¹³² Local Government (Water Pollution) (Amendment) Act, 1990, No. 21, Dáil Éireann (26th Dáil); ‘New Water Pollution Bill’, *RTE News*, with Kevin McDonald, Raidió Teilifís Éireann, 19 January 1989, 00:01:49, RTÉ Archives.

The 1989 bill marked the official incorporation of the Polluter Pays Principle, a framework adopted by the European Parliament and the OECD to establish legal environmental frameworks since 1970, into Irish law.¹³³ Part of the long delay in implementing legislation that would cause polluters to pay, despite the opportunity to do so less formally with prior legislation, was that farmers polluted on behalf of the state project of economic expansion. As with sanitary authorities, pollution by farmers was not incorporated into the permitting system required of industry because their infrastructure was pre-existing and considered necessary. With AFT's research bolstering the intensification of pasture agriculture and AFF's research reorganising Ireland's rivers for waste assimilation, intensive Irish farmers had been prompted and paid to pollute. Enforcing laws that would protect rivers as ecosystems, sources of drinking water, and fisheries instead of pollution sinks would have meant an end to this regime without a clear alternative. What changed with the 1989 bill was that agriculture, like any other industry, would be considered a legitimate source of pollution.

VI. Case Study: North Kerry Milk Products

This far this chapter has discussed institutional dynamics surrounding the 1980s pollution crisis: how research was conducted and assessed, the ways in which media coverage and public interest prompted policy development while being discounted by the government and environmental institutions, and how laws were passed, interpreted, and enforced by different bodies. To fully understand the interaction of all these dynamics, this section explores a case study of one of the worst fish kills in the 'year of the fish kill': the pollution of the river Feale in Listowel, Co. Kerry by the North Kerry Milk Products creamery.

The fish kill, which was recorded on May 8th, 1987, was the largest ever fish kill in the Feale's history and was preceded by several other kills on the Feale through the 1980s. A video shot by Charles Nolan, fisheries officer with the Shannon Regional Fisheries Board, was broadcast on RTÉ's initial coverage of the kill. The video shows dead and dying fish along the river along with an eel wriggling along the sand to try to get oxygen. Speaking to reporter Tom MacSweeney, Nolan described "salmon smolts jumping out of the water on to the bank trying to escape what was coming down," commenting that the fish kill was the worst he had seen since starting as a fisheries officer in 1973.¹³⁴ Fishery officials counted 4,000 dead or dying salmon smolts along 300 meters of the Feale. Edmund Barry, a chemist with Kerry County Council, found BOD levels of 265 mg/L

¹³³ Meyer, 'Pushing for a Greener Europe', 13.

¹³⁴ 'River Feale Pollution', *RTÉ News*, with Tom MacSweeney, Raidió Teilifís Éireann, 27 May 1987, 00:09:36, RTÉ Archives.

in the river.¹³⁵ Healthy oxygen levels for fish are between 6 mg/L and 10 mg/L, meaning the BOD caused by organic matter pollution in the Feale that day was over twenty-six times what the river could ‘assimilate’ while remaining survivable for fish.¹³⁶

As Nolan noted in his interview, a great proportion of the salmon killed were salmon smolts, young salmon cut down on in the last twenty kilometres of the river before they could reach the ocean to begin feeding and breeding. In an interview for *The Kerryman* newspaper the week after the kill, Michael Fitzsimons of the Shannon Regional Fisheries Board pointed out that the full impact of the kill on the salmon population wouldn’t be fully understood until two or three years later when the mature salmon would have returned to the river to spawn.¹³⁷ The impact of pollution into the river Feale also had more direct human impacts. In his interview with RTÉ, Nolan also spoke about recent difficulties with drinking water in Listowel, explaining that he had been going out of the way to find drinking water from elsewhere:

I go to a well in Ballinruddery for the water and my wife gets it from Banemore. The smell coming out of the taps is ridiculous. I mean, you’d have to actually smell it to understand what I’m talking about and as I’ve been on the job for so many years I’ve seen the condition of the River Feale and it is putrid down there.¹³⁸

Nolan’s testimony speaks to both the human and nonhuman effects of pollution in a river used both as a fishery, public amenity, and a source of drinking water. It also shows that the fish kill was not an isolated incident and that levels of pollution in the river were commonplace enough for him and his wife to have sought out alternative sources of drinking water. In response to these drinking water complaints, Brian Sweeney, engineer with Kerry County Council, reassured RTÉ’s viewers that the taste and smell in Listowel drinking water were only superficial changes caused by actinomyces bacteria which would not otherwise threaten human health.¹³⁹

At fault for the fish kill in May of 1987, and several others dating back to before 1985, was the North Kerry Milk Products cooperative (NKMP). Kerry County Council had previously convicted and fined NKMP twice for improper discharge into the river, but the co-op had never been prosecuted.¹⁴⁰ In a statement to *The Kerryman*, Charles Nolan claimed that fish kills

¹³⁵ ‘NKMP Ordered to Pay £3,350 for Pollution’, *The Kerryman* (Tralee), 18 December 1987, 1.

¹³⁶ Shane O’Boyle et al., ‘Dissolved Oxygen Levels in Estuarine and Coastal Waters around Ireland’, *Marine Pollution Bulletin* 58, no. 11 (2009): 1657–63.

¹³⁷ ‘Feale Fish Kill Not Us Say Co-Op’, *The Kerryman* (Tralee), 15 May 1987, 7.

¹³⁸ MacSweeney, ‘River Feale Pollution’.

¹³⁹ Ibid.

¹⁴⁰ Ibid.

were only known to have happened since 1973 when North Kerry Milk Products was first established.¹⁴¹ According to John O’Sullivan, a member of the Kerry Anglers Association, fish kills in the Feale began in 1975 and became a regular occurrence whenever levels in the river were low after that.¹⁴²

The North Kerry Milk Products plant in Listowel was first discussed in 1968 as a consolidation of ten small creameries in the area, which would have been owned in part by the state-run Dairy Disposal Company.¹⁴³ Initially envisioned to produce butter, milk powder, and cheese, construction of the factory began in 1971 with the purpose of producing casein from skim milk for use in processed foods. A 1971 article in *The Kerryman* specified that the factory would be constructed to handle 100,000 gallons of milk each day, “most of which is being sent out of the country at present.”¹⁴⁴ This neatly ties the construction of the factory in with the expansionist agricultural regime at the time: farmers were producing more dairy than ever to be processed and consumed abroad. The NKMP factory was part of an effort by the Dairy Disposal Company to create an Irish industrial capacity to absorb these increased rates of dairy production.

Also explicitly stated in the 1971 *Kerryman* article was “the problem of the disposal of the whey, a high pollutant factor in all milk processing plants, from the Listowel plant.” The article noted that several similar facilities in Munster would be dealing with excess whey, and that plans for a £1,500,000 lactose factory were proposed to deal with the surplus.¹⁴⁵ As reported by the *Irish Press* and the *Farmers Journal* the following year, plans to build the lactose plant were almost immediately challenged by pig producers who sought to instead condense and redistribute the whey as cheap feed for pigs.¹⁴⁶ The Irish pork market then crashed in 1974, and lactose processing was eventually expanded in Munster in the 1980s, but the expanded capacity for processing whey for use in a secondary market was still not sufficient to keep NKMP’s byproducts from consistently polluting the Feale from its earliest days.¹⁴⁷

Not only was the risk of pollution by whey from milk processing known back in 1971, the overabundance of byproducts and potential pollution was even forecast in the 1973 report by the Interdepartmental Working Group on Air and Water Pollution. According to the report, creameries

¹⁴¹ ‘£2m. Clear Water Plant’, *The Kerryman* (Tralee), 22 May 1987, 3.

¹⁴² Derek Cunningham, ‘EEC Moves to Protect the Feale’, *The Kerryman* (Tralee), 24 July 1987, 1.

¹⁴³ ‘Want Butter Making Plant at Listowel’, *The Kerryman* (Tralee), 27 January 1968, 10.

¹⁴⁴ ‘Listowel Factory - at Last!’, *The Kerryman* (Tralee), 27 November 1971, 39.

¹⁴⁵ *Ibid.*

¹⁴⁶ Des Maguire, ‘U.S. Firm to Move into Pig Industry?’, *Irish Press* (Dublin), 22 April 1972, 10; ‘Pig Feeders Plan for Buying Whey’, *Irish Farmers’ Journal* (Dublin), 8 April 1972, 2.

¹⁴⁷ Pat Lynch, ‘Macroom Expansion Means More Jobs and Security for Farmers’, *The Kerryman* (Tralee), 9 May 1980, 38; Mícheál Ó Fathartaigh, ‘The Government’s Creameries: A History of the Dairy Disposal Company, 1927-1978’ (Trinity College Dublin, 2010), 226.

were taking in 100 per cent more milk in the 1970s, with plans for another fifty per cent increase due to demand from the EEC's common market. Despite this increase, "the present methods of waste disposal vary widely—from irrigation to dilution and, in many cases direct discharge into public sewers." The working group also mentioned the seasonal aspect of pollution that would end up being a primary contributor to the crisis in the Feale, specifying that "a contributory factor is that peak milk supply coincides with lower flows in our rivers. In a number of cases of severe pollution arising from local authority sewerage systems the problem is at least partly due to disposal of creamery wastes."¹⁴⁸

North Kerry Milk Products was granted a permit to dispose of one million gallons of organic waste into the Feale each day, as long as that the effluent did not have a biological oxygen demand greater than twenty parts per million, in agreement with the standards set by the 1977 Local Government (Water Pollution) Act. John J. O'Sullivan of Spa, Co. Kerry, who initiated the EEC's investigation into the NKMP pollution, wrote to *The Kerryman* to explain that these standards were first established in 1912 by the Royal Commission on Sewage Disposal.¹⁴⁹ In his letter to the paper, O'Sullivan cited a report from the Institute for Industrial Research and Standards, showing that eight million gallons of water "are required to assimilate this waste." According to O'Sullivan, the variability in flow rate during the drier summer months meant that this standard couldn't have been met during the dry, sunny weather under which the 1987 fish kill occurred.¹⁵⁰

In addition to the misalignment of the pollution license granted by Kerry County Council with the variability of flows in the River Feale, NKMP's water treatment facilities were not able to properly handle the levels of effluent generated by the plant, nor did the plant indicate any effort to stop the rapid growth of production. North Kerry Milk Products began the construction of an anaerobic digestion water treatment plant in October of 1986, which was planned to start operating in early July of 1987. Pat O'Neill, engineer for NKMP's parent company Kerry Co-op, said that the previous treatment facilities had allowed "for plusses and minusses after treatment" which the new plant was meant to fix.¹⁵¹ At the same time, NKMP was involved in court hearings regarding its continued pollution of the Feale, suing Kerry County Council over the constitutionality of its license and applying to the Council for a new license that would allow it to double its allowable effluent discharge from one to two million gallons per day.¹⁵²

¹⁴⁸ Inter-Departmental Working Group on Air and Water Pollution, *Report on Water Pollution*, 19.

¹⁴⁹ Derek Cunningham, 'Review for NKMP License', *The Kerryman* (Tralee), 4 September 1987, 1.

¹⁵⁰ John J. O'Sullivan, 'Pollution of the River Feale', *The Kerryman* (Tralee), 11 December 1987, 29.

¹⁵¹ *The Kerryman*, '£2m. Clear Water Plant', 1.

¹⁵² Cunningham, 'Review for NKMP License', 1.

One month after the pollution event, an Environmental Watch Group was formed in Listowel, organised by anglers from the area of the river Feale and the Cashen estuary downstream after a meeting of around 400 local people concerned by the pollution in the Feale.¹⁵³ The new group protested outside North Kerry Milk Products for the entirety of the following Sunday. The interest of these anglers in the river did not emerge from any use of the Feale as an intensive commercial fishery, rather the anglers at the centre of the movement to protect the Feale would have fished the river for various purposes including recreation, subsistence, and in some cases sales to local markets. *The Kerryman* noted that the sixty or so people protesting included not only anglers but local councillors, non-anglers from Listowel town and the region, and “a number of women.”¹⁵⁴ Charles Nolan stressed during the protest that the pollution issue was ongoing, with reports “that fish were seen in distress in the river” only the previous day. Dan Joy, secretary of the Environmental Watch group, made sure to clarify that the protest was not aimed at NKMP workers, and that “there is a frustration among people in the town with the law which seems to be helpless in dealing with pollution.”¹⁵⁵ Local councillor Patrick Walsh of Fianna Fail was also at the protest and stressed that “he would prefer to be singing the praises of NKMP rather than protesting outside the plant, but the whole of North Kerry was becoming more conscious about pollution.”¹⁵⁶

¹⁵³ ‘Feale Watch Group Formed’, *The Kerryman* (Tralee), 19 June 1987, 1.

¹⁵⁴ ‘Protest at NKMP’, *The Kerryman* (Tralee), 19 June 1987, 1.

¹⁵⁵ *Ibid.*

¹⁵⁶ *Ibid.*



Fishermen protest at the Ashe Hall in Tralee on Monday as County Councillors arrive for a meeting. The County Manager said they were protesting in the wrong place.

Cancel £10

Figure 4.7: Photograph from the *Kerryman* of fishermen at a separate protest outside Kerry County Council following a fish kill on the Feale on 8 May 1987. Charles Nolan pictured on the bottom row third from the right. Source: *The Kerryman*, '£2m. Clear Water Plant', 1.

Nolan, pictured above protesting outside Kerry County Council (Fig 4.7), described a change in the relationship between anglers, who were speaking up about the pollution of the Feale, and the public brought about by the intensifying environmental devastation:

Down through the years, as I say, a lot of people had no time for the anglers. They were known as a bunch of cranks and probably still are, some of them. But in the past couple of years, since 1986 even to this year they've gained moral support extremely well like and, as I say [the fish kills] are getting bigger every day and people are beginning to stand out and talk about the problem on the River Feale."¹⁵⁷

Nolan's description evokes Martinez-Alier's environmentalism of the poor concept in that it describes a public movement around environmental degradation by an external party's attempt

¹⁵⁷ MacSweeney, 'River Feale Pollution'.

to profit at their expense.¹⁵⁸ There are two things specifically of note here. Firstly, the bottom-up protest involved a broad spectrum of participants, such as fisheries officers and anglers who had direct and regular contact with the river's ecosystem as well as others who feared for the quality of their drinking water or were concerned for their neighbours. People in Listowel and across North Kerry saw their livelihoods and health as connected to the health of the river and correctly identified the industrial pollution of NKMP as a threat. Edmund Barry, as a chemist for the County, used his scientific expertise to dismiss concerns about drinking water, but in this case most scientists were not telling others whether or not they adhered to the correct view of environmentalism. Rather, John O'Sullivan and the researchers at the regional fisheries board used their work to support the larger movement growing out of the community's desire for a clean and healthy river. Secondly, Feale Watch leader Dan Joy, in a statement to *The Kerryman*, specified that the plant's operators, not the workers in the plant, were the targets of protest actions. Joy underscored the working-class nature of the protest and the recognition that profit-seeking, not plant workers, was the reason for the crisis.

A final twist to the public reaction to NKMP pollution was that the plant was also under fire at the time for air pollution by burning trash in its steam energy plant. The British government wanted to test the viability of trash incineration as a power source at a plant in Liverpool and contracted with NKMP to burn refuse shipped from Merseyside to power its plant and monitor its effects. While discussions of river pollution in this chapter have mostly focused on the coloniality underlying the notion of a river acting as a waste sink, this arrangement materially recalls Liboiron's *Pollution is Colonialism*. In this instance the British government used private industry connections to use Listowel as both a waste dump and a testing ground for air pollution effects to which it would not willingly subject the people of Liverpool.¹⁵⁹ Former water keeper for the Limerick Fisheries Board Jack Leahy, when interviewed by Tom MacSweeney on the fish kill, mentioned a "constant stench over the town of Listowel," which can be literally interpreted as the smell of burning refuse generating from the NKMP plant.¹⁶⁰ A 1987 letter sent to Listowel's Urban Development Council by twenty members of the local Irish Countrywomen's Association similarly expressed disgust with the burning of trash at the plant.¹⁶¹ The combination of air and water pollution emanating from the same factory allowed for a focused, purposeful environmental justice movement to take hold in North Kerry, pressing the Kerry County Council to hold NKMP

¹⁵⁸ Martinez-Alier, *The Environmentalism of the Poor*, 5-6.

¹⁵⁹ 'Co-Op Plant May Resolve Dispute', *The Kerryman* (Tralee), 24 April 1987.1.

¹⁶⁰ MacSweeney, 'River Feale Pollution'.

¹⁶¹ 'Tests Cost £1,200', *The Kerryman* (Tralee), 12 June 1987, 9.

accountable.

Deficiencies of the 1977 Local Government (Water Pollution) Act also played a role in the pollution crisis on the Feale. North Kerry Milk Products had a license to discharge a regulated amount of effluent under Section 4 of the Act. When the fish kills happened, it was shown to have exceeded that limit. Despite this, NKMP was able to stall the council's prosecution efforts against them for polluting outside the capacity of their license by contesting the constitutionality of their license at the high court, given its additional clause limiting the river's BOD.¹⁶² The solution to this dispute sought by John O'Sullivan was to apply the EEC's 1980 standards for BOD in fish-bearing waters, limited to six mg/L in most fish-bearing waters and three mg/L in salmonid waters, neither of which would have been met in the Feale during dry weather with the amount of effluent NKMP was allowed to discharge.¹⁶³

This three mg/L limit was also far below the twenty mg/L limit set by NKMP's license. Given that flows as low as 4.18 million gallons/day had been recorded in the Feale in the summers of 1984 and 1986, O'Sullivan claimed "this must now be the volume flow on which the new parameters for the river should/will be based. Ideally, the anticipated lowest flow should be taken, as the present lowest flow is more likely to decrease than increase."¹⁶⁴ The mismatch between the NKMP licence's BOD standard and the EEC's standards prompted the EEC to demand a response from the Irish Government, threatening to move against Ireland for infringing these water-quality standards for salmon-bearing rivers like the Feale. As a result, the Department of Environment put pressure on Kerry County Council to report on the pollution event and efforts to improve water quality in order to avoid the EEC coming down on the national government.¹⁶⁵

As Jan-Henrik Meyer shows, this reflects efforts within the EC throughout the 1980s, when the European Court of Justice was used to make sure that the environmental laws of member states aligned with its standards and that member states had effective mechanisms to enforce those standards.¹⁶⁶ Once prosecution took place, North Kerry Milk Products was charged with a fine of £3,350 for the fish kills in addition to £905.15 expenses incurred by restocking the river with 400 brown trout over six months. However, for "one of Europe's best salmon and trout rivers," this small effort at restocking would not come close to making up for the losses to the fishery and the larger ecosystem of the Feale.¹⁶⁷ As fisheries researcher with the Central Fisheries Board Kenneth

¹⁶² Sheehy, 'Pollution in Kerry', 18.

¹⁶³ Council Directive of 18 July 1978 on the Quality of Fresh Waters Needing Protection or Improvement in Order to Support Fish Life, No. 659, European Council, (1978), 7.

¹⁶⁴ O'Sullivan, 'Pollution of the River Feale', 29.

¹⁶⁵ Cunningham, 'EEC Moves to Protect the Feale', 9.

¹⁶⁶ Meyer, 'Pushing for a Greener Europe', 2.

¹⁶⁷ *The Kerryman*, 'NKMP Ordered to Pay £3,350 for Pollution', 1.

Whelan explained at the court hearing in December of 1987, little could be done to restore salmon, given the genetic fingerprint that causes salmon to return to the river in which they and their ancestors hatched.¹⁶⁸

“The row about the Feale,” as RTÉ reporter Tom MacSweeney referred to it, exemplified a broader pattern in the Irish state’s relationship to agricultural pollution in the 1980s. Though the NKMP factory was clearly different from a farm, the incentives to prioritise intensive production with only a superficial regard to the environment remained the same. Interestingly, the mechanisms by which rivers were polluted, through spillage of byproducts rich in organic matter, were also the same as those of silage pollution. The final section of this chapter further explores how the methods with which these pollutants were dealt became indistinguishable between farm and factory.

VII. Ecological and Economic Crises

Apart from the actual mechanics of water pollution, the Listowel case study demonstrates how monitoring by the Regional Fisheries Board clashed with lacklustre enforcement by the County Council, in part due to insufficient legislation. It further demonstrates the power of public environmentalism, an environmentalism of the poor, in bringing polluters to account despite these shortcomings. The partnership between fisheries officers, anglers, and other groups around quality-of-life issues, with John O’Sullivan blowing the whistle to the ECC, ultimately caused the Irish government and Kerry County Council to seriously pursue prosecution for the destruction of the Feale’s fishery.

According to Mattie Nolan of the Shannon Regional Fishery Board, the public pressure caused by the 1987 fish kills was what prompted the courts and local authorities to act once they found a new interpretation of the act that could prosecute polluters.¹⁶⁹ This clearly demonstrates the importance of an ‘environmentalism of the poor’ movement to create and enforce environmental regulations, contrasting with the ‘eco-efficiency’ paradigm of government organisations that both naturalised pollution in service of industrial development and dismissed popular environmentalism as incomplete and naïve. These popular movements were effective against large industrial polluters like North Kerry Milk Products, but the distributed nature of farm pollution and the economic pressures on farmers meant that the majority of fish-kills caused by silage effluent from farmers, could not be addressed in the same way.

More stringent interpretations of the 1977 Pollution Act were first applied in 1987 with the

¹⁶⁸ Ibid, 9.

¹⁶⁹ ‘Polluters Pay for Fish Restocking’, *RTÉ News*, with George Devlin, Raidió Teilifís Éireann, 8 July 1988, 00:02:14, RTÉ Archives.

conviction of West Limerick farmer Patrick Cummane by Limerick County Council. Cummane, who had dumped slurry into a tributary of the White River, another salmon and trout-bearing river, was asked for £4000 pounds to remediate the pollution, a fraction of the £17,000 the *Limerick Leader* and *RTÉ News* reported would be required for a full restocking of the river with the genetic strain of salmon native to the White River.¹⁷⁰ As reported by the *Limerick Leader*:

Mr. Cummane was a young man who had taken over the family farm two years ago, and had since expended a great amount of money, most of it borrowed, in the installation of a fully-concreted yard and silage and slurry tanks. Rainwater had collected inexorably in the slurry tank and Mr. Cummane had genuinely believed that he was releasing rainwater only when he allowed a run-off from the top of the tank. Justice Martin enquired why the defendant had not had his tank pumped out, to which [his solicitor] replied that he had not had the wherewithal.¹⁷¹

Printed in the *Limerick Leader* earlier in the spring of 1987, Pat Kennedy of the Irish Creamery Milk Suppliers Association (ICMSA) described the opposing economic forces facing farmers. Financial assistance for capital expenses like silage pits and slurry tanks had been cut thirty-three per cent in the previous budget despite the economic demands to intensify farm operations. With the wet weather during the early 1980s, Kennedy claimed, “it is not unusual... for farmers to have to find a means of storing up to six months of effluent in liquid form. If it were to be spread on the land, it would be in the river with the next shower.”¹⁷² In other words, without funding to build sufficient infrastructure to store effluent and slurry, wet weather would inevitably lead to pollution events, whether it was spread onto fields or overflowed its tanks.

Though the fact that Kennedy’s role was to represent an association of dairy farmers would have led him to be more forgiving of any wilful or careless agricultural pollution, those critical of farmers’ roles in water pollution also acknowledged the effects of austerity on farmers. Solicitor for the Deel Anglers Tommy Culhane, while urging farmers to remain vigilant in preventing pollution, acknowledged these restraints, “both in terms of financial constraints and in terms of the accumulative effect of two very wet years,” with imperfect holding tanks and pits for silage and slurry effluent.¹⁷³ The difficult financial position of many farmers in the 1980s combined with wet

¹⁷⁰ ‘River Pollution Prosecution’, *RTÉ News*, with Walsh Micheal, Raidió Teilifís Éireann, 4 November 1987, 00:01:44, RTÉ Archives.

¹⁷¹ ‘Pollution Payments: Farmer to Negotiate’, *Limerick Leader* (Limerick), 7 November 1987, 2.

¹⁷² Byrnes, ‘Limerick Resumes War on Pollution’, 9.

¹⁷³ *Ibid.*

summers led many to hastily adopt silage practices to salvage some profit from their struggling operations, increasing the level of environmental risk. Kennedy and Culhane's statements alongside the story of Patrick Cummane's intensification connect the "year of the fish kill" in 1987 to the pressures of the "year when nothing went right" in 1980.¹⁷⁴

The financial pressure on farmers also reduced how effective this regulatory framework could be. By allowing silage effluent to flow into the River Deel, Patrick Cummane destroyed a fishery, and the stringent application of the 1977 Act allowed him to be held accountable for that action. However, his individual act of pollution resulted from the fact that he followed the exact blueprint of what the government and advisory service expected of him: borrowing on credit and installing modern concrete silage and slurry tanks. Having gone into debt to build this infrastructure, he had no means to pay for the tank to be pumped out, and even if he did, the effluent may have still ended up flowing into the river if spread onto the field. After his prosecution, Cummane was shouldered with a £4,000 fine on top of the debts he incurred to adopt the modern best practices that young farmers were advised toward in order to keep their operations profitable. Both the Deel Anglers and the ICMSA acknowledged that these economic pressures presented a problem for farmers and rivers alike, but neither pointed out that this pressure was systemic, resulting from the government's pressure on farmers to produce more intensively in the face of government austerity and decreased agricultural prices.

In the midst of the 1987 pollution crisis, the government's network of environmental organisations began collaborating to stem the crisis through educational interventions and financial aid programmes. However, many of these institutional efforts to deal with farm pollution faced the same under-resourcing as the farmers they were intended to aid. ACOT, Ireland's agricultural training authority, launched a 'Farm Environment Service' in 1987, an effort to address farm pollution through better training of farmers. Liam Downey of ACOT outlined the stakes the pollution crisis represented: "our farmers, as primary producers for our food industry, have the most to lose from pollution... It will put the livelihood of farmers at risk [by] undermining our image of producers of pure food with an annual export value of £2.5 billion. It will also destroy our tourism industry with an annual value of £1 billion."¹⁷⁵

Amidst these efforts to help inform farmers, the agricultural arm of the state was facing its own financial limits. Both ACOT and AFT were running with significant debt and faced staff cuts. ACOT was forced to begin charging for its advisory services, bringing the numbers of farmers it was able to help down from 80,000 to 20,000. The two bodies were merged as a cost-saving

¹⁷⁴ Carton, 'Farming and the Environment' 196; Maguire, 'The Year When Nothing Went Right', 9.

¹⁷⁵ Lally, 'Anti Farm Pollution Service'.

measure in 1988, forming the new body, Teagasc or ‘Teaching’ that still exists today.¹⁷⁶ As discussed earlier, the monitoring of river systems was also negatively affected by small local authority budgets, as An Foras Forbartha wrote in their 1983 report to the Water Pollution Advisory Council.¹⁷⁷ Michael Fitzsimmons, pollution officer with the Shannon Regional Fisheries Board, similarly lamented cuts to the budget of the fisheries service over the previous two years. These cuts meant they had to pick and choose which pollution events were serious enough to warrant their presence, “if it’s only a minor fish kill it’s unfortunate, but we won’t be able to do anything about it.”¹⁷⁸ While the economic expansion embraced by many government bodies and farmers contributed significantly to the pollution crisis of the 1980s, government austerity hamstrung the later efforts of these actors to address the environmental harms resulting from that expansionism.

An Taisce’s integration into environmental governance through the 1963 Planning Act allowed them to forge purposeful collaborations with other nongovernmental stakeholders that shaped the government’s environmental policy. However, as indicated in Ann Quinn’s characterisation of public environmentalism, their guidance adhered to an eco-efficiency paradigm. An Taisce collaborated with the Irish Farmers Association in late 1987 on a series of publications intended to educate farmers on how to safely and efficiently dispose of agricultural effluent. The following year, An Taisce convened a joint working group with the Council of Irish Industry to compile a report on the industry and environment. In the forward to the report, Minister for the Environment Padraig Flynn cited the need for integrated environmental planning, writing that “there is wide acceptance that environmental considerations can no longer be seen merely as an external constraint on industry, agriculture or energy production. Instead, the awareness of environmental requirements must be fully built into the development of policies for these sectors.”¹⁷⁹ Speaking on their partnership with the IFA, An Taisce chair Emer Colleran reflected this need to integrate environmental and industrial interests. In an 1987 interview with RTÉ, she emphasised that “the government must realise, that as an industry where money, for instance, is provided with the [Industrial Development Agency] grants to set up an industry in agriculture, one must go right through to the disposal site and provide money to actually guarantee that the ‘factory farm’ if you like operates successfully and environmentally in a sound fashion.”¹⁸⁰ Colleran’s

¹⁷⁶ ‘Agricultural Institute’, *RTÉ News*, with Michael Lally, Raidió Teilifís Éireann, 9 February 1988, 00:01:36, RTÉ Archives.

¹⁷⁷ William McCumiskey et al, *A Review of Water Pollution in Ireland*, (Dublin: Water Pollution Advisory Council), 1983, 112.

¹⁷⁸ Sheehy, ‘Pollution in Kerry’, 18.

¹⁷⁹ O’Boyle et al., *Industry and the Environment*, 4.

¹⁸⁰ ‘An Taisce and IFA on Pollution’, *RTÉ News*, with Vere Wynne-Jones, Raidió Teilifís Éireann, 25 September 1987, 00:01:09, RTÉ Archives.

statement laid out the impact of Lemass Era expansionism on agriculture in Ireland, this was an industry and its largest farms, though swathed in green, had become factories.

By building environmental awareness into industrial development, as Padraig Flynn advocated, An Taisce leaned fully into the eco-efficiency paradigm, not acting as a check to the development of industry but partnering with the organisations that advocated for it. Though Colleran pointed out that the pollution crisis resulted from an under-resourcing of farmers who were facing pressures to intensify production, her solution was to fully embrace the ‘factory farm’ as a model, where wastes could be fully and efficiently managed. In Colleran’s language, the river and related environmental considerations became another piece of the factory farm’s machinery. One model integrating environmental concerns into the setup of the factory farm was a “low-cost” emergency tanker service started by the IFA in 1988 and funded by the Golden Vale Co-op in Limerick. Tankers were to pump silage effluent out of tanks that were in danger of spilling over into rivers and lakes. The effluent would then be redistributed onto nearby fields.¹⁸¹ While the effluent still ran the risk of running off into bodies of water during the same kind of wet weather that caused Patrick Cummane’s effluent tank to overflow, this gesture toward efficient diversion of potential pollution showed the public that the IFA was working to address the crisis instead of simply spurring it on. Through the pumping and redistribution of silage and slurry, pastures were not only an industrial source of ‘raw material,’ they now had an ‘assimilative capacity’ just as AFF, and Streeter and Phelps before them, assumed of rivers. However, unlike the dumping of pollutants into rivers this waste was not to be simply washed ‘away’ but recycled as soil nutrients.¹⁸²

When asked by RTÉ reporter Michael Lally where this money to help farmers improve their operations would come from, IFA representative John McCallon pointed to the EEC as the ideal source for money to help farmers install proper infrastructure to manage silage effluent and slurry.¹⁸³ The EEC and the Irish government swiftly put this recommendation into practice, with Minister for Agriculture and Food Michael O’Kennedy creating a £45 million grant programme, first distributed on 1 July 1988, to help farmers clean up their operations to prevent pollution. The grant paid £60 per acre of farmland with the farmer paying around forty-four per cent of the costs, while the EEC would pay thirty-eight per cent and Irish government the remaining eighteen per cent.¹⁸⁴ This grant served as a precursor to the Control of Farmyard Pollution scheme (CFP) which would be introduced the following year.

¹⁸¹ Walsh, ‘IFA to Clear Pollutants’.

¹⁸² Max Liboiron, *Pollution Is Colonialism*, 16-22.

¹⁸³ Lally, ‘Anti Farm Pollution Service’.

¹⁸⁴ ‘Scheme to Stop Farm Pollution’, *RTÉ News*, with Maggie O’Kane, Raidió Teilifís Éireann, 24 June 1988, 00:01:29, RTÉ Archives.

Crucially, the 1988 grant and the CFP scheme would have been of greater benefit to farmers with more land, who could draw down more of the subsidised funds and who would have had a greater capacity to shoulder the financial burden of their portion of the cost. This would, in turn, allow those farmers to further intensify their operations, with more capacity to store and pump out silage effluent and slurry. The IFA further clarified their leanings toward intensifying Irish agriculture regardless of its polluting impact in 1989 when Pádraig Flynn introduced the Pollution Control Bill. As discussed earlier, this bill officially closed the trade effluent loophole and allowed polluters to be fined for ongoing pollution via a court order instead of having to wait for a lawsuit, but the IFA called the bill “draconian and utterly out of line with fair play”, claiming the bill was aimed particularly at farmers, which, for good reason, it was.¹⁸⁵

During this time, the IFA also attempted to shift the water pollution conversation away from farmers, emphasizing instead the pollution of rivers and lakes by city sewerage systems as an equal and, in their telling unacknowledged, cause of water pollution. The IFA did not create this narrative. In fact, domestic sewerage systems had been identified as major polluters of Irish freshwater and marine systems long before the 1980s and, as Mary Daly has shown, pollution of Dublin Bay by sewerage was raised as an infrastructural issue as early as 1930.¹⁸⁶ The interdepartmental working group’s 1973 report cited insufficient expenses by local authorities on sewerage as a pollution issue, saying the money had instead been “directed towards the provision of basic drainage services to facilitate housing and industrial development, rather than to the provision of treatment works to protect the waters into which the sewers discharge.”¹⁸⁷ This pollution runs as a parallel history to the worsening agricultural pollution, with a 1990 *RTÉ News* report highlighting the issue of beaches in Dublin polluted by raw sewage and the threat of EEC litigation due to their deteriorating status.¹⁸⁸ The criticism of local authorities not being suited to bring pollution charges to prosecution also arose from the fact that local authorities were major sources of pollution through their sewerage works. However, as demonstrated through the research of An Foras Forbartha and other organisations, agricultural pollution would greatly eclipse the amount of pollution from public sewers from the 1970s forward. The issues of domestic and agricultural pollution ran parallel to one another and intersected within Irish and European legal frameworks, environmental effects, and the common cause of under-resourcing. Still, the IFA’s

¹⁸⁵ ‘IFA Objects to Pollution Bill’, *RTÉ News*, with Joe O’Brien, Raidió Teilifís Éireann, 2 May 1989, 00:01:29, RTÉ Archives.

¹⁸⁶ Daly, *The Buffer State*, 534.

¹⁸⁷ Inter-Departmental Working Group on Air and Water Pollution, *Report on Water Pollution*, 19.

¹⁸⁸ ‘Sewerage Pollution on Dublin Beaches’, *RTÉ News*, with John Murray, Raidió Teilifís Éireann, 27 July 1990, 00:01:45, RTÉ Archives.

reference to domestic and urban sources of water pollution in the midst of this pollution crisis was a deliberate strategy to pull blame away from intensive agriculture.

Together, this scapegoating of domestic waste, the calls for Europe to pay for mitigation, and the publicity around the Golden Vale partnership served to redirect blame and mitigation efforts regarding pollution away from the intensive agricultural practices themselves and onto related issues: a lack of funding for on-farm infrastructure, incomplete sewage treatment facilities, and the need to redistribute waste. Central to the IFA's distinction between agricultural waste and sewage was the assumption that slurry from cows and effluent from silage were not entirely waste but useful byproducts that only became problematic waste if improperly managed, in other words, wasted. Colleran's endorsement of the 'factory farm' framing reflected this as well, as it presented silage effluent or slurry as needing additional processing capacity just as the NKMP factory needed additional processing to keep its whey from being 'wasted.' Kawa et al.'s history of night soil explores the long global history of domestic sewage recycling's integration into agricultural productivity, but in this case the IFA enacted sewage as a rhetorical foil to agricultural effluent: human waste was a true pollutant while agricultural waste was a misplaced source of nutrients.¹⁸⁹

This distinction evokes the neo-Malthusian idea of planetary scarcity outlined by Wennerlind and Jonsson discussed earlier in relation to stocking rates. Human bodies and their waste were seen as polluting and destructive, while livestock bodies appeared as generative and beneficent.¹⁹⁰ This was because unlike humans, livestock, their excreta, and the bacteria and nutrients contained within were not constructed as agentic, but as abstract governable modules of the factory farm system whose waste could be recycled as a byproduct, like the whey in the NKMP factory.

VIII. The Abolition of An Foras Forbartha

As mentioned earlier, An Foras Forbartha began to outgrow its intentional purpose as 'The Development Institute' almost as soon as it was founded. This caused government concern about financial management within the Institute and its growing list of responsibilities, leading the government to call for an interdisciplinary review of AFF's operations in December 1980.¹⁹¹ With the increased importance of environmental work in Ireland, the resulting 1981 report found that, contrary to the government's initial concerns, more resources would need to be allocated to properly conduct the environmental research work AFF had come to manage. The report added,

¹⁸⁹ Nicholas C. Kawa et al., 'Night Soil: Origins, Discontinuities, and Opportunities for Bridging the Metabolic Rift', *Ethnobiology Letters* 10, no. 1 (2019): 40–9.

¹⁹⁰ Albritton Jonsson and Wennerlind, *Scarcity*, 219-20.

¹⁹¹ National Board for Science and Technology, *Review of An Foras Forbartha*, (Dublin: Inter-departmental Review Group on An Foras Forbartha, 18 September 1981), 1.

with a sense of urgency, that “if it were indefinitely deferred there would be increased costs and reduced efficiency in planning and developing the physical environment and in protecting natural resources.”¹⁹² This external review showed not only that An Foras Forbartha was the only body within the government with the resources to research the state of Ireland’s environment, but that there was more work to be done than there were resources for. However, given that a lack of monitoring capacity in the early 1980s made the scope of Ireland’s environmental issues uncertain, the specific amount of additional financing that would be required was “difficult to devise.”¹⁹³

Another issue sought by the government in commissioning the interdepartmental review was whether the AFF had too much autonomy to take on projects and initiatives. The report found the relationship between AFF and the Department of the Environment to be somewhat ambiguous, as the AFF’s governing board and budget was appointed and managed by the Minister while the Institute otherwise operated as an independent partner of the government, working closely with both private industry and local authorities.¹⁹⁴ The report recommended that AFF’s financial independence be formally codified, stating that it “should have the widest practicable discretion, consistent with necessary controls, in regard to internal staffing and financing.” The report’s author similarly called for the involvement of the Department in the Institute’s board and internal functioning to be clarified and limited.¹⁹⁵ As part of this reporting process, The National Board for Science and Technology also drafted a more specific mandate for AFF, encompassing the entire body of work the Institute had come to own and clarifying its relationship with the Department of Environment.¹⁹⁶

In contrast to the recommendation to expand and make the Institute more independent, and the clear need for an institutional body for environmental monitoring demonstrated by pollution events through the decade, Minister for the Environment Pádraig Flynn decided to dissolve the Institute. On the 8th of December 1987, Padraig Flynn and the Government agreed to disband An Foras Forbartha, a move that shocked many and was seen as a dereliction of duty by others. The joint report authored in April of the following year by An Taisce and the Council of Irish Industry bears the marks of this surprise dissolution. The report, for which Minister Flynn wrote the foreword, mentioned An Foras Forbartha three times in its discussion of environmental protection infrastructure, accompanied by an asterisk pointing the reader to a footnote that read “As this report

¹⁹² Ibid, 24.

¹⁹³ Ibid, 25.

¹⁹⁴ Ibid, 18.

¹⁹⁵ Ibid, 19.

¹⁹⁶ National Board for Science and Technology, *Review of An Foras Forbartha*, (Dublin: Inter-departmental Review Group on An Foras Forbartha, 18 September 1981), 12-16.

goes to print, An Foras Forbartha is in the process of disestablishment. How its function will be carried out in the future is not yet known.”¹⁹⁷ This demonstrates how key AFF had become to the environmental management of a nation facing massive public ecological issues. Its sudden and surprising dissolution came so close to the publication of the An Taisce CII report that all the authors could do was wonder in the footnotes if the government structures they were describing would even be relevant after its publication.

Similar to the merging of ACOT and AFT and the reduced funding to fisheries services, the Government’s stated reason for the abolition of An Foras Forbartha was as a cost-saving measure, with Minister Flynn pointing to the need for economic recovery and touting the taxpayer savings the abolition would bring.¹⁹⁸ Whether or not this was the case, the AFF’s abolition left a gap in responsibility for monitoring and addressing the water pollution crisis. Liam Heneghan of the emergent Green Party, then known as the Green Alliance/Comhaontas Glas, spoke out against the decision in an interview with *RTE News*, pointing out that twenty-five per cent of the waters An Foras Forbartha was previously responsible for monitoring were found to be polluted that year.¹⁹⁹ The Labour Party opposition similarly criticised the abolition of AFF. Labour TD Ruairí Quinn submitted ten parliamentary questions immediately following the announcement, asking about everything from staff redundancies and consultancy contracts to AFF’s overseas contracts and the co-management of research laboratories by AFF and local authorities.²⁰⁰ Deputy Quinn then submitted a formal motion to reject the abolition of AFF on the 23rd of February, which failed.²⁰¹

The replacement for the Institute, established by Minister Flynn in February 1988, was the Environmental Research Unit, a body intended “to provide for the Minister and local authorities such research, analytical, monitoring, advisory or other services in relation to environmental or infrastructural matters as the Minister may, from time to time, direct.”²⁰² In contrast to the recommendations of AFF’s interdepartmental review and the mandate drawn up by the National Board for Science and Technology, the establishment of the Environmental Research Unit (ERU)

¹⁹⁷ O’Boyle et al., *Industry and the Environment*, 14, 27.

¹⁹⁸ ‘An Foras Forbartha Abolished’, *RTE News*, with Joe O’Brien, Raidió Teilifís Éireann, 2 September 1987, 00:01:38, RTE Archives.

¹⁹⁹ ‘Green Alliance on Pollution’, *RTE News*, with Alan McCullough, Raidió Teilifís Éireann, 10 September 1987, 00:01:28, RTE Archives.

²⁰⁰ Ruairí Quinn. ‘Written Answers. – An Foras Forbartha’. *Dáil Debates*, Dáil Éireann (25th Dáil). Vol 376. No. 9. Col. 2166-9. 15 December 1987.

²⁰¹ Ruairí Quinn. Business of the Dáil. *Dáil Debates*, Dáil Éireann (25th Dáil). Vol. 378. No. 3. Col. 368. 23 February 1988.

²⁰² Department of the Environment, ‘The Environmental Research Unit (Establishment) Order. 1988’, Stationery Office, 16 February 1988.

brought this body of environmental monitoring further under the Department's purview, remaking it as a 'unit' of the Department rather than a semi-independent 'institute.' The replacement of the largely independent AFF with the ERU points to another possible reason for the institute's abolition aside from budget constraints, the desire for the Minister to more tightly control the developing environmental monitoring and regulatory capabilities of the government.

AFF and its staff continued work in this new, somewhat-reduced form of the ERU until the Environmental Protection Act 1992 established Ireland's Environmental Protection Agency and officially dissolved An Foras Forbartha, absorbing its staff into the newly formed EPA. This was to be a national body under the Department of the Environment, which also included "regional environmental units" intended to supply the local environmental protection and monitoring work previously managed solely by fisheries boards and local authorities. Unlike AFF, the EPA was a regulatory body which allowed it to bring suit against polluters. This meant local authorities would no longer be the only bodies able to regulate the quality of the Irish environment.²⁰³ After its previous incarnation as a development institute with the adopted responsibility of environmental monitoring and a brief spell as a disempowered unit under the Department of the Environment, 1992 finally brought about an Irish agency whose sole purview was environmental protection. With clear legislation like the 1989 Pollution Control Act behind it, the EPA was able to, for the first time, regulate the pollution of Irish waterways by farmers and sanitary services alike on a unified national scale. The stress put on Ireland's institutional infrastructure by the fish kill crisis as well as the scrutiny it focused on the government by both the EEC and the public played a primary role in this reorganisation under the EPA.

IX. Climate and the Factory Farm

The establishment of the EPA was ultimately a positive development for the health of Ireland's rivers and lakes but it did not mean the end to the development-oriented approach to the Irish environment, or massive fish kills which continue to this day.²⁰⁴ To fully articulate this, we must return to ideas of the climate and the AGMET group introduced at the beginning of this chapter. As explored in Chapter Two, the promotion of silage as a better method of preserving winter feed had been justified partially through a deterministic invocation of Ireland's wet climate by agricultural researchers and educators since the 1960s. In his chapter on grassland farming for the farmer-education focused 1992 AGMET publication *Irish Farming, Weather, and the*

²⁰³ Environmental Protection Agency Act, 1992, No. 7, Oireachtas Éireann (1992).

²⁰⁴ Olivia Kelleher, 'Blackwater Fish Kill: EPA Finds Creamery Co-Op Wastewater Exceeded Permitted Discharge Limits', *The Irish Times* (Dublin), 30 August 2025.

Environment, Moorepark researcher A J Brereton echoed this same climatic justification made by his colleagues thirty years previous:

Haymaking is inherently unsuited to the mild and moist Irish climate. Hay is normally harvested at an advanced state of maturity and is therefore rarely of good quality. Bad weather during field drying reduces its value even more. Silage can be made with greater independence of weather conditions and can support high levels of animal performance.²⁰⁵

This goal of ‘higher levels of animal performance’ was an important factor in determining the suitability of silage over hay to the Irish climate. This was despite the issues of farmers and agricultural demonstrators in making silage in the wet years of the 1980s, leading, as Angela Nugent reported in the *Farmers Journal*, to damage to fields and low dry matter content in the ensiled material.²⁰⁶ But at the same time that Ireland’s wet climate arguably made silage the easier and more productive form of winter fodder, it also presented difficulty when it came to the pollution of rivers and lakes from silage effluent, and the AGMET group was keen to make this clear. Brereton explicitly linked the polluting capacity of silage back to the Irish climate, opening the section of his chapter devoted to effluent by saying that “silage effluent is produced in large amounts in Ireland because of our damp climate.”²⁰⁷ This exposes the circular reasoning inherent in the environmental determinism endorsed by these researchers.

According to An Foras Talúntais and Teagasc researchers through the years, Ireland’s wet climate made it particularly suited to silage making rather than hay. But Brereton also acknowledged that the wetness of the Irish climate made effluent pollution more likely, as Irish silage tended to have high moisture and precipitation caused effluent to run off more easily. With this kind of determinism, the argument that the wet Irish climate was suited to silage could be extended to argue that the wet Irish climate was similarly suited to the deterioration of Ireland rivers and lakes, that the pollution resulting from silage was just as natural to Ireland’s climate as the silage-making itself. Within this interpretation, the climate stood in for the way silage’s grass and bacteria were politically enacted by farmers and researchers as inexpensive generators of biomass. When silage is enacted as a productive biomass generator by organisations like AFT, the wetness of Ireland’s climate positively contributes to that production, but when silage is enacted

²⁰⁵ A J Brereton, ‘The Impact of Weather on Grassland Farming’, in *Irish Farming, Weather, and Environment*, ed. Tom Keane (AGMET Group, 1992), 124.

²⁰⁶ Nugent, ‘Winter feeding strategies’, 19.

²⁰⁷ Brereton, *The Impact of Weather on Grassland Farming*, 130.

as a potential source of pollution by organisations like AFF, Ireland's climate makes silage environmentally dangerous.

The climatic risk posed to Irish water by silage-making was not only caused by wet weather. According to South-West Fisheries Board pollution control officer Patricia O'Connor, the sharp increase in fish kills in 1987 was in fact worsened by drier and warmer than average summer conditions which led to lower river levels and a reduced capacity to dilute pollutants, making silage dangerous in both wet and dry weather.²⁰⁸ The rhetorical use of climate shows how environmental health was weighed against the economic productivity of Ireland's agricultural sector. If the ecological preservation of Ireland's freshwater fisheries was the highest goal, then silage's potential to act as a pollutant would make it too dangerous. Hay, which was more vulnerable to wet weather in its preservation but presented little risk to fisheries in any weather, would in this case be seen as the most appropriate form of winter fodder in any weather. But since these references to climate only served to naturalise the productivist enactment of silage, hay's more limited and variable productivity was only suited to Ireland's climate up to a point.

Because environmental values were integrated into the existing expansionist framework of Irish agriculture, Brereton and others were in the tricky position of justifying and instrumentalising silage despite its polluting potential. Other AGMET researchers like J. F. Collins devoted a significant portion of their chapters to educating farmers about the polluting effects of agriculture, specifically from silage effluent and fertiliser runoff.²⁰⁹ For his part, Brereton devoted a later section of his chapter on grassland farming to silage effluent, laying out the complication between the growing dominance of silage and its polluting potential:

Besides representing a loss of nutrients from the silo, silage effluent has a very high pollution capacity if it enters surface or ground water. However silage-making systems within which effluent is produced as a by-product are likely to continue to dominate grass conservation practice on Irish farms for the foreseeable future. Consequently effluent collection and disposal on all farms have to be managed in a sensible and effective manner which prevents harmful effects on the environment.²¹⁰

Brereton's analysis pairs environmental pollution with economic waste, listing "a loss of

²⁰⁸ Sheehy, 'Pollution in Kerry', 18.

²⁰⁹ J F Collins, Soil-Weather Interactions Important to Farming. In *Irish Farming, Weather, and Environment*, edited by Tom Keane. (Dublin: AGMET Group, 1992), 82-84.

²¹⁰ Brereton, The Impact of Weather on Grassland Farming, 130-131.

nutrients” as the primary concern for farmers. This indicates a primary effort to recapture and re-incorporate the economic value represented by the silage alongside, and possibly above, diverting it from water sources where it could become a pollutant. Brereton discussed spreading the effluent back on the field, “provided it is not spread too heavily in any area or too close to freshwater” to avoid pollution and to reclaim its fertilisation capacity “which, although small, is a bonus.”²¹¹ Brereton also suggested feeding the effluent back to cattle, which found it “to be quite acceptable... consuming 15-30 litres per head daily,” and had been shown to lead to weight gain in beef cattle in scientific trials.²¹² Emer Colleran, in discussing An Taisce’s publication partnership with IFA, pointed to similar “benefits that can be derived at farm level” from the proper economic use of silage as a byproduct, listing the fertiliser value of re-spreading slurry and silage on fields and the capturing of methane for fuel from animal slurry using an anaerobic digester.²¹³ The re-enactment of silage effluent from harmful pollutant to useful byproduct justified the conceptualisation of what Colleran referred to as the ‘factory-farm’ within Irish pasture systems. Because silage was deemed essential and useful within the specific system of industrial agriculture, effluent only became a pollutant when it escaped that system. Therefore other uses, however minor, had to be found for it within the system, whether by spreading it onto fields as fertiliser or feeding it to cattle to close the loop and keep the byproducts from becoming economic and environmental waste. This is the same idea that characterised NKMP’s approach to whey and that characterises other industrial feedstocks, they only become dangerous when they spill beyond the factory walls.

This is the result of the merging of the productivist carrying capacity, where the more-than-human assemblage of the pasture system is reorganised to maximise biomass production and profit, and the ‘assimilative’ carrying capacity discussed by Liboiron, where bodies of water must be managed for the efficient assimilation of waste. Expanding the farm system to include bodies of water required assigning every member in the assemblage an assimilative capacity in the interest of preventing byproducts from becoming waste. Pasture soils were expected to recapture slurry and cows were expected to assimilate silage effluent back into their bodies. The productivist framing meant that effluent and slurry would not simply be waste but byproducts that must be recycled upwards into marginal increases in productivity and economic growth. Ultimately this hybrid carrying capacity of high productivity within environmental limits refocused the aim of farm management on efficiency and reimagined the agri-ecological system, including the pasture, the river, and the silage pit, as a factory farm.

²¹¹ Ibid, 131.

²¹² Ibid.

²¹³ Vere Wynne-Jones, ‘An Taisce and IFA on Pollution’.

Following Warde et al.'s discussion of the assumptions behind environmental modelling, the factory farm system required all members of the farm assemblage to be tightly governed, their capacity to act directed in particular ways like the boxes in AFF's flowchart (Fig. 4.4).²¹⁴ This assumed that farmers and researchers could, in most cases, control and direct the actions of other actors in this assemblage. This was and is, of course, not the case. Grass may be wetter or bacteria more efficient than expected, leading to more effluent, cattle may not drink as much of it as expected, and soil can be too wet to absorb it or too light to hold onto it (Fig 4.8). In the messy assemblage of action beyond the model, water can overflow tanks and flow across farm boundaries, bacteria can be too hungry for oxygen, and even when conditions are dangerous salmon return to the stream where they were born. As Tsing shows, systems of salvage accumulation benefit from translating the uncontrolled, and therefore free, agents at the edges of capitalist systems, into financial commodities, but to control them entirely would require complete removal of their agency and the agency of their relations within the assemblage.²¹⁵ The focus on the effects of weather systems on the ever-present possibility of pollution that runs throughout AGMET's publications betrays the scientist's obsession with unruliness, not only of weather systems but the whole complicated assemblage of actors.

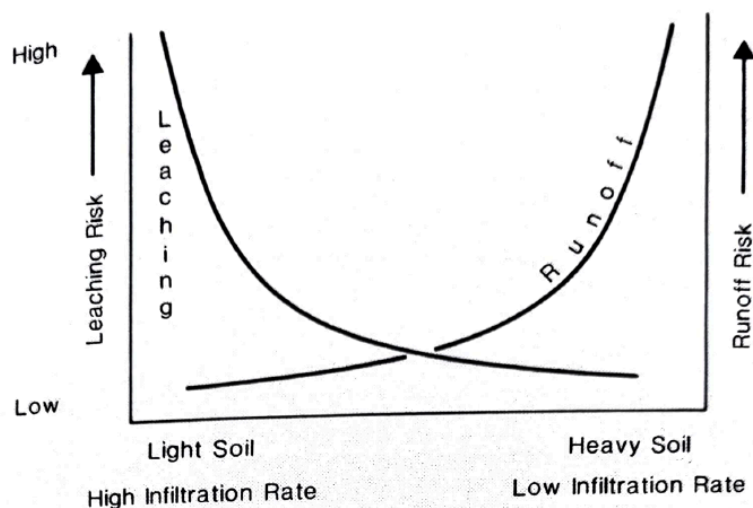


Fig. 16.2 The effect of soil type on the leaching and run-off risks

Figure 4.8: A graph from Carton's AGMET chapter showing how soil type affect the risk of pollutants infiltrating or running off a field. Heavy soils are shown to increase the risk of runoff, water flowing off the surface of the soil into surface water. Light soils are shown to increase the risk of leaching, water flowing through the soil and into groundwater. Source: Carton, 'Farming

²¹⁴ Warde et al., *The Environment: A History of the Idea*, 158-63.

²¹⁵ Tsing, *The Mushroom at the End of the World*, 220-1.

and the Environment', 201.

X. Conclusion

The final chapter of the AGMET volume, 'Farming and the Environment' authored by Teagasc researcher O. T. Carton, laid out the argument of this chapter explicitly in its first paragraph:

The primary objective of modern farming systems is the optimization of profit. Generally, maximising output achieves this objective and usually involves the farmer in modifying the agri-ecosystem. These modifications have resulted in dramatic changes in farm practices on Irish farms over the last three decades. These changes include bigger herds, improved animal performance, increased use of silage and greater use of concentrates... All have resulted in higher concentrations of nutrients and chemicals on the farm which has increased the pollution risk for the environment. There is a need to understand how farming systems and weather interact to create pollution risks so that appropriate action can be taken to minimise the risks.²¹⁶

Despite being situated in a meteorological pamphlet, Carton's text transparently accepted that the intensification of Irish agriculture was recent, motivated by profit, and carried with it environmental harms, or at least the risk of environmental harm. However, faith in the same kinds of research and innovation that led to the development of these polluting systems was still regarded as central to solving this pollution issue. In other words, in addressing the polluting effects of these industrial practices, the solution sought was not the elimination of the practices causing this pollution, but further research to manage and reincorporate those pollutants into the farm system. This faith in research to develop systems of pollutant recycling and recapture reflects the same eco-efficiency paradigm indicated in An Foras Forbartha and the Water Pollution Advisory Council's pollution diagrams (Fig. 4.4 and 4.5). The gospel of eco-efficiency holds that pollutants are acceptable and even useful in achieving larger goals of food and energy efficiency, as long as it is possible to effectively manage them.

Carton closed his chapter with a version of the government's new 'Code of Good Practice' written to guide farmers to properly manage slurry and silage effluent with weather in mind. These practices were voluntary, reflecting the voluntary approach to environmental regulation taken by local authorities before the 1980s. But with the formation of the EPA

²¹⁶ Carton, 'Farming and the Environment', 195.

representing the possibility of legal consequences to water pollution, they read less as possible suggestions and more as preventative measures to falling on the wrong side of the law.

Code of Good Practice

- *Spread slurry at rates which take account of the crops nutrient requirements.

- *Where possible spread slurry earlier rather than later in the growing season.

- *Avoid spreading slurry

- a) on wet or waterlogged soils;

- b) on frozen or snow covered soils; and

- c) in areas near watercourses or wells.

- *Check weather forecast before spreading. If heavy rain is forecast within 48 hours avoid spreading on heavy wet soils.²¹⁷

The history charted in this chapter can be regarded as a success in many ways. Acute pollution incidents are much rarer today because of the concrete legal and financial consequences of effluent discharge and the financial support for farmers to build proper infrastructure to contain and safely dispose of/spread waste on the land like concrete silage pits and effluent tanks. As this chapter has explored, these wastes, whether at the farm gate or the creamery, are the results of an industrialising agricultural system bolstered by an increasing use of fertiliser. But the way crises are addressed does not only result in positive changes. In *Pollution is Colonialism*, Max Liboiron refers to anthropologist Joseph Masco's argument that the shock of a crisis, rather than prompting swift action to mitigate and minimise harm, often instead serves as "a means of stabilizing an existing condition" and shaping the horizons of what change is seen as possible.²¹⁸ Masco discusses the paralysing psychological effects of crisis and state efforts to regulate rather than resolve causes of existential danger, whether from nuclear or climate threats.²¹⁹ While farmers, activists, and reporters did not regularly refer to the wave of fish kills through the 1980s as a 'crisis,' it nevertheless had the same effect on silage making and the treatment of silage effluent, with state actors moving toward the management and normalisation of agricultural pollution, rather than its elimination.

First promoted by AFT researchers in the 1960s, silage only became a common practice through economic necessity twenty years later and had not yet stabilised as a regular practice. Legal

²¹⁷ Carton, 'Farming and the Environment', 207.

²¹⁸ Joseph Masco, 'The Crisis in Crisis', *Current Anthropology* 58, no. S15 (2017), Chicago, IL.

²¹⁹ Ibid.

environmental frameworks were likewise only taking shape in Europe and Ireland. Because of the crisis and the massive public response to pollution events, the Irish government was forced to solidify silage practices and infrastructure as part of the relationship between environmentalism and agriculture. The state's reaction to the fish kill crisis established a strict governance of the agricultural assemblage, including both the pasture and the river, as an efficient factory within environmental research, agricultural guidance, and legal frameworks. With this new horizon defined by the pollution crisis, when silage effluent was reapplied to fields under certain conditions or fed to livestock, it was constructed as a benign and marginally helpful byproduct of this same system. As an example, groundwater researcher Donal Daly similarly recommended that manure and silage effluent can be managed without groundwater pollution if they are spread on fields during the growing season "at a rate which the crop can use," reflecting the language used to justify fertiliser use in the context of the EU Nitrates Directive.²²⁰

Ireland's environmental legal framework for water pollutants solidified around this crisis of acute pollution events, which means it has not been suited to the more chronic eutrophication impacts to aquatic systems caused by the steady runoff of fertiliser nutrients themselves. The changes to agricultural practices and legislation discussed in this chapter focused primarily on the amelioration of the conditions caused by acute pollution incidents. These incidents were relatively short lived and intense, leading to a visibly large number of fish and other aquatic species dying at once due to the introduction of organic matter into water. However, as noted in many of the studies of pollution conducted during this time, these acute events do not represent the full extent of the pollution of Irish waters from agricultural operations.

The biological mechanism by which these acute incidents operate is that a large amount of organic matter is introduced to a body of water, whose immediate decomposition by bacteria quickly uses up the oxygen in the water column. Eutrophication through the pollution of water by fertiliser nutrients, on the other hand, is slower and more diffuse. The additional nutrients cause microscopic algae to bloom and multiply rapidly. When these algal blooms die en masse, their decomposition by bacteria triggers the same effect of deoxygenation effect but can be spatially and temporally dislocated from the actual pollution event. An Foras Forbartha's 1983 review of Irish water pollution found that "small increases in the nitrate content of a number of the larger rivers... [can be] tentatively attributed to the increases in the usage of artificial fertilisers and land disposal of livestock manures which have occurred over the last decade."²²¹ This eutrophication contradicts the assumption that any water body has a capacity to 'assimilate' a certain amount of waste. In the

²²⁰ Daly, 'Groundwater Quality and Pollution', 18-20.

²²¹ McCumiskey et al., *A Review of Water Pollution in Ireland*, 27.

case of eutrophication, assimilation itself is the problem, as nitrates washed ‘away’ are assimilated into deoxygenating algal blooms in estuarine and marine environments.²²²

AFF’s report noted that Irish use of artificial fertiliser was less than other EEC countries at the time, but the more than doubling of artificial nitrogen use between 1972 and 1982 indicated that reliance on nitrogen among farmers was fast increasing.²²³ The slow build-up of nutrients in waterways caused the growth and death of algal blooms, but its diffuse and chronic nature did not fit the 1977 Pollution Act and its amendments’ regulatory ability. It is notable as well that the report cited the land-spreading of manures alongside fertiliser applications as a cause of eutrophication, meaning that even when these wastes were stored and reincorporated following the procedures recommended by government bodies, they could still have a diffuse effect on the pollution of waterways. As early as 1983, AFF called for funding to elucidate “the nature and effects of eutrophication, particularly in freshwaters” and “the role of non-point sources of pollution, particularly agriculture, in eutrophication,” but the lack of a proactive and fully enforced framework for diffuse pollution has led to gradually worsening water quality through to the present.²²⁴

This thesis’s thread on the metabolic rift helps bridge the acute and chronic versions of agricultural pollution. Irish pollution legislation emerging from the fish kill crisis focused on proper governance of the agri-environmental assemblage. This assumed that the underlying cause of pollution was mismanagement and that byproducts like effluent only acted as pollutants when they were in a river instead of a field. NET’s use of the Kinsale gas field as a new fossil fuel source to fill the metabolic rift within Ireland’s pastures, extracting gas from under the Celtic Sea to continually feed nitrates into Ireland’s ryegrass silage-based system of intensive livestock farming. This introduced an abundant source of fossil energy in the form of bioavailable nitrates to an ecological system that relied on continuous recycling of scarce nitrogen through a multispecies assemblage of more-than-human actors. This chapter has demonstrated how that abundant fossil nitrogen not only generated abundant milk, beef, and cheese to be exported, but spilled over into Ireland’s rivers as abundant effluent, slurry, and whey, leading to deoxygenation and mass death of fish and other organisms. This shows the metabolic rift as not simply a one-way system of extraction but, as Liboiron writes, a “treadmill of industrial and capitalist production... ever in need of more Land to contain its pollution.”²²⁵ While Ireland’s regulatory framework, put in place by

²²² ‘Red Tide in Cork Harbour’, *RTÉ News*, with Tom MacSweeney, Raidió Teilifís Éireann, 6 July 1987, 00:01:56, RTÉ Archives,

²²³ McCumiskey et al., *A Review of Water Pollution in Ireland*, 27.

²²⁴ *Ibid*, 114.

²²⁵ Liboiron, *Pollution Is Colonialism*, 13.

the 1977 and 1989 Pollution Acts, was able to deal with acute pollution incidents, it was not written to address the crisis's underlying cause of abundant fossil nitrates.

In contrast, the rhetoric of the efficiently governed factory farm was easily adapted to the issue of chronic nitrification. Like silage effluent and slurry, nitrogen and phosphorus, the “primary sources of water pollution from modern farming systems” in Carton’s words, were not seen to be pollutants in all contexts.²²⁶ When best practices were adhered to, spreading on a field during conditions where the nutrients were fully incorporated by crops instead of either running off the surface of the field or leaching down into groundwater, nitrogen and phosphorus were cast as benign tools necessary for the operation of the industrial agricultural system. As Michael Staub has shown, this rhetoric emerged from petrochemical companies in reaction to the concerns of ecologists like Barry Commoner and Rachel Carson over the deleterious effects of overcharging the nitrogen metabolism of an ecological system.²²⁷ This idea of the agri-ecological system as one requiring constant management by the farmer and researcher reflects Latour’s idea of the hybrid.²²⁸ The modernist attempts to liberate the human production from ‘natural’ limits within Irish agriculture resulted in the further entanglement of human agency not only on the pasture but in the functioning of Ireland’s waterways. But even armed with the theoretical best practices of human management, effluent, slurry, and nitrates continued to leach, run off, and leak out of the pasture system and cause eutrophication in the estuaries and marine systems of Ireland. The following chapter will explore the collaborations and confrontations between Europe and Ireland’s governments in attempting to address this diffuse form of pollution.

²²⁶ O T Carton, ‘Farming and the Environment’, 195.

²²⁷ Staub, ‘Farming with Petroleum’, 350-2.

²²⁸ Latour, *We Have Never Been Modern*, 11-2.

Chapter 5 – Scheme Regime: The Nitrates Directive and Ireland’s “Green Image”

I. Introduction

Through a combination of changes to European Community policy priorities and the need to address environmental problems caused by agricultural intensification in Ireland and across Europe, agricultural practice in the 1990s became increasingly encapsulated within a series of policy schemes, political attempts to systematically alter agriculture to reduce its environmental harms. From the Control of Farmyard Pollution Scheme to today’s Targeted Agricultural Modernisation Scheme and from the Rural Environment Protection Scheme (REPS) to today’s Agri-Climate Rural Environment Scheme (ACRES), the operating principle of this policy environment in Ireland was to tie EC funding to a category of agricultural practices that were deemed desirable.

The development of these schemes accompanied reforms to the Common Agricultural Policy, first the introduction of dairy quotas in 1984 to stem overproduction, and later the MacSharry reforms of 1992, which lowered market supports for commodities, opting instead for annual income support payments tailored to support smaller farmers.¹ These reforms to the CAP were more focused on economic issues springing from the price protections rather than being motivated by environmental concerns. According to the assessment of economists Christopher Ritson and Lionel Hubbard, the CAP’s initial price supports worked against the policy’s goals in many ways, encouraging inefficient production, advantaging large farmers and increasing food prices.² Earlier chapters of this thesis have shown how this played out across Ireland, as farmers with the capital to invest in animal housing, fertilisers, and infrastructure like milking parlours and silage pits were able to make regular profits across the year, while smaller beef and sheep farmers operated on smaller margins and could be devastated by a single bad year. This thesis has also shown that this pattern of overproduction had devastating effects on soil and water health in Ireland, a pattern replicated across Europe. While reforms to the Common Agricultural Policy attempted to rein in its harmful economic effects, the focus of this chapter is the body of policy that emerged around the same time to address the environmental harms of this same intensification.

Returning again to the theme of carrying capacity, the agricultural intensification regime was enabled by a series of technologies that redefined a previous notion of a relatively static

¹ Hubbard and Ritson, ‘Reform of the CAP’, 85-89.

² Ibid, 82.

carrying capacity conceived around climate and ecological cycles within a given place, explored in Chapter One in relation to soil science. Chapter Two showed how this idea of a static carrying capacity was replaced with a plastic carrying capacity that increased in proportion to additional energy inputs to the farm system through the means of fertilisers. This plastic carrying capacity, enabled by a cheap influx of fossil energy into farm systems explored in Chapter Three, is what led to the massive national increase in marginal production under CAP protections, as price protections meant that additional purchases of fertiliser would be compensated for at a stable rate. As articulated in Chapter Four, the merging of productivist and assimilative ideas of carrying capacity shifted the focus of agricultural production toward efficiency, the effort to increase production within Ireland's environmental limits.

While this factory farm idea is articulated from the farmer's perspective, Liboiron shows that the same idea can be articulated through the environmental paradigm of nature being "robust within limits."³ Peter Ashwin et al. articulated this robustness within limits as a tipping point, where inputs to an environmental system eventually overwhelm the ability of that system to maintain its current state, causing a transition to a new state.⁴ Liboiron connects the idea of ecological tipping point with the twentieth-century idea of 'assimilative capacity' through their common assumption that nature is "robust within limits," calling into question the parameters of that robustness.

These different conceptions of carrying capacity can be explained using Bruno Latour's concept of the hybrid.⁵ The idea that the primary carrying capacity, articulated by climate and ecology, is an externally imposed limit to be overcome by technology is a modernist one, separating out 'nature' as something unique from humanity, which can be manipulated or suppressed in favour of the second plastic carrying capacity. The approach toward and surpassing of one or several tipping points, as happened in Ireland's fish kill crisis, establishes one of Latour's hybrid networks, a system in which human attempts to become modern by drawing a boundary between humans and nature further entangles humans with the functioning of larger assemblages. In the Irish case, this meant the need to restock rivers devastated by agricultural pollution and to precisely manage nutrient fluxes within agricultural and aquatic systems to limit future harm. Eutrophication, where nitrate and phosphorus build up in freshwater and marine systems eventually leading to algal blooms and deoxygenation, was the focus of a major European effort to legally address one of these tipping points.

³ Liboiron, *Pollution Is Colonialism*, 4.

⁴ Peter Ashwin et al., 'Tipping Points in Open Systems: Bifurcation, Noise-Induced and Rate-Dependent Examples in the Climate System', *Philosophical Transactions: Mathematical, Physical and Engineering Sciences* 370, no. 1962 (2012), 1168.

⁵ Latour, *We Have Never Been Modern*.

The suite of policies introduced through the 1990s across the EU attempted to introduce the tipping point idea into law, addressing the same root issue of overproduction from the CAP but with a focus on its environmental rather than economic effects. This chapter demonstrates that the contradictory approach of both CAP reforms and environmental policies in moving away from maximising production as the purpose of agricultural legislation without articulating a new purpose in its place created industrial and economic conflict within agriculture across Europe. No nation demonstrates this conflict more clearly and dramatically than Ireland, a country that both spurred along and helped shape these EU policies and whose government and private actors like the Irish Farmers Association and the Irish Creamery Milk Suppliers Association fought to delay and reshape them to entrench preexisting expansionist and profit-seeking interests. The tangled nature of this web of schemes, listed below (Fig. 5.1), developed through the 1990s and 2000s demonstrates the conflicting motivations of politicians, lobbyists, farmers, and environmentalists underlying their development.

Name	Acronym	Institution	Date	Description
Less-Favoured Areas Scheme	LFA	EU	1975	Revision to the CAP providing resources to environmentally disadvantaged areas of Europe
Control of Farmyard Pollution Scheme	CFP	Department of Agriculture, partially funded by EU	1989, renewed 1995 and 1999	Grant funding for farmers to build on-farm infrastructure
Targeted Agricultural Modernisation Scheme	TAMS	Department of Agriculture, partially funded by EU	2009, renewed 2015 and 2023	Successor to CFP Scheme
Nitrates Directive		EU	Entered into force 1992, adopted in Ireland 2007	Limits to nitrate fertiliser and manure spreading to 170 kg/ha within Nitrate Vulnerable Zones to stem eutrophication and pollution of drinking water
Rural Environment Protection Scheme	REPS	Department of Agriculture, funded by EU	1994	Grant funding for farmers to pursue protective practices for heritage and environment
CAP Direct Payments	DP	EU	1992	Suite of direct payments meant to compensate for the reduction of the CAP's market supports.
Code of Good Agricultural Practice		Department of Agriculture	1996	Voluntary set of practices developed under the Nitrates Directive, including a limit to organic nitrate spreading of 250 kg/ha
County Bye-Laws		Required by Department of Environment, administered by local authorities	Implemented by counties between 1999-2000	Bye-laws set up by counties in zones vulnerable to nitrate pollution which made the nitrate limits within the Code of Good Agricultural Practice mandatory.

Irish Nitrates Derogation		EU, applied for by IE	2007	Exception to Nitrates Directive increasing organic nitrate limit to 250 kg/ha based on exceptional environmental circumstances

Figure 5.1: List of the policy schemes discussed in this chapter.

This chapter walks through how these schemes, in Europe and in Ireland, developed between 1989 and 2007. Building on the involvement of the European Court of Justice in the 1987 NKMP case study, this chapter shows how Ireland’s agri-environmental regulatory structure was built through collaborations and conflicts between Irish and European governments. By comparing the development of the REPS scheme with that of the Nitrates Directive, the chapter shows how Europe’s combined attempts to solve the “rural problem” of cultural sustainability and the “farm problem” of agricultural livelihoods played out in Ireland.⁶ The chapter argues that this network of schemes further entrenched the economic disparity between small and large farmers while at the same time masking the continuing environmental harm attributed to Ireland’s largest and most intensive operations.

II. Control of Farmyard Pollution Scheme

The first of these agri-environmental schemes to be introduced was the Irish government’s Control of Farmyard Pollution Scheme. The scheme was introduced in August of 1989 by the Department of Agriculture as a direct response to the 1980s pollution crisis and the resulting popular environmental movement. As runoff from silage and slurry were the primary sources of major water pollution incidents through the 1980s, the scheme provided funding to partially cover the cost of building farm infrastructure that would keep those pollutants at bay.⁷ Money for the scheme came from the European Community’s structural development funds, and the rates at which farmers were compensated were determined based on the distinction of Less-Favoured Areas (LFA). This distinction had emerged during the 1975 revision of the Common Agriculture Policy to designate areas where agricultural populations and the cultural landscapes they created were at risk and should therefore be supported.⁸ Farmers in Less-Favoured Areas could have fifty-five per cent of the cost of slurry and effluent storage equipment and forty-five per cent for animal housing

⁶ Carine S. Germond and Kalliopi Geronymaki, ‘Transforming Agriculture and Rurality: The Common Agricultural Policy, Actors, National Adaptations and Responses to Policy Challenges’, in *Living with the Land: Rural and Agricultural Actors in Twentieth-Century Europe - A Handbook*, vol. 3, Contemporary European History (De Gruyter Oldenbourg, 2023).

⁷ Seamus Kirk, Seamus, ‘Adjournment Debate. - Farm Development Service.’ *Dáil Debates*, Dáil Éireann (26th Dáil). Vol. 393. No. 8. Col. 2046-4728 November 1987.; Walsh, Joe, ‘Written Answers. - Silage Effluent’. *Dáil Debates*, Dáil Éireann (26th Dáil). Vol. 422. No. 5. Col. 1159. 26 May 1992.

⁸ Thomas Dax, ‘The Redefinition of Europe’s Less Favoured Areas’, *Munich Personal RePEcArchive*, 1 January 2005, 1.

and storage for silage or hay paid for by the scheme. In parts of Ireland not designated as LFAs, the same expenses would be covered up to forty-five per cent and thirty-five per cent respectively.⁹

While the Less-Favoured Areas scheme extended across the entire EC, in the Irish context it reflected a longer history of dividing the island into good and poor farmland. The first instance of this way of thinking occurred with the establishment of the Congested Districts Board by the British government in the 1890s to alleviate the rural poverty they saw as a source of unrest in the western counties of Donegal, Sligo, Mayo, Leitrim, Roscommon, Kerry, and western regions of Cork and Clare.¹⁰ This distinction of productive and poor farmland continued into Ireland's postcolonial statehood as reflected in the National Soil Survey's decision to title their 1969 soil survey of West Donegal and other Western regions 'resource surveys' with a focus on diversifying the regional economy away from agriculture.¹¹ This ongoing use of map-making to categorise land as more or less valuable is one of the ways in which the colonial ideas of the British Empire carried over into the way the independent Republic of Ireland understood its relationship to land.

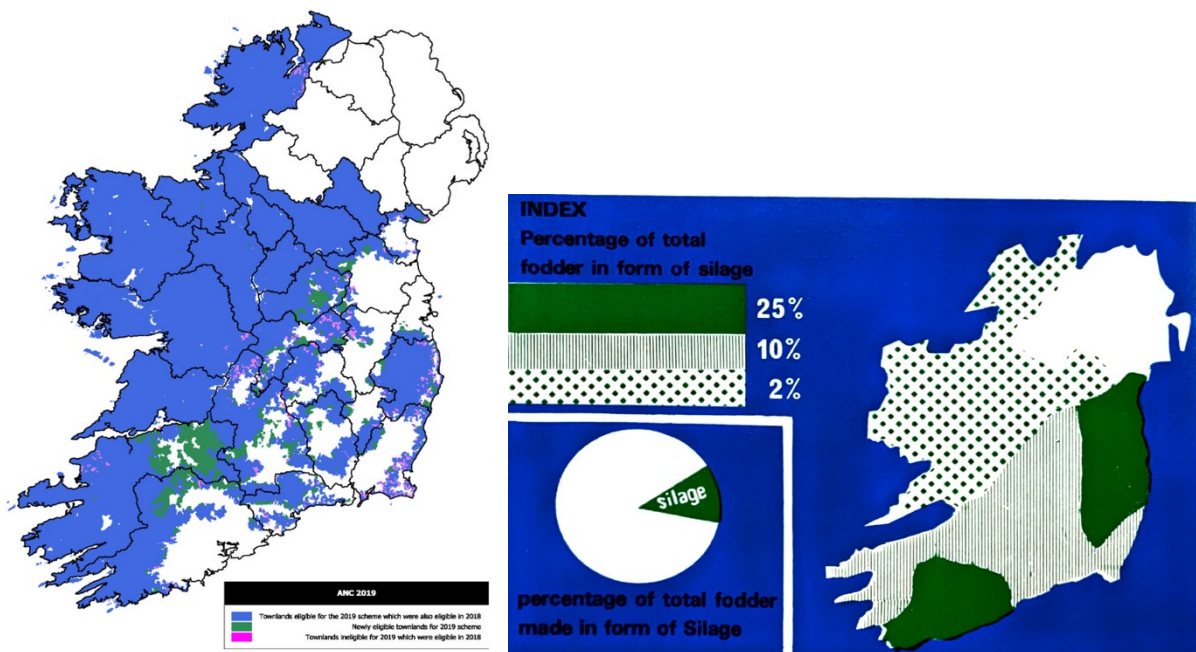


Figure 5.2 (left): 2019 map of 'Areas of Natural Constraint' (ANC) in Ireland, indicated in blue, previously referred to as 'Less-Favoured Areas.' Source: Shea, 'O'Shea Welcomes Greater North Cork Presence in 2019 ANC Scheme'.

Figure 5.3 (right): 1975 map showing different proportions of silage grown by farmers across Ireland. Source: Craig, *Silage*, 1.

The above figures demonstrate how the Less-Favoured Areas Scheme drew upon these

⁹ *Annual Report of the Minister for Agriculture and Food* (Stationery Office, 1989), 83.

¹⁰ Breathnach, *The Congested Districts Board*, 184.

¹¹ Ryan, *West Donegal Resource Survey*.

distinctions in its apportionment of aid. The silage map on the right (Fig. 5.3) shows the proportion of fodder preserved as silage across Ireland in 1974 which, as this thesis has shown, can be used as a proxy for intensive high-investment farming during the immediate postwar decades. The low-lying areas in the South and East of the country were shown to be making the highest proportion of their fodder as silage, with the other areas of Ireland shown to be making only between ten and two per cent silage.¹² Comparing the distribution of silage making with the ANC map on the left (Fig 5.2) shows that the regions included under Europe's Less-Favoured Areas Scheme correlate very closely with these areas of less intensive production.¹³ Comparing these schemes and programmes shows how the divide between good and bad agricultural land in Ireland was culturally and economically reinforced throughout the period explored by this thesis. While it would be inaccurate to say that geophysical and ecological differences do not meaningfully exist across Ireland, the long-standing evaluation of these landscapes around the narrow use case of agricultural productivity has continually reinforced these differences since the colonial period. Through revisions to the Common Agricultural Policy beginning in 1975 attempted to ameliorate the effects of these differences, this chapter argues that attempts to target support for less wealthy and less productive farms redefined the dimensions of this divide but did not succeed in erasing it.

The Control of Farmyard Pollution scheme was incredibly popular from the outset. Intended to last from 1990-1993 on a budget of £66.4 million, the fund was exhausted one year ahead of schedule in 1992.¹⁴ Following the exhaustion of its funding, Minister for Agricultural and Food Joe Walsh answered several requests in the Dáil on whether the program would be renewed, leading to more funds being allocated to the scheme in 1995.¹⁵ It is little wonder why the CFP scheme was so popular, as the infrastructure it allowed farmers to build with the intention of preventing pollution (pits for silage, slatted sheds to capture slurry, and animal housing) was the same infrastructure that had been promoted twenty years earlier to increase stocking rates and profits. Many farmers in 'Less-Favoured Areas' who did not have the capital to sustain intensive production during the 1970s or 1980s, would have been able to intensify with this aid. In the case of the Roche's farm in Carlow, it was the successor to the CFP scheme, the Targeted Agricultural Modernisation Schemes that allowed them to build a silage pit, slurry tank and modern animal housing in 2008 and 2018.¹⁶

¹² J. Craig, *Silage*, ed. P. Keenan (Dublin: Department of agriculture and fisheries, 1974), 1.

¹³ John Paul O' Shea, 'O'Shea Welcomes Greater North Cork Presence in 2019 ANC Scheme', *John Paul O' Shea*, 22 November 2018.

¹⁴ Walsh, 'Written Answers. - Farmyard Pollution Control.' Col. 375-76.

¹⁵ Jimmy Deenihan, 'Finance Bill, 1995: Second Stage (Resumed)'. *Dáil Debates*, Dáil Éireann (27th Dáil). Vol. 452, No. 2. Col. 287. 27 April 1995.

¹⁶ Roche, 'NuReCycle Oral History, 00:10:00.

In this way, the CFP scheme was a part of the post-crisis environmental governance that sought to preserve status-quo practices in the face of catastrophe. These pieces of infrastructure, silage pits and slatted sheds, were the exact technologies that had enabled mass pollution of Irish rivers in the previous decade. Yet under the CFP scheme they were recategorised as devices to “control” pollutants instead of creating them. That the LFA category allowed the scheme to target smaller farmers on more marginal land ultimately meant that these investments actually reinforced intensive practices through further infrastructural investment. During debates over renewal of the scheme in the Dáil in 1995, TDs made this rhetorical transition around the infrastructure of intensive animal husbandry explicit. In one instance, Pádraic McCormack, TD for Galway West, told a brief version of this same history of intensification leading to pollution followed by an endorsement of an extension to scheme that would enable more farmers to intensify:

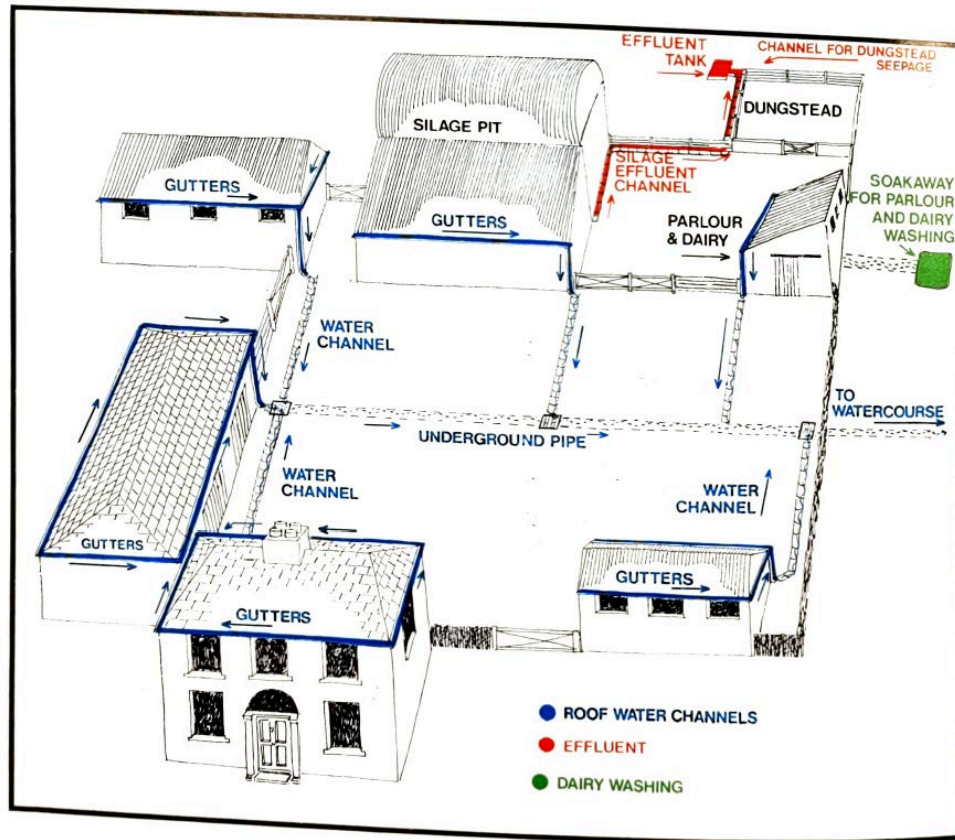
The pattern of farming has changed over the past ten to fifteen years and the potential for farmyard pollution has become a major issue. The majority of farmers have taken steps to avoid it. Ten to twenty years ago livestock was fed or foddered in fields and we moved from that to loose housing with straw which did not cause pollution because bedding was spread on the land in the spring. We now have tanks under slatted sheds and that is where dangers arise. I have sympathy with the amendment.¹⁷

This post-crisis reorganisation of agriculture into a system of tanks, pits, and pumps meant that the agricultural ecosystem began to more closely resemble the mechanical flowcharts designed by researchers at An Foras Forbartha or the earth science Bretherton diagram.¹⁸ In this construction of agriculture, the assemblage of actors, from plants and humans to fish and bacteria, is reduced to a non-agentic controlled system of inputs and outputs. This itself was its own kind of mapping, using flowchart diagrams to enact particular meanings for actors within an assemblage the way the NSS used range-of-use to simplify and categorise Irish soil.¹⁹ Previous chapters have shown how industrial boosters and agricultural scientists promoted this reorganisation of the farm system from the 1960s. But the need to create comprehensible regulations for farm pollutants under a carrying capacity concept of production within environmental limits is what institutionalised this factory-like systems as the proper organisation of agriculture.

¹⁷ Pádraic McCormack, ‘Submissions by Professional Groups - Section 20.’ Dáil Committee on Finance and General Affairs, (27th Dáil). 10 May 1995. Vol. 452, No. 2.

¹⁸ Warde et al., *The Environment: A History of the Idea*, 143.

¹⁹ Kitchin et al., ‘Power and Politics of Mapping’, 440.



Plan to reduce the quantity of effluent

Figure 5.4: Diagram modelling water management on a farmyard to reduce the amount of effluent generated by limiting contact between rainwater and pollutants. Source: *Farmyard Sewage*, 3.

An early example of this kind of thinking appeared in a 1972 pamphlet titled *Farmyard Sewage*, published by the Department of Agriculture and Fisheries. The farmyard diagram from the pamphlet pictured above (Fig. 5.4) echoed efforts to promote efficient building construction communicated by *Telefís Feirme* in 1962 as a way to make farms more profitable.²⁰ This diagram had a similar goal of efficiency within the farm layout, but in this case the focus was the efficient movement of water through the farmyard, keeping rainwater flowing to the nearby watercourse without coming into contact with high BOD pollutants like silage, slurry, or milk.²¹ In this model, what was previously conceived of as an effort to create more efficient use of space for economic reasons is recast as the most efficient way to limit pollution from the farm.

Discussions around the CFP scheme in the Dáil in 1995 were couched in the claim that all

²⁰ Browne, 'Milk Matters'.

²¹ *Farmyard Sewage*, Leaflet 142 (Department of Agriculture and Fisheries, 1972), 3.

farmers want to act environmentally, but the way environment desire was characterised linked it with economic policy. Brian Cowen, then the TD for Laois-Offaly claimed that “many farmers are demanding that this work be done because they recognise as producers that we need a proper environmentally friendly farming industry to penetrate the markets.”²² Cowen explicitly talked of the need for “capitalising on the green image that a grassland based agriculture provides.”²³ Cowen also attempted to reassure the minister that CFP funding “does not add a penny to a farmers bottom line.”²⁴ While it’s true that the scheme was an infrastructural subsidy, not a cash payment, the silage pits and slatted sheds it subsidised had been proven to be effective at increasing profits through intensification, more so than their ability to prevent pollution. These Dáil statements show that, in Ireland’s post-crisis environmental governance, ‘green’-ness was divorced from the popular environmentalism that had been instrumental to stopping and prosecuting river pollution, instead becoming a marketing strategy and a way in which status-quo intensification infrastructure could be legitimised as a preventative measure. For farmers in LFAs, an embrace of this new kind of environmental farming through schemes like the CFP meant an opportunity to join the tide of increasing stocking rates and profits, while for Cowen’s constituents in areas with more intensive production, it meant further expansion of production and profit while promoting Irish farming as inherently green.

III. The Nitrates Directive in Europe

Historian Jan Henrik-Meyer’s demonstrated in his article ‘Pushing for a Greener Europe’ that European environmentalism emerged in the early 1970s out of an effort to unite legacy conservation efforts with a new concern for environmental harms caused by economic growth and industrialisation.²⁵ Much of these harms were caused by pollution: pollution of the Rhine by German industry, accumulation of DDT in the bodies of animals, and damage to Swedish forests by acid rain.²⁶ Ireland’s intensifying livestock industry may indeed have seemed ‘green’ when compared to these high-profile examples of pollution involving novel industrial chemicals, but the cumulative impacts of agricultural intensification were not missing from the EC’s efforts to develop international environmental policy, nor was European environmental policy developed without the active participation of Irish politicians.

²² Brian Cowen, ‘Submissions by Professional Groups - Section 20’. *Dail Debates*, Dáil Committee on Finance and General Affairs (27th Dáil). Vol. 452, No. 2. 10 May 1995.

²³ Brian Cowen, ‘Finance Bill, 1995: Second Stage (Resumed)’ *Dáil Debates*, Dáil Éireann (27th Dáil). Vol. 452, No. 2. Col. 305-6. 27 April 1995.

²⁴ Cowen, ‘Finance Bill, 1995: Second Stage (Resumed)’ Col. 305-6.

²⁵ Meyer, ‘Pushing for a Greener Europe’, 5.

²⁶ Ibid, 7-8.

In 1974, Albert Noirfalise, chair of Ecology at the University of Gembloux, published a study titled *Ecological consequences of the application of modern production techniques in agriculture*. The study was commissioned by the Directorate Générale of Agriculture at the European Commission as an effort to determine what kind of agriculture policies would be needed to address environmental harms.²⁷ Noirfalise devoted sections of the report to arguing for the banning of DDT and other organochlorine pesticides, but focused more acutely on erosion and the pollution of water by fertilisers.²⁸ Brussels quarterly *30 Jours d'Europe* covered the report after it was made public in their summer 1975 issue, highlighting its assessment of risks of erosion and the contamination of water by nitrates “especially in sandy or very rainy regions” due to overuse of cheap nitrate and potassium.²⁹

In the report, Noirfalise went beyond an effort to simply regulate the amount of fertilisers applied to a field, but instead recommended a dynamic shift in agricultural research to further study soil conservation and erosion resistance, the way nitrates move through soils and leach into aquifers, and the development of soil bacteria, fungi, and legumes to build up soil organic material. According to the reporting in *30 Jours*, Noirfalise contended that “understanding the economic and phytotechnic limits of fertilisers must remain one of the permanent objectives of agricultural research, along with its ecological consequences for surface waters and aquifers.”³⁰ As the normative focus of agricultural research in Ireland and beyond had been increasing production efficiency and profits, Noirfalise’s call for agricultural researchers to focus instead on how agriculture interacts with the larger environment would have meant a radical shift in the concept of agricultural science. Shifting to the ecological research model for agriculture which Noirfalise advocated would have meant an outward-looking view of agriculture as a part of larger ecosystems, switching out the factory-like focus of efficient production within limits for one that reimaged good agricultural practices as actively contributing to the stability of a larger ecological and climatological system.

The Irish Department of Agriculture kept tabs on these early developments of EC agri-environmental efforts. Department representatives contacted Ireland’s permanent representative J. Farrelly to request a copy of the Noirfalise report in November 1978. They were specifically interested in understanding its relation to the EEC Programme of Action on the Environment that

²⁷ Albert Noirfalise, *Conséquences écologiques de l'application des techniques modernes de production en agriculture*, Informations internes sur l'agriculture 197 (European Commission, 1974), Avant-propos.

²⁸ Noirfalise, *Conséquences écologiques*, 53.

²⁹ ‘Sauvegarder Le Sol de l'Europe’, *30 Jours d'Europe*, August 1975.

³⁰ Ibid.

had commissioned it and its contents on farm waste pollution.³¹ The Department also contacted Farrelly in 1979 with regards to the development of a proposed EC directive “relating to water for agricultural purposes (i.e., irrigation and livestock, etc.).”³² This proposal, drafted two years after the Noirfalise report in 1976, was Europe’s first attempt to tackle agricultural water pollution. Neither the Noirfalise report nor the draft proposal were available in languages other than French and German, but Farrelly reassured the Department of Agriculture that the draft proposal would be circulated among member states before moving forward.³³ Whether or not it was circulated at this stage, there would still be thirteen more years of work until a directive focused on agricultural pollution was finally proposed to the Commission.

The directive that eventually emerged to tackle agricultural pollution of water was the EC Nitrates Directive. The directive was intended to tackle eutrophication of marine and fresh waters by excess use of nitrogen fertilisers and animal manure. The focus on nitrogen was intended to address not only the pollution of drinking water, which could lead to health effects especially for newborns, but also the eutrophication of marine and estuary waters. Environmental ministers from member states had noted issues with coastal eutrophication throughout the 1980s, with significant toxic algal blooms caused by nitrates occurring annually in the Baltic, North, and Adriatic seas.³⁴

As part of the drafting process, in September 1987 the agricultural committee began assembling an inventory of agri-environmental measures already taken by member states.³⁵ Ireland’s contribution to this inventory came across as benign, even though it directly coincided with the nation’s high-profile fish kill crisis. The inventory stated that “few problems with nitrate levels have been reported from Ireland but small increases in the nitrate content of a number of the larger rivers have been observed recently. A spate of pollution incidents arising from silage storage have been reported in 1987.”³⁶ The source cited for this information was the Water Pollution Advisory Committee’s 1983 report to the Taoiseach, which, in addition to being outdated, did not anticipate that the small number of pollution events in the early 1980s would increase so severely. To the report’s credit, the fish kills were not directly related to nitrate loading in the water, and the

³¹ M Manion ‘Copy of Study’, to M Cowley, 16 November 1978, National Archives of Ireland, DFA/2009/120/1035.

³² Ibid.

³³ J Farrelly, *Water Directive*, Bordreau 147 (European Commission, 1979), National Archives of Ireland, DFA/2021/78/530.

³⁴ A. Piavaux ‘Proposal for a Nitrate Directive’, to Marini, 5 November 1988, Historical Archives of the European Commission, BAC 125/2005 No. 1.

³⁵ Guy Legras ‘Pollution Due to Excessive Use of Fertiliser and Intensive Stockfarming’, to Laurens Jan Brinkhorst, 29 July 1988, Historical Archives of the European Commission, BAC 125/2005 No. 1.

³⁶ *Working Document of Proposed Community Measures Concerning the Protection of Freshwater and Internal Coastal Waters against Pollution from Livestock Manure and from the Overuse of Nitrogenous Compounds* (European Commission, 1988), Historical Archives of the European Commission, BAC 125/2005 No. 1, 8.

decade-long process of eutrophication in Ireland's lakes was the result of phosphorus loading instead of nitrogen. However, by discounting environmental harms, especially in referring to the rising tide of river pollution as a "spate of pollution incidents" from a single year, the Irish government demonstrated an effort to deny or downplay the need for further action.

By October 1988, the draft proposal for a nitrates directive called for member states to establish vulnerable zones in areas draining into surface or groundwaters that were used as drinking water and contained or could contain more than fifty mg/L nitrate or areas that are or could become eutrophic.³⁷ The proposal would cover all potential sources of nitrates, including animal manure whose spreading was limited to the equivalent of two dairy cows per hectare, municipal sewage systems whose effluent was limited to containing ten mg/L of nitrogen, and chemical fertilisers. The draft would have required member states to establish maximum application rates for chemical fertilisers, but the specific rates were unclear. They would be either based on the rate of uptake needed for crops or whatever amount would be required to not cause eutrophication or drinking water pollution.³⁸

Disagreement arose specifically around the limits on fertilisers. Comments on the working document from Vladimiro Mandl, head of the European Commission's Water Protection and Management Division, underscored the need for a more specific limit than what crops would be able to take up.³⁹ Mandl also received a letter on October 24th from the European Fertiliser Manufacturing Association (EFMA) stating that the association "welcomes all efforts to protect the environment" and wanted to provide comments on the October draft. A surprised comment from Mandl in the margins of the letter remarks on their possession of the draft, "how they got it?"⁴⁰ The comments from the EFMA generally sought to weaken the regulation of fertilisers, claiming "it is wrong to concentrate nitrogen input as the key measure for reducing nitrate in the water" and that instead "all land management practice by farmers" should be considered with equal scrutiny.⁴¹ However, they did accept the use of crop requirements as the measure by which fertilisers application should be limited, writing that "this is a principle which has long guided all fertilizer industry recommendations."⁴² Regardless of whether this letter from the association led to further revisions, the initial intention to get the proposed directive to the Commission by the end

³⁷ Directorate-General Environment, Consumer Protection and Nuclear Safety, 'Proposed Nitrates Directive Working Document', 4 October 1988, Historical Archives of the European Commission, BAC 125/2005 No. 1, 32.

³⁸ Ibid, 33, 29.

³⁹ Ibid, 29.

⁴⁰ R. Bauer 'Directive Nitrogenous Fertilizers', to Mandl Vladimiro, 24 October 1988, Historical Archives of the European Commission, BAC 125/2005 No. 1.

⁴¹ European Fertiliser Manufacturers Association, 'Directive Nitrogenous Fertilizers: Draft of Comments', 20 September 1988, Historical Archives of the European Commission, BAC 125/2005 No. 1, 1-2.

⁴² Ibid, 2.

of November was delayed until the beginning of 1989.⁴³

Jan-Henrik Meyer has covered the influence of lobbying by environmental interest groups in the creation of European environmental policy and Carine Germond and Kalliopi Geronymaki have shown similar influence of agricultural industry groups in shaping reforms to the CAP.⁴⁴ The role of the EFMA in this case, has both agricultural and industrial interest in shaping the draft directive. The EFMA's rhetorical association with agri-environmental research in this letter to Mandl also reveals fertiliser's close association with a particular kind of environmentalism, one that sees growth and production as both desirable and natural.

The draft proposal for a directive "on the control and reduction of water pollution resulting from the spreading or discharge of livestock effluents and the excessive use of fertiliser" was accepted by the European Commission on 5 January 1989.⁴⁵ From there, it went on to the Working Party on the Environment, made up of environmental ministers and delegates from all member states for further revision before coming into force. The initial draft of the directive proposed limits on nitrogen compounds applied to land as well as the discharge and treatment of municipal waste. Reflecting the EFMA's letter, the version given to the working party did not include any hard limits on nitrogen fertilisers, with member states only asked to establish best practices in its application, though delegates from Germany and Spain initially pushed for the establishment of specific limits on fertiliser application.⁴⁶ Regulation of nitrate in municipal waste was also dropped early in this working party stage as there were already plans to develop a separate directive to specifically regulate municipal sewerage.⁴⁷

The resulting directive weighted its specific regulations in vulnerable zones toward animal husbandry, with specifically enumerated limits to the amount of manure and animal stocking rates but with more general limitations on fertiliser application open to interpretation by member states. Limits on livestock were initially tied to the number of animals per hectare: two dairy cows, four beef cattle, sixteen pigs, one hundred turkeys, and so on.⁴⁸ As this animal limit was carried over from the proposal, one of the working party's early amendments was to establish an abstracted

⁴³ C. D. Byrne, 'Nitrate Directive', Telefax to Close, 5 November 1988, Historical Archives of the European Commission, BAC 125/2005 No. 1.

⁴⁴ Meyer, 'Pushing for a Greener Europe'; Carine S. Germond and Kalliopi Geronymaki, 'Transforming Agriculture and Rurality: The Common Agricultural Policy, Actors, National Adaptations and Responses to Policy Challenges', in *Living with the Land*, 163.

⁴⁵ *Proposal for a Council Directive Concerning the Protection of Fresh, Coastal and Marine Waters against Pollution Caused by Nitrates from Diffuse Sources*, outcome of proceedings 8733/89 (European Council Working Party on the Environment, 1989), National Archives of Ireland, DFA/2021/78/530, 4.

⁴⁶ Ibid, 16-17.

⁴⁷ Ibid, 11.

⁴⁸ Ibid, 16.

equivalent limit of 170 kg/ha of nitrogen contributed to the soil from animal waste. This amendment detached the manure from the animals themselves, allowing more animals on a hectare of land than would otherwise have been limited as long as the resulting excess manure was captured and spread elsewhere.⁴⁹ In a meeting of the working group in September 1989, Directorate-General Jørgen Henningsen explained that the limit of 170 kg/ha was determined based on evidence showing “that environmental problems arose where manure was spread exceeding the manure equivalent of two cows.”⁵⁰

In contrast to this specific European-wide limit on manure, the draft directive in September of 1989 required member states to set their own “maximum application rates” for chemical fertilisers based on the uptake rates of crops and the amount of nitrogen supplied to the soil through other means. The draft directive also required states to establish rules for when fertiliser spreading should be limited and minimum distances from watercourses where spreading should be banned.⁵¹ While this early draft did require some kind of maximum limit to be set, it gave member states the opportunity to create their own suite of regulations, a sharp contrast with the definitive 170 kg/ha limit on manure spreading. When questioned on this in the meeting of the working party, Henningsen specified that chemical fertiliser and manure needed different regulations “because of the different manner in which manure and chemical fertilizer released nitrogen into the soil.”⁵² In a later meeting in March of the following year, the Commission representative clarified that effluents from animal husbandry “represent a constant and inevitable loss of nitrogen” to the environment, assuming that only sixty per cent of nitrates from manure are available to be absorbed by crops, whereas chemical nitrogen was perceived as more precisely controllable.⁵³

The scientific reasoning behind this “constant and inevitable loss of nitrogen” was based on the idea that a minimum of forty per cent of nitrogen in animal manure is locked up in organic compounds and is therefore not available for uptake by crops.⁵⁴ Because this nitrogen was not available to be taken up directly by crops, the rate and method at which it would be brought into the system was not explicitly controllable. The specific calculation provided by the Commission

⁴⁹Mary Moylan, *ENV Working Group - 7/8 September, 1989*, Bordreau 1297 (Department of Foreign Affairs, 1989), National Archives of Ireland, DFA/2021/78/530, 1.

⁵⁰ *Ibid*, 5.

⁵¹ *Outcome of Proceedings 8733/89*, DFA/2021/78/530, 18-20.

⁵² Moylan, *Bordreau 1297*, DFA/2021/78/530, 5.

⁵³ *Preparation de La Session Du Conseil 'Environnement' Du 22 Mars 1990*, outcome of proceedings 5086/90 (European Council Working Party on the Environment, 1990), National Archives of Ireland, DFA/2021/78/530, 4; ad hoc Working Party on Agriculture (Nitrates), *Proposal for a Council Directive Concerning the Protection of Fresh, Coastal and Marine Waters against Pollution Caused by Nitrates from Diffuse Sources - Agricultural Implications*, 6743/1/90 (European Community, 1990), National Archives of Ireland, DFA/2021/78/530, 2.

⁵⁴ ‘Organic Manures’, *Teagasc | Agriculture and Food Development Authority*, 1 April 2023.

regarding the 170 kg/ha figure assumed that a net precipitation rate of 300 mm per year would result in a nitrate concentration of 50 mg/L in surface and groundwater if all of the nitrogen not taken up by crops was to run off into sources of water.⁵⁵

Latour's *We Have Never Been Modern* can again be used to connect this distinction within the Nitrates Directive to the fallacy of modernity as a separation from and control of nature advocated by both agricultural scientists at An Foras Talúntais and industry boosters like the EFMA.⁵⁶ As manure comes from an animal body, the nitrogen it contains is not perfectly uniform in composition and therefore maintains a degree of unruliness and uncertainty associated with 'nature.' Despite any pollution control infrastructure built to contain it, this uncertainty is assumed to present an inherent risk that the non-available nitrogen will run-off when it rains. Henningsen and the directive contrast this with chemical fertiliser, a manufactured and engineered uniform product that can be applied to crops in a civilised and scientific manner. The inherent indeterminacy of how quickly and completely plants will take up the fertiliser nitrogen is discounted and the potential for fertiliser to run off if applied in excess or preceding precipitation are enacted through a productivist lens with plants, nitrates and water not seen as actors themselves but as controllable variables as entirely dependent on human practices. The nature/human divide based on the chemical uniformity and manufactured nature of artificial nitrate fertiliser allowed the Commission and the working party to mask the underlying assemblage of actors in the farm system, where any nitrates not directly taken up by crops always hold the potential to run off into rivers, lakes, and estuaries whether from manure, chemical fertiliser, or any other source.

The influence of the EFMA on to the distinction of pollution uncertainty between artificial fertiliser and manure runs parallel to the use of uncertainty as an industrial lobbying tactic explored by Orkeskes and Conway in *Merchants of Doubt*.⁵⁷ In the cases of tobacco and fossil fuel industries explored in the book, scientific uncertainty was used to promote doubt around the inherent health and climate risks of their products. In this case, the EFMA's letter to Mandl used the association between fertilisers and civilised laboratory science to deemphasise the uncertainty in pollution from synthetic fertilisers in order and avoid direct European regulation. As a foil to this cultured idea of fertiliser, the EFMA used the association of manure with nature and the animal to emphasise its uncertain pollution.⁵⁸

⁵⁵ Directorate-General Environment, Consumer Protection and Nuclear Safety, 'Assumptions Underlying 170 Kg N Manure Application Limit', Commission of the European Communities, 13 March 1990, National Archives of Ireland, DFA/2021/78/530.

⁵⁶ Latour, *We Have Never Been Modern*, 11-12.

⁵⁷ Naomi Oreskes and Erik Conway, *Merchants of Doubt* (Bloomsbury Press, 2010).

⁵⁸ Bauer to Vladimiro, 'Directive Nitrogenous Fertilizers', BAC 125/2005 No. 1.

The French delegation consistently pushed back against this distinction between fertiliser and manure. In a letter to the working party on 9 October 1989, the delegation asked for a measure that would “pay equal attention to all nitrogen inputs, whether animal (livestock manure) or industrial (chemical fertilizers)” in order to “avoid disparities arising between the different types of farms.”⁵⁹ The delegation further claimed that the specific 170 kg/ha limit “is likely... to be seen by all European stock-farmers as tantamount to a tax on capital.”⁶⁰ It is important to note that this was not necessarily an effort to curtail the influence of fertiliser trade groups or to more strictly regulate fertiliser use by arable farmers, but to relieve a potential financial burden on livestock farmers. The massive increase in battery pig farming in Bretagne during the second half of the twentieth century, as detailed by Clémence Gadenne-Rosfelder, evinces a possible motivation for the French delegation to push back against specific limits to manure spreading and livestock concentrations.⁶¹

Mary Moylan, the permanent representative for Ireland joined France’s objection at the time. In her report to the Department of Agriculture in late 1990 as the directive was being finalised, she wrote that “the proposal is of both a farm production and environmental interest as it may force competing MS e.g. NL, which are heavy users of chemicals... to move toward reduction.”⁶² In Moylan’s perspective, Ireland’s low rates of fertiliser use and manure spreading relative to Europe’s most intensive agricultural economies like the Netherlands would allow it to escape much of the regulatory limits of the directive and give it a competitive edge. Despite the truth underlying this assumption, indeed the vast majority of farmers in Ireland were not and still are not over the 170 kg/ha limit, this exact issue would later become the major point of contention during the implementation of the Nitrates Directive in Ireland.

The Irish representative did push back against the specific criteria for the establishment of the vulnerable zones where directive limits would be introduced. Both the Belgian and Irish delegations worried that the designation could translate into a financial burden to farmers and asked for financial compensation for designated zones.⁶³ Moylan specifically worried that the preventative measures in the draft directive “could have very broad implications effectively

⁵⁹ *Proposal for a Directive on Nitrogen Concentrations in Water (Nitrates) - The French Delegation’s Comments*, 9078/89 (European Community, 1989), National Archives of Ireland, DFA/2021/78/530, 2.

⁶⁰ Ibid.

⁶¹ Clémence Gadenne-Rosfelder, ‘La Modernisation Des Élevages Porcins En Bretagne Durant La Seconde Moitié Du XXe Siècle: Une Histoire Sociale, Zootechnique et Environnementale’ (EHESS, forthcoming).

⁶² Mary Moylan, *Draft Directive on Nitrates Pollution from Diffuse Sources*, Bordreau (Department of Foreign Affairs, 1990), National Archives of Ireland, DFA/2021/78/530.

⁶³ Mary Moylan, *Draft Directive on Nitrates Pollution from Diffuse Subjects*, Bordreau 1477 (Department of Foreign Affairs, 1989), National Archives of Ireland, DFA/2021/78/530, 4.

requiring vulnerable zone type measures throughout the whole country.”⁶⁴ Though she admitted that Ireland was the only delegation arguing for discretion in choosing the measures to be applied in vulnerable zones, the breadth of vulnerable zone designation would indeed become another key issue for Ireland in the directive’s later implementation.⁶⁵

Moylan’s concern reflects the most common critique of the draft directive throughout the three years of working party negotiations, a desire to eschew specific requirements for guidelines to be adapted by each member state. As Moylan reported to her Irish colleagues after the September 1989 meeting of the working party, several delegations including Spain, the Netherlands, Belgium, Portugal, Ireland, the United Kingdom had pushed back against the strict unilateral limits of the initial proposal, wanting a less structured ‘framework’ directive that would set specific targets but allow member states to determine their own path toward meeting them.⁶⁶ Moylan herself argued that “member states should have the option of deciding which measures were needed in their cases and should not have to apply the whole range of measures set out in the Article if these were not essential in their circumstances.”⁶⁷ Similar concern was brought up in the European Agriculture Council’s meeting to explore how the directive would affect the agricultural industry in October 1989, where the council instead recommended courting voluntary participation of farmers through the encouragement of best practices like cover crops, soil testing, and proper effluent storage.⁶⁸

The EC leadership responded to these criticisms by referring back to the linked problem of overproduction and environmental harm. In the environmental working party, Henningsen responded to Moylan’s critique by evoking the Common Agricultural Policy, claiming that “solving the environment aspect of the problem could help solve the Community’s overproduction problem.”⁶⁹ Agricultural Director Ray MacSharry, spoke out even more strongly against the ad-hoc agricultural party’s assertion that regulations in the directive were “too onerous,” stating that the polluter must pay and farmers would have to “face up to their responsibilities” in caring for water quality “which was vital to life.”⁷⁰

The conflict underlying all of these efforts to weaken or expunge the mandatory aspects of the Nitrates Directive speak to a conscious effort from member states to maintain economic competitiveness within their agricultural sectors. These and other efforts to reform the CAP and

⁶⁴ Ibid.

⁶⁵ Ibid.

⁶⁶ Moylan, *Bordreau 1297*, DFA/2021/78/530, 2-3.

⁶⁷ Ibid, 6.

⁶⁸ DPR, *Discussion at Agriculture Council on Draft Directive on Pollution Caused by Nitrates*, Bordreau 1551 (Department of Foreign Affairs, 1989), National Archives of Ireland, DFA/2021/78/530, 2-3.

⁶⁹ Moylan, *Bordreau 1297*, DFA/2021/78/530, 3.

⁷⁰ DPR, ‘Discussion at Agriculture Council on Draft Directive on Pollution Caused by Nitrates’, Bordreau (Brussels: Department of Foreign Affairs, 25 October 1989), DFA/2021/78/530, National Archives of Ireland, 1.

stem overproduction threatened to reintroduce competition in a market that had long been head steady by price supports. The proposal, as drafted by the environmental division of the Commission displays an earnest commitment to reducing environmental harm, but in the working party stage this commitment came into conflict with the economic desires of the member states. At a meeting of the working party in March 1990, the representative of the commission explicitly stated that “the emphasis of the proposal... was on environmental needs rather than avoiding distortion of agricultural competitiveness.”⁷¹ The representative emphasised the urgency of addressing eutrophication and assured the environmental working party that distortions would be small compared to other aspects of the industry, but this was nevertheless taken by Moylan and other as an admission that some states would benefit from the legislation while others would lose. Moylan’s support of the directive reflected the hope that Ireland would be able to economically benefit from it, while the efforts to dilute the directive’s regulation were clearly motivated by a desire to limit its effect on each country’s competitiveness.

The final directive, which was accepted by the European Council in December 1991 and is still in force, asks member states to designate vulnerable zones where surface or groundwater used as drinking water is or could be polluted with fifty mg/L nitrate or where surface water is, or could become, eutrophic. Within these vulnerable zones, member states must enforce the hard limit of 170 kg/ha from manure and develop their own limits for fertiliser application “based on the balance between the foreseeable nitrogen requirements of the crops and the nitrogen supply to the crops from the soil,” while taking into account the ecological and climatological particularities of the zone.⁷² This was exactly the kind of regulation supported by the EFMA in their communication to Mandl during the initial drafting process and what the French delegation had worried would be seen as an affront to livestock farmers. The French delegation did, however, have one victory in the inclusion of a code of good practice in the directive.

IV. Codes of Good Practice

In their same 9 October 1989 letter to the working party where they spoke out against the hard nitrate limit on livestock operations, the French delegation called for general measures to prevent diffuse agricultural pollution throughout Europe, outside of the designated vulnerable zones. Their proposal, that the directive would call for the establishment of “good practices” to be

⁷¹ Mary Moylan, ‘Bordreau 347’, Bordreau (Brussels: Department of Foreign Affairs, 2 March 1990), DFA/2021/78/530, National Archives of Ireland, 2.

⁷² Council Directive Concerning the Protection of Waters against Pollution Caused by Nitrates from Agricultural Sources, 91/676/EEC (1991).

followed within and beyond vulnerable zones, was incorporated into later drafts of the directive.⁷³ These codes of good practice were to be created individually by the governments of each member state. They had to at least indicate times and places where fertiliser should not be spread due to potential pollution, provide guidance for effluent and slurry storage vessels, and include guidelines for proper spreading of fertilisers and manure.⁷⁴ The codes were meant as guidance, followed voluntarily by farmers without being tied to any compensation or prosecution.

The voluntary nature of the codes meant that they were readily developed and disseminated by a whole host of institutions across Ireland. The previous chapter discussed one such code developed by AGMET in 1992 which specified when and where to avoid spreading fertilisers, slurry, and effluent based on the weather.⁷⁵ Alongside AGMET, the Fertiliser Association of Ireland was one of the first to develop a code of good practice which it first published in the *Irish Farmers Journal* on 22 February 1992.⁷⁶ The FAI code was republished in the *Farmers Journal* several times as a marketing strategy and included an introduction from their president Liam Stafford:

Fortunately when fertiliser is used efficiently (i.e. the right amount of the appropriate fertiliser is applied at the right time in suitable weather conditions), there is no threat to the environment. To help preserve the enviable condition of water and the environment generally in Ireland, I commend to you the ‘Code of Good Practice’ which was drawn up by the Fertiliser Association of Ireland last year in consultation with all interest parties and is included in this feature.⁷⁷

This early adoption of a code of good practice by the FAI is a well-trodden strategy of fertiliser manufacturers using the rhetoric of agricultural research, portraying themselves not only as seeking profit but as advocates for the betterment of farm operations. One example of this comes from the postwar United States where fertiliser companies offered to send free soil tests to farmers and even send staff out to farms to help them determine what amounts of fertilisers their land would need.⁷⁸ Alongside the cultivated association between fertiliser and environmental health explored by Staub, this code of good practice both allowed the FAI to associate itself with new research and

⁷³French Delegation’s Comments, DFA/2021/78/530, 1.

⁷⁴ Nitrates Directive, 91/676/EEC.

⁷⁵ Carton, ‘Farming and the Environment’, 207.

⁷⁶The Fertiliser Association of Ireland, ‘Code of Good Practice for the Environment’, *Irish Farmers Journal* (Dublin), 22 February 1992, 39.

⁷⁷ Liam Stafford, ‘Presidents Message’, *Irish Farmers Journal* (Dublin), 22 February 1992, 33.

⁷⁸ Gabriel Coleman, ‘Nitrogen Economy, 30.

policy and served to greenwash the industry as engaging with the fight against pollution and eutrophication instead of directly profiting from it.⁷⁹

The Irish government followed the FAI by developing their own code of good practice four years later in 1996 as a collaboration between the Irish departments of Environment and Agriculture alongside Teagasc. The code, titled *Code of Good Agricultural Practice to Protect Waters from Pollution by Nitrates*, recommended limiting combined application of animal slurry and organic fertiliser to 210 kg/ha outside of vulnerable areas, leaving buffer strips varying between ten and 300 metres from water sources where slurry is not spread.⁸⁰ In their respective forwards to the publication, the Minister for Environment Brendan Howlin and the Minister of Agriculture, Food, and Forestry Ivan Yates presented different views of Ireland's agri-environmental situation. Howlin explicitly called out the modernisation of agriculture as the cause of environmental harm, stating that "farmers have traditionally been the guardians of the countryside and its heritage" but that animal housing, fertilisation, and the switch from hay to silage had increased environmental pressures.⁸¹ Yates, in contrast, spoke to the need to preserve Ireland's "clean green island image abroad" which had been "exploited successfully by our food industry over the years," a clear focus on green-ness as primarily a way to market Ireland's agricultural exports.⁸²

The eager adoption of these codes of good practice by different organisations follows from Yates's effort to use environmental stewardship as a way to market Ireland's agriculture. The code represented a voluntary way to prod Irish farmers toward the reduction of nitrate pollution and to more importantly show the Irish government's commitment to tackling nitrate pollution without having to commit to mandatory restrictions on manure spreading in vulnerable zones. The mid-1990s saw similar attitudes expressed around the reintroduction of the Control of Farmyard Pollution Scheme, with discussions in the Dáil betraying a similarly split mindset as expressed by Howlin and Yates. As discussed earlier in this chapter, several TDs explicitly connected agricultural developments of the past decades to environmental harm in their statements of support for the CFP scheme, while others framed the issue around the need to preserve Irish agriculture's green image abroad. The following section will explore the Rural Environment Protection Scheme to show how the divide between less and more productive farmers was reframed along similar environmental and policy lines.

⁷⁹ Staub, 'Farming with Petroleum', 351-2.

⁸⁰ Angela Nugent, 'Nitrates - Code of Good Practice', *Irish Farmers' Journal* (Dublin), 31 August 1996, 26.

⁸¹ Department of the Environment and Department of Agriculture, Food and Forestry, *Code of Good Agricultural Practice to Protect Waters from Pollution by Nitrate* (Government of Ireland, 1996).

⁸² *Ibid.*

V. Rural Environmental Protection Scheme

The introduction of Ireland's Rural Environment Protection Scheme in 1994 spoke to both kinds of environmental concern, that Irish agricultural practices were taking a toll on the island's ecology and that green agricultural practices would be needed to market Irish agricultural products abroad. TD Barry Cowen explicitly attached the CFP scheme infrastructural funding to REPS in the Dáil finance committee during debates over its renewal, saying that "Many smallholders with reasonably small milk quotas and acreage have to get this [infrastructural] work done in order to qualify for the REP scheme... they will not be eligible if they do not get pollution control work done."⁸³

Cowen was right that the use of CFP funding by small farmers to build infrastructure like a slurry tank or a silage pit would allow them to more easily meet the requirements of the REPS programme, but a more significant population of farmers would benefit financially from the scheme without any intention of joining a programme like REPS. This financial divide is explicitly brought up in this Dáil exchange with Michael Ahern of East Cork stating:

We hear a lot about the money farmers make, and thankfully their income position has improved over the past few years. They are willing to carry out the necessary work to improve the environment.

The capital expenditure required is large. There are large farmers who make a considerable amount of money, but most just make a good living wage. If this work must be carried out, they need greater capital allowances. There is a misconception that they put this money into their pockets and use it to go on holiday to the Bahamas, Barbados, and such places.⁸⁴

This lays out the financial divide quite cleanly: While the CFP scheme would pay for infrastructure and not profit, it would benefit farmers in different ways. Smaller and poorer farmers could have used this funding to qualify for REPS as Cowen states, but the other farmers, whom Ahern alludes to as making beyond a "good living wage," could use the grant to pay for infrastructure that would allow their stocking rates, and their profit margins, to increase.

The Rural Environment Protection Scheme was announced by Minister for Agriculture, Food and Forestry Joe Walsh on 27 January 1994, after it was approved by the Committee on

⁸³ Brian Cowen, 'Select Committee on Finance and General Affairs Debate'. *Dáil Debates*, Dáil Committee on Finance and General Affairs (27th Dáil). Section 20. 10 May 1995.

⁸⁴ Michael Ahern, 'Select Committee on Finance and General Affairs Debate'. *Dáil Debates*, Dáil Committee on Finance and General Affairs (27th Dáil). Section 20. 10 May 1995.

Agricultural Structures and Rural Development. The REPS scheme was developed by Ireland's Department of Agriculture to give farmers access to the European Agri-Environment Regulation grant scheme, introduced in 1992.⁸⁵ This European funding behind the scheme was intended to pay £230 million through 1997 to around 40,000 farmers.⁸⁶ In apportioning this money, the REPS scheme would pay farmers £122 per hectare per year for up to forty hectares to develop a plan to apply a series of eleven measures to their agricultural practice.⁸⁷ The measures included were:

- Follow a waste management, liming and fertilisation plan
- Follow a grassland management programme
- Follow specific nitrogen application levels and other limits for arable crops
- Attend a 20 hour REPS training course
- Keep proper records
- Protect watercourses and wells
- Stop applying agrochemicals and fertilisers near hedgerows and water
- Retain wildlife habitat
- Maintain hedgerows and stone walls “in the interest of stock control, wildlife and the scenic appearance of the farm”⁸⁸
- Protect identified historical and archaeological sites
- Maintain the farm's appearance⁸⁹

The REPS programme was also built with the Nitrates Directive in mind. It included a five-point Code of Good Practice that asked farmers to take precipitation, soil, and crop needs into account when spreading manure, silage effluent, and fertiliser, alongside additional requirements to avoid spreading within 1.5 meters of hedgerows or near bird nesting sites during breeding season.⁹⁰ REPS farmers were asked to adhere to specific uptake limits for nitrogen application on arable crops and a 170 kg/ha limit on the application of organic sources of nitrogen, both directly taken from the Nitrates Directive. However, pasture farmers were allowed to apply an additional ninety kg/ha of fertiliser nitrogen on top of the 170 kg/ha limit, bringing the total limit for nitrogen

⁸⁵ Council Regulation (EEC) No 2078/92 of 30 June 1992 on Agricultural Production Methods Compatible with the Requirements of the Protection of the Environment and the Maintenance of the Countryside, 2078/92, European Council (1992).

⁸⁶ Joe Walsh, 'Written Answers. - Rural Environment Protection Scheme', *Dáil Debates*, Dáil Éireann (27th Dáil). Vol. 438. No. 7. Col. 1771. 15 February 1994.

⁸⁷ Council Regulation (EEC) No 2078/92; Paul Bell, *Environmental Farming: A Guide to the Rural Environmental Protection Scheme (REPS)* (Philip Farrelly & Company, 1996), 7.

⁸⁸ Bell, *Environmental Farming*, 15.

⁸⁹ *Ibid*, 15-16.

⁹⁰ *Ibid*, 46-7.

up to 250 kg/ha.⁹¹ The relationship between REPS and the Nitrates Directive is interesting in two ways. First, it shows the willingness and capability of the Irish government to implement the full suite of directive regulations, albeit tied to an EU-funded grant programme, over a decade before Ireland would actually begin to apply to the directive as intended. Second, the 250 kg/ha figure from REPS foreshadows Ireland's Nitrates Directive derogation of 250 kg/ha, which used the same figure but collapsed the distinction between fertiliser and manure.

The measures required in the scheme fall into two categories, environment and heritage. These rhetorical linkages between environment and heritage in the Irish context emerge from several places. First, as discussed by Cowen, Ahern, and others in the Dáil Finance Committee, the notion of Ireland being a 'green' place was important to tourism and export marketing. Showing Ireland as a uniquely beautiful place required green agricultural behaviours to be folded into the ancient and traditional picture of the landscape, selling environmentalism as part of Ireland's unique heritage. Second, the legacy of the 1963 Planning Act and An Taisce's role as both an environmental and heritage arbiter caused Ireland's environmental and heritage conservation movements to evolve largely in tandem. Third, within the EC, the Common Agricultural Policy was always concerned with the preservation of rural heritage and combined efforts to maintain agricultural incomes with the preservation of a particular rural heritage centred around the notion of the 'family farm.' As shown in Carine Germond and Kalliopi Geronymaki's analysis of CAP history in Greek and Italian contexts, the balance of supporting farm incomes and preserving the family farm as central to rural society was a central tension in both the conception of CAP and its reforms.⁹² The introduction of the Less-Favoured Areas scheme in 1975 is one example of this. It explicitly sought to preserve the work of small farmers as a kind of rural heritage that was threatened by the industrialisation and commercialisation that CAP's farm incomes had enabled.⁹³ While environmentalism in Europe encompassed a broad swath of issues, in terms of agriculture, environmental concerns were just as entangled with heritage as in Ireland. The REPS programme's dual emphasis on the farmer as a steward of the environment and of scenic rural heritage reflects both Irish and European ideas around how a rural landscape should function and look.

The relationship between REPS and the EU's Agri-Environment Regulation funding is clear from the extent to which environmental measures included in REPS reflect the goals of European environmental directives being put into force at the time. In addition to the inclusion of

⁹¹ Noel Culleton, 'Living with the Constraints of REPS', paper presented at 1998 REPS Conference, Wexford, *REPS Conference Proceedings*, Teagasc, 3 December 1998, 1.

⁹² Germond and Geronymaki, 'Living with the Land', 156.

⁹³ Dax, 'The Redefinition of Europe's Less Favoured Areas', 1.

a code of good practice discussed above, the details of nutrient and waste plans and the protection of watercourses explicitly used the language of the Nitrates Directive, while the maintenance of wildlife habitat and care for breeding birds reflected the objectives of the European Habitats and Birds Directives. However, these environmental measures were applied to the letter of the law, not exhaustively or stringently. For instance, the use of sheep dip, pesticide, and other agrochemicals was still allowed, but with the stipulation that they not be used within 1.5 metres of hedgerows and watercourses.⁹⁴ Though farmers could be awarded additional income for adhering to supplementary environmental measures like organic farming, the enhancement of riparian zones, and the conservation of local breeds, they would only be compensated for one of the six possible measures.⁹⁵ This created a financial disincentive for farmer to go above and beyond the base requirements of the programme, stemming any desire for proactive environmental stewardship.

Additionally, the research behind the implementation of REPS did not reflect the change in agricultural research called for by Albert Noirfalise, whose report called for a shift toward an awareness of the farm as part of a larger ecological system and an exploration of farming within that system's limits. Instead, Teagasc researchers implementing REPS guidance followed the same tradition of reworking ecological dynamics to increase efficiency and profitability that had been central to Irish agricultural research since the beginning of the postwar period. Teagasc researcher Noel Culleton's introductory paper for the organisation's REPS conference in 1998 is indicative of this attitude.⁹⁶

Culleton focused on how to maintain profitable production within the restrictions on nitrate application. The restriction of nitrates was the second issue for scientists at the conference, and Culleton's paper specifically focused on reduced nitrate use as factor limiting the amount of silage farmers could make to a single cut. Hay was not mentioned as an alternative, as it had become established as a less efficient use of land than silage by this time. The solution proposed in the article, therefore, was not to move away from silage, but to adjust other factors on the farm in order to make grazing land more productive and to increase the stocking rate this single silage cut allowed. This again evokes the efficiency-focused productivity-within-limits version of carrying capacity, but with the limits being more stringently applied. Culleton proposed more efficient management of paddocks to prevent cows from overgrazing or standing on the field too long, extension of the grazing season, the judicious application of phosphorus fertiliser and lime in addition to nitrogen, and the introduction of improved grass varieties like ryegrass and improved

⁹⁴ Bell, *Environmental Farming*, 90.

⁹⁵ Ibid, 115.

⁹⁶ Culleton, 'Living with the Constraints of REPS'

clover varieties that could tolerate applications of nitrogen fertiliser.⁹⁷ Culleton closed the paper with a “vision of REPS grassland farming in the future,” writing:

The countryside will be a rich mosaic of relatively intensive farming and more extensive farming, with emphasis on biodiversity. Farmers will be operating nutrient balance sheets, and strict codes of practice for fertilising and slurry applications will be adhered to thereby leading to steady improvements in the nations water quality.

The challenge for the future is to stop the antagonism between environmental concerns on one hand and productive agriculture on the others. The way forward is to seek ways in which both concerns can be met. In fact it is highly likely that various synergies will be found when both sides are integrated. REPS is the mechanism by which this can be done.⁹⁸

The environmental crises caused by agricultural intensification had prompted many European and Irish scientists and law makers to rethink the farm not as an isolated system but an interconnected piece of a larger ecology. But Culleton’s paper instead portrayed REPS as a series of arbitrary restrictions that the enterprising farmer could work around to achieve the twin goals of environmental and economic efficiency. The financial interests that would lead to a divergence of intensive and extensive farming in his ‘mosaic’ landscape are unacknowledged, and the promotion of simplified fertiliser-dependent pastures of improved clover and ryegrass are to be somehow balanced by the wildlife habitats developed by other farmers somewhere else. The paper as a whole was motivated not by a care for the larger environment but by a need to re-engineer the farm system around REPS restrictions to maintain as much profit for the farmer as possible. This attitude was also reflected in the larger theme of the 1998 REPS conference, which was to explore ways to expand beyond the 40,000 farmers participating in the scheme both in number and in diversity of practice. The research presented by Culleton and others at the conference shows that the intentions of the scheme to promote environmental stewardship broke down when applied beyond the cohort of small extensive farmers already operating within the limits of the Nitrates Directive.

Culleton’s image of the countryside of a “rich mosaic,” regardless of how possible it was, reflects Venus Bivar’s portrayal of the multifunctional countryside model that emerged in France following the postwar boom.⁹⁹ Bivar shows that, like Culleton, the French state reimaged the

⁹⁷ Ibid, 3-6.

⁹⁸ Ibid, 10.

⁹⁹ Venus Bivar, ‘Manufacturing a Multifunctional Countryside: Operational Landscapes, Urban Desire, and the French State, 1945-1976’, *French Politics, Culture & Society* 36, no. 2 (2018): 54.

countryside as not only a site of agricultural production at all costs, but as a landscape where productivism coexisted alongside rural tourism and conservation. Culleton portrayed of REPS as a “mechanism” to improve biodiversity and water quality as he promoted mechanical suggestions as to how high levels of production could still be achieved under the scheme’s limits. The issue was that REPS was not built to create a multifunctional mosaic, with conservation and productivist farmers working alongside one another, but to reimagine the longstanding economic divide between Ireland’s good and bad farmland along environmentalist lines.

The central tension in the application of REPS was that the scheme was developed to provide financial support to smaller extensive farmers in exchange for improving their environmental practices, a similar focus to that of the CAP’s LFA scheme. But REPS was not officially portrayed as an LFA companion for poor farmers but an environmental scheme that any farmer theoretically could, and would want to, avail of. Other research presented at the conference clearly showed the difference in demographics between REPS and non-REPS farmers: A study in Louth showed that forty-six per cent of REPS participants only farmed part-time, with eighty-three per cent of them not dependent on farming for their livelihood.¹⁰⁰ Similar research in Donegal found seventy per cent of REPS participants farmed part-time.¹⁰¹ In a Wexford study, it was found that half of REPS farmers were over fifty and half had no formal education in agriculture.¹⁰² By contrast, several studies found that larger farms would require much greater financial investment in order to qualify for REPS than small farms and additional income from the scheme would have less of an impact on a large farmer’s livelihood. A study from the conference focusing on Sligo found that low-intensity farms with up to fourteen dairy cattle could profit up to £1,271, while high-intensity farms with more than thirty cows would only take home £194 after implementation costs.¹⁰³

IFA head Tom Parlon cited these higher infrastructure costs as the primary reason why

¹⁰⁰ John Clarke and J. Whelan, ‘Study on the Uptake of the Rural Environment Protection Scheme in Co Louth in the First Four Years of the Scheme’, in *REPS Conference Proceedings* (Teagasc, 1998), 11.

¹⁰¹ John Cannon and J. Whelan, ‘A Study of the Potential Impact of the Rural Environment Protection Scheme on Selected Drystock Farms in County Donegal’, paper presented at 1998 REPS Conference, Wexford, *REPS Conference Proceedings*, Teagasc, 3 December 1998, 20.

¹⁰² Eugene Ryan and J. Whelan, ‘Study on the Impact of the REPS Scheme Over Three Years on a Sample of Farms in County Wexford with Particular Reference to Nutrient Management’, paper presented at 1998 REPS Conference, Wexford, *REPS Conference Proceedings*, Teagasc, 3 December 1998, 19.

¹⁰³ Joe Curtin and J. Whelan, ‘A Study of Farms Participating in the REPS Scheme in County Roscommon and Benefits to the Rural Environment of This Scheme in Its Present Form’, paper presented at 1998 REPS Conference, Wexford, *REPS Conference Proceedings*, Teagasc, 3 December 1998, 25; Louis Leonard and J. Whelan, ‘Study on the Costs and Benefits of Implementing an Agri-Environmental Plan by Selected Categories of Dairy Farmers in County Sligo’, paper presented at 1998 REPS Conference, Wexford, *REPS Conference Proceedings*, Teagasc, 3 December 1998, 15.

farmers were not joining the scheme in his opening remarks of the 1998 conference.¹⁰⁴ The results of these studies demonstrated why REPS was only of interest to smaller farmers. Financially the programme only made sense for small farmers with small incomes and, in many cases, alternative sources of income. To admit that the scheme was only for small farmers would have undermined its primary assumption, namely that all farmers could and wanted to be more green, admitting that large intensive operations could not operate both with the same degree of profit and within the limits of the new regime of environmental regulations.

A study by presented at the conference by Teagasc researcher P. J. Phelan presented at the same conference made this problem explicit through its focus on intensive dairy farms and their impact on the Nenagh River. Phelan's research found that inadequate storage on surveyed farms led farmers to spread waste for disposal rather than as fertiliser, making them direct sources of pollution. Researchers found this out through routine soil surveying work, discovering that slurry and effluent were not spread in the fields that needed additional nutrients the most, but in the fields closest to the farmyard. The paper stated explicitly that "the group surveyed are not likely to be able to meet the requirements of the Rural Environmental Protection Scheme and yet have the potential to cause [far] greater environmental damage."¹⁰⁵ Frank Rath of the Department of Agriculture made a similar observation in the 1994 scientific meeting of the Fertiliser Association of Ireland, stating that "It is unlikely that REPS will have any effect on nitrogen used by farmers too intensive to participate in REPS who currently use fifty-seven per cent of total chemical nitrogen," concluding that the impact of REPS would only have a four per cent impact on nitrogen use after five years.¹⁰⁶ This attitude was internalised by farmers as well, as exemplified by a 1998 study conducted by Tina Aughney at the University of Ireland, Galway. According to this research, farmers largely believed that "good land is for farming," whereas "protection for wildlife can only occur on scrub."¹⁰⁷ When interviewed by Angela Nugent for the *Farmers Journal*, Aughney pointed out that, though the ideas expressed by farmers during the study did not necessarily reflect reality, they expressed the same sentiment as the government: that conservation is something that only makes sense if you cannot profitably farm your land.¹⁰⁸

¹⁰⁴ Tom Parlon, 'Message from Tom Parlon, IFA President', *REPS Conference Proceedings* (Wexford), An Foras Talúntais, 3 December 1998.

¹⁰⁵ P.J. Phelan, 'A Study of Nutrient Management Plans on Intensive Dairy Farms in the Nenagh River Catchment', paper presented at 1998 REPS Conference, Wexford, *REPS Conference Proceedings*, Teagasc, 3 December 1998, 29.

¹⁰⁶ Frank Rath, 'Impact of REPS on Fertilizer Use', *Fertiliser Association of Ireland*, Winter Scientific Meetings, No. 35 (January 1997), 6.

¹⁰⁷ Angela Nugent, 'Farmers' Attitudes to Nature Conservation', *Irish Farmers' Journal* (Dublin), 31 October 1998, 46.

¹⁰⁸ *Ibid.*

To admit that REPS would not draw in the farmers with the most impact on the environment would be tantamount to admitting that, despite its close adherence to European environmental directives, the scheme was not designed to achieve the environmental aims of those policies in Ireland. But to stretch the scheme, as Culleton's paper suggested, to make it applicable to more intensive farmers also made REPS weaker as an instrument of environmental policy. The authors of several studies presented at the 1998 REPS Conference actively called for the policy to be weakened, with researchers of the Louth and Roscommon studies both calling for an increase to the 170 kg/ha manure limit and the limit on fertiliser nitrogen. The authors of the Roscommon study justified this by claiming that "in grassland situations research into ground water quality and surface water show that nitrogen levels used in livestock farming pose no threat to water quality."¹⁰⁹ This same argument would later become a primary talking point of Ireland's agricultural associations in the 2000s during debates over the Nitrates Directive, demonstrating how the construction and public litigation of REPS functioned as a rehearsal for those later debates. Just as with REPS, the IFA and ICMSA would use the longstanding divide between extensive and intensive farming in different regions of Ireland to both dilute and delay the Nitrates Directives regulations.

VI. REPS and the "Green Image of Ireland"

The heritage aspects of REPS, including the protection of features of historical and archaeological interest, improvement of the visual appearance of the farm, and maintenance of field boundaries, fell closely in line with both Irish and European efforts to preserve a kind of rural heritage in terms of landscape, architecture, and practices.¹¹⁰ Historian Corinne Geering has argued that rural European cultures were remade as a resource throughout the twentieth century, allowing them to be extracted and exploited a similar fashion to the land and resource exploitation laid out in previous chapters of this thesis.¹¹¹ By exploring the ways in which visual aspects of Irish rural life were folded into the political construction of natural farming, this section will show how the tying of environmentalism and Irish rural life was exploited for both economic and legal state projects.

¹⁰⁹ Clarke and Whelan, 'Study on the Uptake of the Rural Environment Protection Scheme in Co Louth', 14; Curtin and Whelan, 'A Study of Farms Participating in the REPS Scheme in County Roscommon', 27.

¹¹⁰ Rural Environment Protection Scheme, EEC Regulation 2078/92 (1999), 5.

¹¹¹ Corinne Geering, 'Managing Culture in the European Countryside: The Modern Roots of Rural Traditions', in *Living with the Land: Rural and Agricultural Actors in Twentieth-Century Europe - A Handbook* (De Gruyter Oldenbourg, 2023), 302.

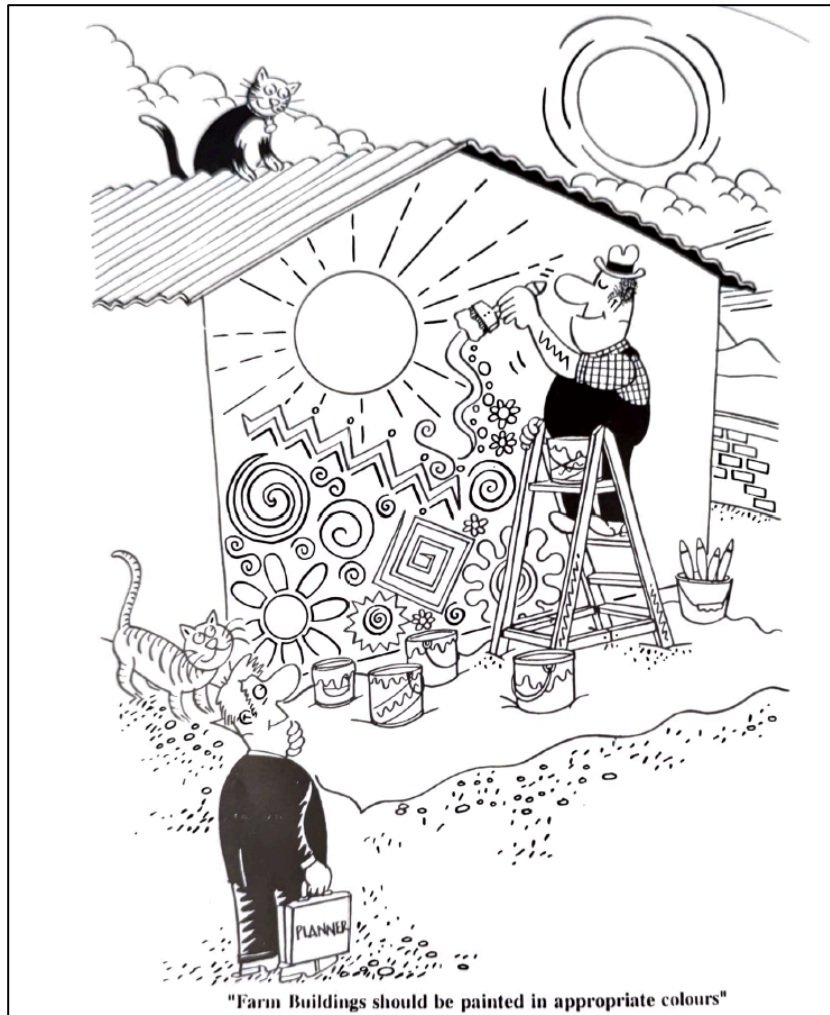


Figure 5.5: An illustration from Paul Bell's manual on REPS included in the section explaining the requirements regarding the visual improvement of the farm. The appropriate colours for walls according to the scheme were grey, blue-grey, brown, light reddish-brown, whitewash, or the natural unpainted colour of block or plaster walls. Source: Bell, *Environmental Farming*, 102-3.

The requirement to maintain the visual appearance of the farm shows that the preservation of rural heritage was at least partially an aesthetic exercise. The environmental sustainability of rural livelihoods was not only understood in functional metrics like water quality, biodiversity, and economic viability, but by their visual cohesion with the rural landscape. Paul Bell's 1996 manual instructing farmers on the details of REPS opens the chapter about this measure by explaining that farmers must take into account how their farm buildings affect the visual pleasure of the landscape both close up, "as noted when we are passing by or walking through the yard and buildings" and from a distance where "the size, shape and colour of the building [either] disturbs the view or not."¹¹² The cartoon included in this section of the manual (Fig. 5.5) demonstrates the regulatory aspect of this: the farmer is shown painting a detailed and whimsical mural on a farm building, one

¹¹² Bell, *Environmental Farming*, 102-3.

that he, the REPS planner, and the farmyard cats take pleasure in. The mural shows a great deal of effort and care being put into the farm but, as the caption below reminds readers, this is a joke: “Farm buildings should be painted in appropriate colours.”¹¹³ Despite the specific requirements as to how the visual appeal of the farm was to be maintained, the justification was only a vague idea of coherence with the landscape. For instance, Bell writes that if a farm was in a region where it was common to have a red roof, the farm building should also have a red roof, the underlying idea being to make sure a REPS farm maintained the traditional aesthetic of an Irish farm. Another of the REPS heritage measures, the maintenance of field boundaries, further clarifies what this aesthetic meant.

To qualify for REPS, farmers were required to maintain 140 metres of hedgerows or seventy metres of stone walls per hectare on farms under forty hectares.¹¹⁴ In *Environmental Farming*, Bell wrote that these boundaries were important as both elements of cultural heritage and the ecosystem, providing habitat for plants, animals, and birds as well as contributing to the iconic image of the Irish countryside. As Bell wrote “The hedges and stone walls are man-made additions to the landscape. Many of them are now centuries old and are now considered part of our natural environment.” The naturalness of Irish stone walls came not only from their role as habitats but their natural-seeming place in the landscape.¹¹⁵

The role of hedgerows as habitats and migratory corridors for a variety of species has been well researched, but research into stone walls as habitats is much thinner. One 2022 study led by Teagasc ecologist Sara Ruas has shown that stone walls provide habitats for a diverse set of lichens, mosses, and other bryophytes, but their importance for nesting birds, amphibians, and other plants has not been formally studied.¹¹⁶ Both the 2022 study and other studies on hedgerows indicated that the ecological health of these boundaries are dependent to a large degree on biodiversity of the farm itself.¹¹⁷ The larger factor for maintaining these field boundaries within REPS seems to be their role as landscape heritage, an association that has been strengthened through the years, with the Council of Europe including stone walling techniques as part of the ‘Intangible Cultural Heritage of Humanity’ in 2019.¹¹⁸ The preservation of stone walls and hedgerows as heritage

¹¹³ Ibid.

¹¹⁴ Ibid. 82.

¹¹⁵ Ibid, 81.

¹¹⁶ Sara Ruas et al., ‘Assessing Stone Walls Habitat Quality - Which Factors Affect Bryophytes and Macrolichens on Farmland Stone Walls in Ireland?’, *Ecological Indicators*, no. 139 (2022), 3.

¹¹⁷ Lyndsey Graham et al., ‘The Influence of Hedgerow Structural Condition on Wildlife Habitat Provision in Farmed Landscapes’, *Biological Conservation* 220 (April 2018), 122; Ruas et al., ‘Assessing Stone Walls Habitat Quality’, 1.

¹¹⁸ Claire Cornu, ‘Dry Stone in the Landscape: Ancestral and Innovative for Sustainable Territories’, paper presented at European Landscape Convention, Strasbourg, *10th Council of Europe Conference on the European Landscape*

clarifies the underlying visual aesthetic sought through the scheme, one that was not only contiguous with the landscape but that preserved a landscape of Irish farming which evoked a natural traditional heritage.

As recognised in Claire Cornu's report for the Council of Europe's incorporation of stone walls as intangible heritage, building and maintaining stone walls takes significant labour. The skill in finding different arrangements for the stone develops slowly with practice.¹¹⁹ In some places like the Aran Islands where the preservation of famine walls is still woven into overall land practices, the walls have been continually maintained, allowing the technique to be practiced and passed on as a kind of vernacular. This is not the case across the island, however.

In the case the O'Brien's farm in Belclare, Co. Galway, the farm's single stone walls were easily damaged by cattle, making their maintenance for REPS a continuous job. To save time on continuous maintenance, Pat installed electric and barbed wire along the outside of the wall to keep cows from knocking into them (Fig. 5.6).¹²⁰ As with the practice of making silage clamps discussed by O'Brien, this practice was seen as acceptable and even seems to have been encouraged by REPS planners, with Bell writing "If you don't have enough stones available to bring these walls up to stockproof condition you can use wire fencing as a replacement."¹²¹ The reinforcement of stone walls with wire is a strange practice considering the stated environmental and heritage goals of REPS. Though it wouldn't largely affect bryophytes, the presence of electric or barbed wire would certainly impact any birds or other animals within the habitat of the walls. In terms of maintaining the 'natural' heritage of the rural landscape, the wire fence acts as a modern second wall, not intended to divide the land but to protect the ancient natural heritage of the first. It reflects Bell's guidance on the visual appearance of the farm, as the wires would be visible up close but would be less visible when passing by or when viewed from a distance.

Convention, Council of Europe, 10 April 2019.

¹¹⁹ Cornu, 'Dry Stone in the Landscape', 13.

¹²⁰ Angela Nugent, 'REPS a Lifeline: Committed to Scheme', *Irish Farmers Journal* (Dublin), 18 September 1999, 34.

¹²¹ Bell, *Environmental Farming*, 82.



LEFT: Pat O'Brien has single stonewalls which cows can easily damage. He uses strands of electric or barbed wire for protection.

Figure 5.6: Pat O'Brien pictured in a 1999 article for the *Farmers Journal* repairing a stone wall with barbed wire running along it. Source: Nugent, 'REPS a Lifeline', 34.

Returning to David Edgerton's *Shock of the Old*, the reason these stone walls are seen as an important heritage is that they are seen as relics of an agrarian past with simple technologies like stone walls and different organisation of farm labour that allowed for their continued maintenance.¹²² This association with an agrarian past leads to a twin association with nature. As Bell wrote in his explanation of REPS, they are "now considered part of our natural environment."¹²³ As the walls become a part of nature, so does this image of an agrarian Irish heritage and the work of the heritage farmer.

This image of an agrarian heritage close to nature was also being read back onto the island's history during the 1990s. The stone walls of the Céide Fields in County Mayo comprise the oldest known stone wall system in the world, dating back to 3700 BCE. According to the research of paleoecologists Karen Molloy and Michael O'Connell, the agriculture practiced by the neolithic people who built the walls would have been primarily pasture-based, accompanied by arable farming.¹²⁴ Signage along the boardwalks at The Céide Fields visitor centre, established in 1993, guides the visitor through the archaeological site, stating that "generations of farmers worked this land thousands of years ago," and that "nature was alive to the people who lived here." These statements ask visitors to imagine the site as inhabited by prehistoric farmers who stewarded 'nature' as they 'worked' the land, a similar picture as the one painted by the REPS measures.

¹²² Edgerton, *The Shock of the Old*, 64-66.

¹²³ Bell, *Environmental Farming*, 81.

¹²⁴ Karen Molloy and Michael O'Connell, 'Palaeoecological Investigations towards the Reconstruction of Environment and Land-Use Changes during Prehistory at Céide Fields, Western Ireland', *Probleme Der Küstenforschung Im Südlichen Nordseegebiet*, No. 23 (1995), 216.

However, the walls of the Céide Fields are quite different to those of an Irish farm of the 1990s. They were built during a distinctly warmer and drier climate, meaning agriculture would have looked quite different to contemporary Irish practices, even outside contemporary ideas of ‘nature’ and ‘working the land.’¹²⁵ Molloy and O’Connell did not conclude that the stone walls were used for animal enclosure or shelter, but rather that they were the result of removing stones from the ground to increase grass production, a common origin story for ancient stone walls around Europe, as noted in Cornu’s report.¹²⁶ Nevertheless, the framing of the site as heritage, invoking ‘generations of farmers’, asks visitors to map more contemporary agricultural practices onto the site and, in so doing, lends the stone-walled Irish agriculture promoted by REPS an ancient persistence.

But that image of the natural past could not be made real through a program like REPS. The arrangements of labour in the 1990s remained distinctly modern and farmers like the O’Briens still had to run a productive modern farm business. The labour of preserving the stone walls is therefore substituted with the modern technology of the wire fence, maintaining the image of an agrarian past, at least from a distance. In this way, the stone wall and the REPS program itself become a Latourian hybrid, an effort to preserve a natural past separate from modern intensive practices of Irish agriculture. Trying to preserve the heritage of a stone wall outside of the labour conditions in which it originated requires it to hybridise with modern electric and barbed wire.

This is also true of Culleton’s paper at the REPS conference: in order for the farm to become more natural in its nitrate levels, the clover and other pasture plants themselves must be of modern stock bred for intensive agriculture.¹²⁷ In constructing nature and natural heritage within REPS as something separate from typical farming, even something that only certain farmers should concern themselves with, the scheme created these hybrids of technology and nature, of past and present. As an environmental measure, REPS’s limited incentive structure for intensive farmers did not allow it to improve the kinds of pollution and habitat issues of the EU environmental directives behind it. But for intensive farmers and politicians like Brian Cowen and Minister Yates, the scheme was able to preserve the “green image” of Ireland as a beautiful and natural place that could be exported to the world, albeit wrapped in barbed wire.¹²⁸

¹²⁵ Ibid, 189

¹²⁶ Ibid, 222; Cornu, ‘Dry Stone in the Landscape’, 13.

¹²⁷ Noel Culleton, ‘Living with the Constraints of REPS’, paper presented at 1998 REPS Conference, Wexford, *REPS Conference Proceedings*, Teagasc, 3 December 1998, 3-6.

¹²⁸ Brian Cowen, Finance Bill, 1995: Second Stage (Resumed). Dáil Éireann (27th Dáil). 27 April 1995. Vol. 452, No. 2. Col. 305-6.



Figure 5.7: The ‘green image’ of Ireland abstracted onto the packaging of soft cheese in a supermarket in Tiefenort, Germany. The packaging promises the cheese is made “aus frischer Weidemilch,” with fresh pasture milk. Source: Bruisch, *Kerrygold in Tiefenort, Thuringia, Germany*.

This is not to say that REPS was an abject failure. On the contrary, it was a lifeline to many of the small and part-time farmers who availed of it and its descendant schemes GLAS and ACRES. The O’Brien farm was one of the early adopters of REPS, and their 1999 profile by Angela Nugent in the *Irish Farmers Journal* discussed the financial difficulty faced by the family before joining the scheme. Low lamb and wool prices meant that Elizabeth’s off-farm job was the family’s primary support. Pat’s early reservations about needing to reduce his stocking rate under the scheme are understandable, given the popular conversation about the scheme explored above and the precarity of the farm’s situation. But these doubts were assuaged when he looked into the limits and realised his current stocking rates were already within the scheme’s parameters.¹²⁹

In his interview with Nugent, Pat discussed how REPS allowed him to do the maintenance work, such as repairing stone walls and gates that he would otherwise not have time for. Profits from the scheme also allowed him to pay for a second building to house cattle, allowing him to collect and re-spread slurry.¹³⁰ In terms of environmental awareness, REPS and the other agri-environment programmes have given Pat a new way of seeing the farm as an ecosystem. In an oral

¹²⁹ Nugent, ‘REPS a Lifeline: Committed to Scheme’, 34.

¹³⁰ Ibid.

history interview for the NuReCycle Project he expressed pride in the restored turloughs and wet areas where ducks land, pointing out lines of trampled grass where “foxes and wildlife... run like a railway track” up along the walls and hedges with “nothing to disrupt them or hurt them.”¹³¹ The additional work put into maintaining the stone walls on the farm even helped the family get closer to the more recent history of the land, almost dangerously so. In 2014, Pat discovered a viable mills grenade at the base of one of the stone walls while repairing a gap which sheep were moving through, one that *Tuam Herald* reporter Tom Gilmore assumed dated back to the Civil War.¹³² In many cases, REPS did serve as an economic and environmental paradigm shift on the farm scale. The scheme not only allowed small farmers to stay in business but tied that funding to the long-term maintenance of the farm’s physical infrastructure and its relationship to the larger environment.

These positive benefits at the farm-scale are entangled with the issues linked to the scheme at the national level. As the *Farmers Journal* interview shows, the O’Brien farm was not an acute environmental problem, at least in terms of nitrates, before they joined the scheme, while the positive impacts of the scheme on their and other small farms unfortunately have not been able to lower the environmental impact of larger intensive farmers for which REPS would never have been an option. The environmental efforts of REPS farmers did not ameliorate the environmental harms of the Irish farming sector as a whole, nor did the scheme allow Western farmers to transcend the economic disparity that had come to define the region since the time of the Congested Districts Board. Conversely, the bucolic “green image” of Ireland preserved by REPS’s heritage measures served as profitable marketing for non-REPS agriculture operations, providing a further incentive to intensify production and worsen the very environmental crises the scheme sought to address.

The association of environmentalism and Irish rural heritage within REPS represents an inversion of the internationalising and productivist mapping conducted by Tom Walsh and the NSS. The deliberate replacement of Irish names for soil with Dokuchaev’s international terminology was the first step to reimagining the Irish countryside as a productivist and scientific landscape. REPS creates an entirely different land imaginary where heritage, through stone walls and red painted roofs, are just as key to the environmental management of the rural landscape as a reduction in fertiliser nitrate. While intended as an environmental farming scheme backed by Europe’s Nitrates and Wildlife directives, these inherent distinctions of Ireland’s agri-environmental schemes only served to re-enact long standing class distinctions among farmers

¹³¹ Patrick O’Brien, ‘NuReCycle Oral History, 00:12:51.

¹³² Tom Gilmore, ‘Caherlistrane Farmer Carries Live Grenade through the Fields’, *Tuam Herald* (Tuam), 30 April 2014.

along the newly drawn policy lines of environment and heritage.

VII. The Nitrates Directive in Ireland

Running parallel to this story of the Rural Environment Protection Scheme was the contentious implementation of the EU Nitrates Directive in Ireland. While work on the directive within Europe had been largely collegial and seemingly to the economic benefit of Ireland according to Mary Moylan's communications, the attitude was quite different once the directive hit the ground on Ireland. The reception of the European agricultural policy changes by Irish farming interests was reflected in European Agricultural Minister Ray MacSharry's welcome back to Dublin in 1991 in the midst of debates around CAP reforms. These reforms would have weakened the commodity price protections in the interest of providing single aid payments to farmers for adhering to certain restrictions.¹³³ A piece written for the *Farmers Journal* by Matt Dempsey, titled "Single Minded MacSharry," depicted MacSharry coming into conflict with the IFA's Family Farm Committee chairwoman Rosemarie Smith, who was leading a protest of "farm women" about the falling income of farm families due to proposed stocking rate limits attached to the proposed payment scheme. MacSharry's response drew the economic lines of Smith and the IFA's argument explicitly, saying that seventy-two per cent of the country was categorised within disadvantaged areas with average stocking rates of one LU/ha, far below the proposed limit of 1.4 LU/ha under the single payment scheme for those areas and even lower than the two LU/ha limit to be introduced in vulnerable zones under the Nitrates Directive. In his perspective, "the majority of farmers will gain - the others will have to adjust their input/output ratios."¹³⁴ Contrary to the demographic effects of REPS discussed above, MacSharry's frank language comes from the underlying idea that the CAP reforms would greatly benefit poorer and smaller farmers in terms of competitiveness, while the economic losses faced by larger operations would simply be a check on their environmentally destructive profit-seeking.

Smith's rhetoric on behalf of the women of the IFA and similar arguments by the ICMSA around European agricultural regulations like direct payments and the Nitrates Directive posited that European regulation hurt Irish farmers across the board. Making this argument necessitated an obscuring of longstanding economic and environmental divisions between large and small, intensive and extensive, Eastern and Western farmers. This chapter has already shown that this rhetorical erosion of difference appeared in discussions of REPS, where calls by IFA and Teagasc for additional infrastructural compensation and looser restrictions on nitrate spreading were

¹³³ Germond and Geronymaki, 'Living with the Land', 162.

¹³⁴ Matthew Dempsey, 'Single Minded MacSharry', *Irish Farmers Journal* (Dublin), 3 August 1991, 5.

depicted as ways to involve farmers in general in the scheme but were actually targeted at retooling the scheme for larger, more intensive farmers. While REPS was a regulatory carrot, offering financial compensation for specific practices, the Nitrates Directive was a stick, and agricultural associations would need to argue that these regulations would negatively impact all farmers, even though the Directive would not actually affect the smaller, more extensive operations that, as MacSharry pointed out, made up the majority of Irish farms.

The first step to implementing the Directive in Ireland was to develop the water quality monitoring data that would inform the extent of vulnerable zones in the country.¹³⁵ This work needed to take place by December 1993, and the Irish Department of the Environment led local authorities in a monitoring programme for nitrates in drinking water supplies and groundwater in October 1992.¹³⁶ Teagasc researcher Bill O'Brien reported that much of the land in North Kerry as well as areas around Castleisland and Killarney would possibly be designated as a vulnerable zone because of high nitrate levels in drinking water "due to over-use of nitrogen, especially for the first silage cut."¹³⁷ In a similar vein to the research Culleton would present at Teagasc's REPS conference six years later, O'Brien's recommendations for remediating the pollution was to better lime the soil to help plants to take up the nitrogen and to replace some artificial nitrogen with clover which was expected to fix eighty to ninety per cent of nitrogen needed in the pasture.¹³⁸

Member states were meant to use this monitoring data to designate specific vulnerable zones, where the Directive's limits would apply by 1995. However, by 1996 Ireland had not designated any zones, though rumblings about the extent of nitrate pollution in Irish waters indicated that these zones would be much broader than the region of North Co. Kerry focused on by Bill O'Brien. According to Angela Nugent's reporting, "the quality of water in Ireland is deteriorating with an increase in the percentage of surface waters showing slight and/or moderate pollution. Eutrophication or the fuelling of plant growth and oxygen depletion of waters by plant nutrients, particularly phosphates, is often involved. The nitrate concentrations in many surface waters are increasing, particularly in the southeast."¹³⁹

Instead of designating any vulnerable zones in 1996, the initial effort by the Irish government to come in line with the Nitrates Directive was to implement the voluntary *Code of Good Agricultural Practice to Protect Waters from Pollution by Nitrates* discussed earlier in this

¹³⁵ Council Directive Concerning the Protection of Waters against Pollution Caused by Nitrates from Agricultural Sources, 91/676/EEC (1991).

¹³⁶ Marie Sherwood, 'Soil Nitrates', *Irish Farmers Journal*, 22 May 1993, 40-43.

¹³⁷ Con Hurley, 'Kerry Farmers Can Lift Profits by £5 Million', *Irish Farmers Journal*, 23 October 1993, 29.

¹³⁸ Ibid.

¹³⁹ Ibid, 27.

chapter. The *Code* suggested limiting the application of slurry and ‘organic fertilisers’ to 210 kg/ha, the equivalent of one LU or dairy cow per acre. In contrast with the 1994 REPS programme, which was written in line with the exact figures and phrasing of the Nitrates Directive, this ‘policy’ eschewed the Directive’s specific 170 kg/ha limit and its higher limits were not made mandatory. The IFA’s environmental committee chairman Aidan Larkin won further concessions in negotiations with the Department of the Environment, including an increase of the voluntary organic fertiliser limit to 250 kg/ha “where surface and ground waters are in good condition,” keeping to 210 kg/ha elsewhere.¹⁴⁰ While the 250 kg/ha limit appeared as a combined figure for organic nitrogen and fertiliser nitrogen in REPS, this concession was the first time 250 kg/ha was attributed to organic sources of nitrogen alone.

Like the Fertiliser Association of Ireland’s reaction to REPS, the IFA’s primary justification for these high nitrate application rates was that Ireland had only minor pollution problems. In Larkin’s words, “Ireland is fortunate that the overall water quality of both surface and ground waters remains high and compares very favourably with other EU member states. In fact, 97 per cent of our ground water does not have a nitrate pollution problem.”¹⁴¹ This scattershot approach to the adoption of the Nitrates Directive seemed intended to adopt each individual piece of the Directive in some respect while targeting each measure so as to not require any part of the agricultural industry to change its operations. A code of good practice was adopted on a voluntary basis nationwide, while the 170 kg/ha limit was targeted at farmers already well under that limit through REPS. Moreover, no vulnerable zones or mandatory measures were implemented due to the purported ‘favourable’ conditions of Irish waters.

The tide would begin to shift in 1998 when the Department of Environment first reported that nitrate levels in northern Cork, the Lee catchment, Barrow catchment, and parts of eastern Galway were high enough to warrant them being considered vulnerable zones.¹⁴² By the following year, the Government had designated at least twelve areas across the country where groundwater levels were above the fifty mg/L nitrate limit split between Cork, Carlow, Waterford, Louth, and Kerry.¹⁴³ Despite the ability of the newly established EPA to not only monitor the environment but to enforce environmental regulations on a nationwide scale, Minister for the Environment and Local Government Dan Wallace fell back to the old pattern of leaving environmental regulation to local authorities. Teagasc researcher Marie Sherwood had warned about the “onerous programme

¹⁴⁰ Irish Farmers Association, ‘IFA Wins Changes to EU Nitrates Code’, *Irish Farmers Journal* (Dublin), 15 June 1996, 43.

¹⁴¹ Ibid.

¹⁴² ‘Farmers to Be Hit by New Nitrate Rules’, *Irish Farmers Journal* (Dublin), 19 December 1998, 8.

¹⁴³ Trish O’Dea, ‘Don’t Drink the Water’, *The Corkman* (Cork), 21 July 2000, 1.

of water monitoring” needed to be undertaken by understaffed local authorities back in 1989 before the EPA was founded, but despite the foundation of the agency, government policy still leaned on poorly resourced local authorities.¹⁴⁴

With Wallace’s guidance, local authorities were to develop their own bye-laws that would make the 210 kg/ha limit in the Code of Good Practice mandatory.¹⁴⁵ Cork County Council, which included four zones, the most of any county, first implemented their bye-laws on the first of October 1999.¹⁴⁶ Fourteen local authorities planned to introduce bye laws by the end of 2000, with Mayo County Council going as far as proposing a ban on the purchase of phosphorus without a permit.¹⁴⁷ Though these bye-laws designated zones deemed to be vulnerable to nitrate pollution where local authorities were tasked with issuing mandatory limits on nitrate spreading, these were different than the Nitrate Vulnerable Zones (NVZ) required under the Nitrates Directive. Instead, this programme was another tactic to delay the full implementation of the Nitrates Directive by slowing the pollution of bodies of water by nitrates, diluting the full 170 kg/ha regulation to a looser 210 kg/ha limit. A generous reading of this policy would see the Irish government as optimistic, thinking that a targeted locally driven campaign would ameliorate conditions enough so that the establishment of official NVZs would not be necessary. However, given the influence of agricultural associations on policy negotiations, it seems likely that delaying regulations to allow large intensive farmers another season of high production profits played a significant role in this incomplete implementation of the Directive.

The European Commission began taking legal action on the Nitrates Directive in 2000, initially targeting Luxembourg, Finland, Portugal, and the UK because of their weak implementation plans.¹⁴⁸ By 2001, Ireland was the only remaining member state that had yet to designate vulnerable zones. By the time Ireland began drafting its NVZ policy in 2002, most member states had already opted to implement Nitrates Directive restrictions across their entire jurisdiction. This was partially to simplify the regulatory process, as countries like the UK, one of the few countries that had chosen to designate specific NVZs, found they had to continually expand their boundaries as farmers outside of those zones continued to contribute high rates of nitrate pollution.¹⁴⁹ Teagasc researcher Joe Sheehy wrote in *The Irish Examiner* that forty per cent of

¹⁴⁴Marie Sherwood, ‘Nitrates in Water:- Do Irish Farmers Have a Problem?’, *Irish Farmers Journal* (Dublin), 5 August 1989, 19.

¹⁴⁵ Angela Nugent, ‘Water Quality Must Be Improved’, *Irish Farmers Journal* (Dublin), 27 February 1999, 28; Angela Nugent, ‘Addressing Deteriorating Water Quality’, *Irish Farmers Journal* (Dublin), 11 December 1999, 26.

¹⁴⁶ O’Dea, ‘Don’t Drink the Water’, 1.

¹⁴⁷ Paul Mooney, ‘Bye-Laws Must Be Workable’, *Irish Farmer’s Journal* (Dublin), 2 December 2000, 6.

¹⁴⁸ Eric Donald, ‘Water Pollution’, *Irish Farmers Journal* (Dublin), 8 April 2000, 11.

¹⁴⁹ Joe Sheehy, ‘National Approach Needed on Cuts in Nitrate Fertilisers’, *Irish Examiner* (Cork), 30 May 2002, 20-21.

Ireland would have to be designated as a vulnerable zone and draft policies showed that the government was leaning toward a nationwide approach to the implementation of the directive. Sheehy also hinted that adopting the nationwide standards may allow for “more practical stocking rates or some derogation being accepted by the EU for more intensive farmers who can show they are causing no risk to the environment.”¹⁵⁰

These policies led the IFA and ICMSA, which had successfully contributed to the delay of directive implementation up to this point, to go on the offensive, lobbying the EC to increase limits and the Irish government to not designate a nationwide nitrate vulnerable zone. As shown in the figure below (Fig. 5.8), the agricultural associations also attempted to engage the larger farming public, digging into the now-common arguments that municipalities, not agriculture, were the core cause of pollution and that regulation represented a threat to the livelihoods of all farmers, not just the most intensive ones.¹⁵¹ Though Teagasc put their weight behind the standard nitrate regulations for the whole country in May 2002, all political parties and the agricultural lobby groups still stood against it. Even the Green Party, in a move smacking of eco-efficiency, came out against the directive and accused the government of “using the nitrate directive to get rural environmental protection ‘on the cheap’” and that “the proposed new regulations on the use of nitrates and the spreading of slurry on agricultural land are so rigid they make a mockery of environmental protection.”¹⁵²

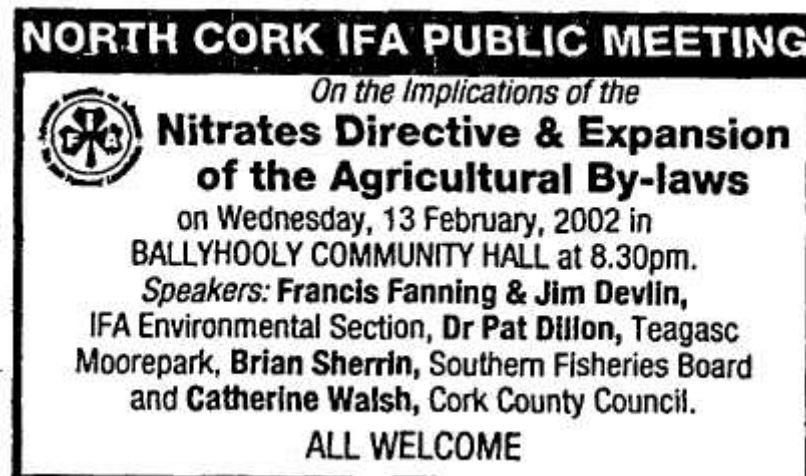


Figure 5.8: Advertisement for a public meeting in *The Irish Examiner*. Source: Irish Farmers Association, ‘North Cork IFA Public Meeting’, 33.

¹⁵⁰ Ibid.

¹⁵¹ Ray Ryan, ‘I Will Be Decisive on Environment, Says Dillon’, *The Irish Examiner* (Cork), 16 January 2002, 14.

¹⁵² Ray Ryan, ‘Government Must Be Flexible on Slurry Criteria, Says Green Party’, *The Irish Examiner* (Cork), 11 January 2002, 14.

By 2004, the government had developed a draft plan for the implementation of the Nitrates Directive, but had still not introduced any related policy. The third round of REPS was due to be introduced in January 2004, but the EU held up funding until the Directive was implemented and finally brought Ireland to the European Court of Justice.¹⁵³ When a draft agreement between the Irish government and the EC was finally agreed to a few months later, IFA president John Dillon went fully on the attack. “One cow per acre,” the equivalent of the 210 kg/ha limit the government had previously adhered to, became the IFA slogan trotted out to rural papers around the country.¹⁵⁴ In one of these ‘one cow per acre’ editorials for *The Limerick Leader*, Dillon evoked Ireland’s colonial past, writing:

It doesn’t sound exorbitant, but it will mean little to town dwellers and non farmers accustomed to drinking milk from tetra packs with a use-by date weeks after it was taken from the cow. However, if race memory serves us right, one cow per acre has historic and emotional reverberations. The native Irish, lucky enough to become tenants under the Cromwellian plantation, were allowed three cows for every acre of land they received for being good citizens... Unlike the Cromwellian Plantation, which at least left certain zones west of the Shannon for native enterprise, Environment Minister, Martin Cullen has designated the entire territory of the Republic of Ireland for the purposes of the EU Nitrates Directive.¹⁵⁵

Though Dillon’s intention was to ironically paint Europe as worse for Ireland than Oliver Cromwell, his screed almost comes across as nostalgic for a previous colonial regime, where the landowning class were able to profit from the extraction of the Irish landscape without question. More interesting, however, is the appeal to nature that runs throughout the statement, evoking ‘race memory’ of the relationship between Irish people, cows, and milk fresh from the teat, as opposed to the European market’s adherence to technological tetra-paks and draconian regulations. Dillon’s argument universalises the natural image of Irish farming prized by REPS, bridging modern intensive agriculture practices with the ancient traditions of stone-wall building Celts not only to market Irish dairy and butter abroad, but to unify all farmers as protectors of heritage, regardless of their stocking rate or stone walls. By evoking the “zones west of the Shannon” left to native enterprise, Dillon nods to Western farmers as the keepers of Irish culture while purposefully

¹⁵³ Aiden Corkery, ‘Dept Claims EU Is Delaying REPS’, *The Corkman* (Cork), 29 January 2004, 32.

¹⁵⁴ Roche, Richard, ‘Written Answers.’ *Dáil Éireann* (29th Dáil). 30 September 2004. Vol. 589. No. 2. Col. 758-61.

¹⁵⁵ John Dillon, ‘One Cow per Acre’, *Limerick Leader* (Limerick), 3 April 2004, 8.

leaving out that this neglect of the West was part of a programmatic marginalisation under Cromwell, the echoes of which still remained in place.

The lobbying groups did not always hide this economic divide in a heritage narrative, with ICMSA head Pat O'Rourke writing in *The Kerryman* that he had his “worst fears... confirmed that the Nitrates Directive will have major impact on at least 12,000 farmers — the vast majority of whom are dairy farmers.”¹⁵⁶ As these would be the farmers with above-average stocking rates, they would be the most financially well off of the 140,000 farmers in the country at the time.¹⁵⁷ According to Agriculture Minister Joe Walsh, writing for *The Connaught Tribune* in 2004, over 100,000 of those farmers were already operating below the required 170 kg/ha limit required by the Directive.¹⁵⁸ It has been demonstrated several times throughout this chapter that the IFA and ICMSA consistently acted in the interest of the minority of large intensive farmers rather than the larger and more economically and operationally diverse suite of farmers across Ireland. As Germond and Kalliopi argue, European agricultural policy has long been characterised by an effort to balance the ‘farm problem’ of agricultural incomes and the ‘rural problem’ of sustaining rural ways of life.¹⁵⁹ In response to the introduction of CAP reforms, the Nitrates Directive, and agri-environmental payments like REPS, agricultural associations and to a large degree the Irish government negotiating with them, collapsed these two together into a single image of the Irish farmer, portrayed as both a steward of land and heritage and a business-minded profiteer who may be mortally wounded by any regulatory limits to production.

VIII. Conclusion: Derogation

The initial 2004 agreement did not last, as the battle between Ireland and Europe over the Nitrates Directive continued over a derogation for Irish farmers. This derogation was based on a part of the Nitrates Directive that allowed member states to apply for a higher level of manure that would not “prejudice the achievement of the objectives” of the Directive “on the basis of objective criteria.”¹⁶⁰ As Minister for the Environment Dick Roche said before the Dáil in September of that year, “an application is being made to the European Commission for approval to apply higher limits — up to 250 kg per hectare per annum in appropriate circumstances — in relation to the

¹⁵⁶ Aiden Corkery, ‘Nitrates Action Plan “Useless”’, *The Kerryman* (Tralee), 12 February 2004, 15.

¹⁵⁷ *Census of Agriculture 2010 - Final Results*, Census, Census of Agriculture (Central Statistical Office, 2012), 7.

¹⁵⁸ Frank Farragher, ‘Dept. Move to Try and Free REPS Bottleneck’, *Connacht Tribune* (Galway), 13 February 2004, 22.

¹⁵⁹ Germond and Geronymaki, ‘Transforming Agriculture and Rurality’, 156.

¹⁶⁰ European Commission, Commission Implementing Decision Granting a Derogation Requested by Ireland Pursuant to Council Directive 91/676/EEC Concerning the Protection of Waters against Pollution Caused by Nitrates from Agricultural Sources, No. 2022/696, (2022), L 129/37.

landspreading of organic nitrogen. The case for this derogation is being developed by the Department of Agriculture and Forestry (DAF) and Teagasc in consultation with my Department.”¹⁶¹ Debates around this Irish exception to the Directive would continue for another three years, but the research behind Ireland’s exceptional nitrate levels had been developing as long as the Nitrates Directive itself.

Writing for the *Farmers Journal* in 1989, Teagasc researcher Marie Sherwood had already pushed back against the directive’s limits, claiming that “preliminary research results at Johnstown Castle have indicated that these stocking rates may be unnecessarily restrictive under Irish conditions and further definitive information is needed to argue for modifications.”¹⁶² The reasoning behind the assumption that Irish conditions prevented a nitrate problem in large parts of Ireland were “low average fertiliser use on grassland” and “very few free draining soils.”¹⁶³ This Teagasc research, as it appeared in the *Farmers Journal*, seems to be the origin of the higher 250 kg/ha limit that would be incorporated into REPS and later solidified as Ireland’s derogation.¹⁶⁴ The concurrence with negotiations around the Nitrates Directive is of interest. While in Europe, artificial fertiliser was carved out of strict legislation on the basis of fertiliser’s ability to be controlled with scientific precision, Teagasc researchers were at the same time returning to their soil surveying roots, arguing that Ireland’s soil, climate, and grassland agri-ecosystem, made it naturally able to absorb more nitrogen.

The focus on nitrates as both a source of human health issues and of eutrophication within the directive was also exploited by Ireland’s agricultural industry. While eutrophication in marine environments was driven by nitrogen and was very visible in several European nations bordering the North Sea, the Baltic, and the Mediterranean, freshwater eutrophication was a much more visible issue in Ireland, beginning with the lakes in the border region in the 1970s. In Ireland, the loading of phosphorus in soil was consistently talked about as the driver of eutrophication from 1997 forward. Litigation around nitrates through the Directive was instead more characterised as a risk for human health, such as through their associations with blue baby syndrome and cancer. While Angela Nugent, reporting to the *Farmers Journal*, discussed eutrophication in estuaries by nitrates, Ireland’s marine waters were not often taken into consideration.¹⁶⁵ Though nitrification of drinking waters was then and remains an issue in Ireland today, with 37.5 per cent of Ireland’s

¹⁶¹ Roche, Richard, ‘Written Answers.’ Col. 758-61.

¹⁶² Marie Sherwood, ‘Nitrates in Water:- Do Irish Farmers Have a Problem?’, *Irish Farmers’ Journal* (Dublin), 5 August 1989, 19.

¹⁶³ Ibid.

¹⁶⁴ Ibid, 18.

¹⁶⁵ Angela Nugent, ‘EPA Reports on Water Quality’, *Irish Farmers Journal*, 26 June 1999, 34.

groundwater monitoring stations reporting an increase in nitrates as of 2022, the different forcing of freshwater and marine eutrophication weakened the focus on nitrates, as Irish people were more likely to experience phosphorus-driven eutrophication.¹⁶⁶

Throughout the 2000s, the derogation replaced ‘one cow per acre’ as the all-or-nothing cause of the agricultural associations. When Teagasc agreed to a programme that would implement the Nitrates Directive, including its 170 kg/ha limit, in 2006, with promises to negotiate a derogation later in the year, the IFA and Macra na Feirme both pushed back against the programme, with the IFA deciding to cease cooperation with the research body.¹⁶⁷ In 2007, an agreement was finally reached, which would give farmers the ability to apply to the Irish government for a derogation to apply up to 250 kg/ha if they could show that at least eighty per cent of their farm was under grass. The justification for this and continued renewals of the derogation every four years has been based on the fact that Ireland’s high levels of rainfall and narrow temperature range led to a long grass growing season that would be able to absorb a greater amount of nitrogen on an annual basis.¹⁶⁸ While there is no reason to dispute this research on its own, the derogation and its subsequent renewals were also based on the fact that Ireland’s derogation was not impinging on the goals of the Directive, that sixty-seven per cent of Ireland’s land was farmed extensively and that Irish waters were “of generally good quality.”¹⁶⁹ In 2018, only 4.9 per cent of Irish farms availed of the nitrates derogation, representing 9.7 per cent of Ireland’s agricultural land, meaning that it cannot be assumed that the overall pattern of Irish agriculture or water conditions reflect this small minority.¹⁷⁰

The collapse of organic nitrogen and fertiliser nitrogen into a single figure by Irish researchers since 1989 revealed the false dichotomy in the Nitrates Directive that allowed fertiliser to be regulated more loosely than animal manure. However, this differential treatment was itself a weakness of the Directive, which the Irish state exploited to dismiss all the negotiations and research behind the 170 kg/ha limit in favour of a higher limit to nitrate spreading that has since benefited less than five per cent of the nation’s farmers. The cooperation of the European and Irish governments with industrial associations, from the EFMA to the IFA, served to dilute and delay the Directive at every step of the way by weakening regulatory limits and taking a scattershot approach to implementation.

Agri-environment schemes like REPS, while well-intentioned and beneficial to many small

¹⁶⁶ European Commission, ‘Decision Granting a Derogation Requested by Ireland’.

¹⁶⁷ Sean Mac Connell, ‘Teagasc Agrees Guidelines on Nitrates Directive’, *The Irish Times*, 2 March 2006.

¹⁶⁸ European Commission, ‘Decision Granting a Derogation Requested by Ireland’.

¹⁶⁹ *Ibid.*

¹⁷⁰ *Ibid.*

farmers, represented one of these partial implementation strategies and further served to develop a new image of the Irish farmer, as both an environmentally conscientious steward of heritage and an economically vulnerable business owner sensitive to operational limits. This has resulted in the contradictions that define Irish agriculture today: an image of an environmentally sound and ancient rural landscape used for tourism and marketing that coexists with, and bolsters, the environmentally destructive impact of the industry's largest and more intensive producers. While appearing in the abstract as a kind of multifunctional countryside, these patterns of land use break down along distinct economic and geographic lines. This modern/ancient and human/natural hybridity of Ireland's agricultural landscape emerges from an underlying colonial matrix of power that shapes relationships between the Irish state and people themselves with the land and one another. These hierarchies extend out from the more-than-human assemblages re-enacted as controllable pieces of an efficiency-focused factory farm to the economic disparity of small farmers masked with an idea of environmental and heritage stewardship. The merging of Irish agriculture's "green image" with its productivist intentions has widened Ireland's metabolic rift not only to fully encompass the pasture system, but the global reach of dairy and beef exports that rely on the mining of fossil fertiliser and the robbery of Ireland's capacity, through its land, water, and people, to sustain itself.

Conclusion

This thesis has clearly demonstrated the ways in which the image of rolling green pasture which today serves as the emblem of Ireland's nature and heritage was purposefully constructed since 1945 to advance an expansionist regime of Irish industrial farming. Despite the recurring appeals to nature and climate in the work of the National Soil Survey discussed in Chapter One, the promotion of silage by An Foras Talúnatis in Chapter Two, and the codifying of rural heritage through the REPS scheme in Chapter Five, this ecological arrangement did not emerge as a 'natural' extension of Ireland's climate or its soil, but as the result of a purposeful effort by the government to reorganise Ireland's agricultural ecology around grass as the "raw material" of industrial Irish agricultural production, with fossil-dependent synthetic nitrogen fertiliser as its feedstock.

This thesis has shown that the consistent focus of the postwar expansionist regime, as expressed through its policy, research, and educational institutions, was increasing Ireland's carrying capacity for livestock. This first came as an effort by the NSS to apply the international lens of soil science to define what Ireland's soil was suited to profitably producing, recommending that farmers apply phosphorous and lime to bring the soil to its optimum state of production. Once these optimum phosphorous levels were seemingly achieved, the government supported a new kind of plastic carrying capacity centred around artificial nitrogen fertiliser. As shown in Chapters Two and Three, this meant financial support for the manufacturing of fossil-fertiliser with natural gas piped from under the Celtic Sea and the reconfiguration of Ireland's pasture assemblages around ryegrass and silage, technologies that relied on ever-increasing applications of nitrogen. This fossil-feedstock fuelled Ireland's growing global export trade, not only of beef and dairy products but of nitrogen fertiliser itself, exported to fuel other Green Revolutions across Europe and Asia in a twentieth-century version of the metabolic rift and robbery farming practices that Marx and Liebig experienced in Ireland more than a century previous.

This thesis has also explored how the permeability of the agricultural landscape and the tendency of nutrients, bacteria, plants, and animals to act outside what the postwar productivist frame required of them caused this new abundance of fossil-fertiliser energy to spill out into the larger Irish environment in the form of effluent, slurry, and creamery waste. The resulting fish kill crisis discussed in Chapter Four required the adoption of a third kind of carrying capacity, the 'assimilative capacity' of Ireland's rivers, re-enacted through water quality models as a tool to mop

up after Ireland's industrial farmers. Environmental organisations and state bodies promoted this eco-efficiency view of environmentalism, despite a groundswell of public concern in the 1980s around the pollution of Ireland air and water by intensive agriculture. Through the 1980s fish kill crisis, the eco-efficient concept of assimilative capacity was combined with Ireland's productivist agricultural sector to re-enact not only the farm, but its rivers and estuaries as well as a kind of factory whose excess waste was no longer a pollutant but a byproduct to be efficiently recycled.

This reconfiguration of Ireland's agricultural landscape in the second half of the twentieth century had not only environmental but social consequences. As shown in Chapter Two, Irish farmers faced dire financial circumstances that made many reliant on off-farm incomes and forced others into imperfect and environmentally hazardous efforts to modernise their operations. The thesis has shown, in Chapter One, how the financial and productivity divisions between the West of Ireland and its South and East were reified by the National Soil Survey categorisation of soil as having a narrow or wide ranges of use. This divide was later reorganised, as shown in Chapter Five, around the division between the "green image" of Irish agriculture, preserved by small Western farmers that relied on European agri-environmental schemes, and the export-oriented productivism promoted by the agricultural associations fighting against the European Nitrates Directive.

Taken together, this thesis tells the story of the hidden industrialisation of Ireland's pastures, a regime which led to the deterioration of the island's water quality, loss of terrestrial, aquatic, and avian biodiversity, the demographic hollowing out of rural communities, and the nation's continued impact on the disruption of global carbon and nitrogen cycles.

I. Toward Repair

Presented in this way, a list of all the things uncovered and deconstructed in the preceding pages, piled at the reader's feet, the thesis appears as what Eve Kosofsky Sedgwick referred to in her book *Touching Feeling* as a "paranoid reading" of Ireland's agricultural modernisation. This paranoid position, as Sedgwick explains, imbues the critical act of revelation and deconstruction with a kind of power of its own, imagining that if the underlying machinations of heteropatriarchy, fossil capitalism, or coloniality are revealed, they will stop, or at least the revelation will stop their continued blows from hurting so terribly.¹ But revealing that Seán Lemass didn't care for "incompetent lazy and farmers," that the Fertiliser Association of Ireland never worried that REPS would reduce fertiliser use, or that the president of the IFA jokingly evoked Cromwell as a positive

¹ Eve Sedgwick, 'Paranoid Reading and Reparative Reading, or You're So Paranoid, You Probably Think This Essay Is About You', in *Touching Feeling: Affect, Pedagogy, Performativity* (Duke University Press, 2003), 144.

foil to the tyranny of European regulation, does not stop similar actors from inflicting similar harms today, nor does it make these past and present harms less painful.²

In *We Have Never Been Modern*, Latour was similarly sceptical of the postmodern faith in deconstructing false modern promises, asking whether it has been “really worth destroying everything to end up adding this insult to that injury?”³ But Latour’s alternative was not a ‘return’ to a fictive premodern ideal, but a reimagining of the paranoid work of postmodern deconstruction as positively constructive, not disentangling these hybrids of human and nonhuman agency but rediscovering and relishing our entanglement.⁴ Sedgwick’s alternative to paranoid reading was similarly constructive and, importantly, reparative, using the research process to seek fragile fracturing hope and seeing research subjects as “once good, damaged, integral, and requiring and eliciting love and care.”⁵ The work of environmental history is well suited to reparative reading, seeing its subjects not as heroes or villains but as complex actors embedded in social, political, and environmental assemblages. After all, this thesis has not shown Ireland’s green pastures to be only a simulacrum, instead it has depicted a tangled web of more-than-human action, conflicting human desire, and beautiful, sometimes tragic, stories.

This thesis has attempted to go beyond critical deconstruction to explore the pathos and care of its research subjects, from the curiosity and passion which scientists like Tom Walsh and Charles Nolan brought to their research, to the lovely difficult stories shared by the O’Brien and Roche families through their oral history interviews. Even Angela Nugent, as the inadvertent voice of so much of this history through her reporting for the *Farmers Journal*, has become a player in this history, her reporting evolving alongside the national conversation around the rural environment.

Reading the work of AFT scientists to reveal, not only the underlying politics of their research, but the stories of the non-human actors in the pastures they studied is a kind of repair practiced throughout this thesis. Reading Roger McCarrick’s work through Law and Mol’s framework of more-than-human assemblages allowed the thesis to show how, even in seeking to make silage systems more efficient and economically productive, he painted a complex portrait of interaction between grass, water, cattle, and bacteria. Sedgwick teaches that even less-flattering

² Lemass memorandum, Department of the Taoiseach S13101A. Paragraph 9-13. Qtd in Horgan, *Seán Lemass: The Enigmatic Patriot*, 114; Rath, ‘Impact of REPS on Fertilizer Use’, 6; Dillon, ‘One Cow per Acre’, 8.

³ Latour, *We Have Never Been Modern*, 131-2.

⁴ Ibid, 134.

⁵ Sedgwick, ‘Paranoid Reading and Reparative Reading’, 137.

historical portraits, like Seán Lemass's cover for *Time Magazine* (Fig. 2.1), can be repurposed to elicit a camp kind of surprise and joy in their whacky wickedness.⁶

This reparative perspective strengthens the decolonial frameworks of the CMP and the metabolic rift that run through this thesis. A solitary focus on the material traces of colonialism can lead to similarly paranoid readings of contemporary Ireland, pulling back the curtain on data centres, intensive dairy farmers, and the six counties as if this revelation would spark a revolution on its own. But by paying attention to the underlying ontological coloniality, the thesis focuses instead on broken relations that, while following invented hierarchies, are more importantly in need of repair. The revelation that air pollution generated by the NKMP factory came from a contract for the incineration of British trash is shocking. However, it is not the reflection of Ireland's earlier colonial history, but the underlying idea of pollution's coloniality articulated by Liboiron that points us toward the wound in need of attention. The colonial arrangement in this instance of pollution is not the political relationship between two states, but the hierarchical instrumentalisation of nature as an assimilator of waste that allows that political relationship to make sense.

Reading these histories with the intention of unpacking hierarchical understandings of nature, gender, and race calls us to heal the legacies of colonialism and its progeny. This unseats the instrumentalising view of nature adopted throughout Ireland's expansionist economic project as the default view, showing it instead to be one of many ways of looking at these multispecies assemblages.

II. Artistic Research

The incorporation of artistic practices within research opens the possibility to go beyond a theoretical reading of Sedgwick's in order to develop a creative vision of repair, both in Ireland and in the global context of the metabolic rift. As one of the most successful examples of the artist-as-researcher, the work of musician Björk Guðmundsdóttir is well suited to defining a vision for Ireland's twentieth-century metabolic rift. The "heart wound" concept first elaborated by Björk in 2015 unites the theoretical and the personal, lyrically connecting a personal struggle with the dissolution of the artist's family to larger societal rifts in hierarchies of gender and nature.⁷ Björk argues that these rifts need attention and care to heal, but like Sedgwick she also argues that their

⁶ Ibid, 150.

⁷ Björk Guðmundsdóttir, *Vulnicura*, 20 January 2015, Music; Björk Guðmundsdóttir, *Utopia*, 17 April 2017, Music.

pain can be generative, a source of care and connection.⁸ Like the heart wound, the metabolic rift requires close attention to the metabolic practices of agricultural and extractivism in order to heal, the careful and generative recycling of nutrients called for by Liebig.⁹ But, as Björk posits, the pain of extraction and of robbery can also be a source of connection and of mutual liberation.

Clark and Bellamy Foster, along with Edward Melillo use the metabolic rift of artificial fertiliser to link the robbery of soil in British imperial farming with the extraction of nitrates from South America and labour from coerced Chinese workers.¹⁰ This thesis has argued that Ireland's metabolic rift has become a global wound, encompassing the fossil energy sources of nitrate fertiliser, the Global South sites that relied on NET fertiliser from beneath the Celtic Sea, and the countless supermarkets around the world stocking Irish butter and beef. The heart wound image allows for this network of extraction to be reimagined as a collective injury with countless potential sites for mutual healing, connection, and liberation.

The growing use of artistic research as a methodology in Ireland has allowed the work of this thesis to spill out into new questions and new audiences. Recent works by playwright Luke Casserly and artist Eimear Walshe show the potential of looking at the history of the Irish environment through a creative lens.¹¹ Walshe uses camp portrayals of characters from modern Irish history, like the Land League and Shergar, to articulate a queer relationship to land, while Casserly uses scent and sound to bring theatre audiences into the post-industrial landscape of cutover peatlands as a place of beauty and community.¹² Dierdre O'Mahony, whose transcribed *Sustainment Experiments* serve themselves as oral histories of agricultural intensification, has taken a similar approach to the issues surrounding Irish agriculture, reimagining both the field and the gallery as places to feast and share stories, connecting people to land and to one another.¹³

The film *Handiwork* and the multimedia installation *Spillage*, developed during the research process for this thesis, have served as artistic research experiments in what the archival material assembled for the thesis can do when approached through creative disciplines. *Handiwork* began as an effort to use music and film to explore eutrophication from an emotional perspective.¹⁴ This involved writing lyrics on how an atmospheric nitrogen molecule might feel being split apart

⁸ In *Vulnicura*, Björk writes "Don't remove my pain, it is my chance to heal." In *Utopia* she sings specifically of exchange and solidarity, writing "My healed chest wound transformed into a gate where I receive love from. Where I give love from," Ibid.

⁹ Foster and Clark, *The Robbery of Nature*, 1-3.

¹⁰ Foster and Clark, *The Robbery of Nature*; Melillo, 'The First Green Revolution', 1028-60.

¹¹ Gabriel Coleman, 'Broken Pieces of Earth', NiCHE Canada, *The Otter*, 19 September 2024.

¹² Eimear Walshe, *The Land Question*, 2020, Film; Luke Casserly, *Distillation*, 2023, Play.

¹³ O'Mahony, *Sustainment Experiments*.

¹⁴ Coleman, *Handiwork*.

into nitrate or held tightly by water molecules, and montaging together human and nonhuman perspectives from archival and original footage to experiment with how they might visually and musically harmonise. Much of this creative work has resurfaced in the thesis, through the prominence of more-than-human assemblages in the narrative and the importance of foregrounding first-person perspectives from both oral history interviews and archival sources.

The ongoing *Spillage* project continues the exploration of more-than-human perspectives through creative media while also playing with the conventions of archival and historical work itself.¹⁵ The project has involved making a series of multispecies archival documents that reappropriate archival material gathered for the thesis into new more-than-human portraits of the Irish agricultural landscape (Fig. 6.1). This starts with handmade paper, made from ryegrass, clover, flax, and bog cotton which is then dyed with photosensitive cyanotype chemicals so that archival images from Ireland's agricultural intensification can be collaged on to them through exposure to the sun and water.

¹⁵ Gabriel Coleman, *Spillage*, 2025, Print, dimensions variable.



Figure 6.1: Cyanotype print made as part of the Spillage project. The print collages together illustrations from Bord Gáis's 1982 Irish Times editorial (Fig. 3.4), a graph of grass growth patterns from the 1992 AGMET report on farming and weather, and original illustrations of nitrate molecules on paper handmade from ryegrass and linen. Source: Gabriel Coleman, *Spillage*, 2025.

The project has involved making these prints with members of the public, participants collaging their own prints at workshops in Mayo, Galway, and Dublin from the archival material amassed through the creation of this thesis. These workshops ask participants not only to interact and collaborate with the more-than-human actors within Ireland's rural landscape, but to work with a historian's tools, curating the past to imagine a new portrait of what Ireland's landscape can be. Aside from the prints themselves, the process itself has been generative: prompting questions from participants about clover and cows, suggestions on how to incorporate more natural elements into the prints, along with stories and memories of rural life in Ireland and further afield.

These artistic research endeavours allow the reparative impulse at the core of this thesis to come into its own, putting this difficult history out into the world for people to play with, react to, and build upon. The fracturing fragile hope at the root of these projects is that by telling and sharing these stories, by really diving into the metabolic rifts, the matrixes of power, and the hybrid networks that connect us to this landscape, we can try to repair and reassemble this island's broken

pieces.¹⁶ This thesis ultimately calls for us to articulate a new kind of carrying capacity, one we can read into the land as well as ourselves: a tangled assemblage, a delicate web of action that somehow carries us all.

¹⁶ “There is a swarm of sound / around our heads / and we can hear it / and we can get healed by it.”
Björk, *Vulnicura*.

Appendix: NuReCycle Oral History Project Forms and Transcripts

I. NuReCycle Oral History Information and Forms

NURECYCLE ORAL HISTORY INTERVIEWEE INFORMATION

Adapted from the Oral History Network Ireland's sample interviewee pack and forms

Project Aim

NuReCycle is an interdisciplinary postgraduate research programme based at Trinity College Dublin. The programme combines the disciplines of engineering, botany, microbiology, and history in order to develop new practices of nutrient recycling and recapture in agricultural operations.

The NuReCycle Oral History project contributes to this larger research programme by **working to understand changes to farm practices relating to fertilisation and grass conservation as well as on-farm perceptions of environmental and landscape change**. The project will record face-to-face interviews with farmers, farm workers, and family members from across Ireland to understand their personal relationship with their land.

It is hoped that sections from some of the interviews will be used as primary sources in a graduate thesis on Irish agricultural modernisation in order to add farm-community voices to a historical subject that has been previously discussed from a primarily government-focused perspective.

What is Oral History?

Oral history is the gathering and recording of people's memories and opinions. It enables us to see the human side of historical events, rather than relying solely on books and records. It also allows us to challenge assumptions about our recent past by asking direct questions to people who lived through those times. **Oral history is particularly valuable because we can seek out the views of all elements of society, including people that are often left out in general history books.** There are challenges - people's memories can be flawed, or they may not feel able to talk openly about certain things - but in conjunction with other historical methods, oral history gives us a much richer understanding of our recent past.

What happens during the interview?

Gabriel Coleman, Lead Researcher, will come to visit you (see appointment details below). The interviewer will have a hand-held recorder which will be used to record the interview. The interview will be more like an informal chat, but should take place in a quiet room free from distractions, if possible. You are welcome to have a family member or friend present during the recording.

The aim of the interview is to record your memories in your own words. Stories, anecdotes and asides are all welcome, **the purpose of the recording is not to gain a formal history of agricultural modernisation, but to learn about your personal experiences of life as a livestock farmer.**

We are also hoping to collect photographs and documentation relating to farm practices (farm records, journals, etc.). This material does not need to be given permanently, we are happy to take it on short-term loan, copy it and return it to you. If you have any material that you think would be of interest to us, please do let us know.

What happens to your contribution?

In the short-term your contribution will be stored on a password-protected hard drive and sections from it may be made accessible to the public as part of a graduate thesis or other NuReCycle publications. In the long-term we would hope that copies of the material would become available to researchers **if a suitable Irish Oral History archive is established**. The material collected may be used in the following ways:

- o Public performance, lecture or talks.
- o Use in publications, including print or online digital audio or video.
- o Public reference purposes in libraries, museums and archives.

Permission to use your recordings:

Before we begin recording you will need to read and agree to sign a participation agreement attached below. **This only gives us permission to record the interview and not to do anything with it.** After the interview you will be asked to sign a recording agreement also attached below. Signing this form means that you are allowing NuReCycle to use your interview in the ways listed. This also means that you are giving copyright of this material to the project, on the understanding that it will not be used in a derogatory manner and that you will be correctly identified in all uses of it. If you have any questions about this or would like to retract any of these permissions, please do not hesitate to contact Gabriel Coleman in advance of your interview.

Appointment details (if you are no longer willing to participate please let me know)

Time:
Date:
Location:
Name of Interviewer:
Interviewer's Contact:

Data Protection Statement

This project is being conducted by Gabriel Coleman, on behalf of Trinity College Dublin. In addition to the details listed above you can also contact me at colemaga@tcd.ie to discuss aspects of your contribution to this project. As outlined within the documentation below your personal contact details will be stored and used in accordance with the General Data Protection Regulation and the Data Protection Act, 2018.

We collect your personal data for the purpose of creating an archival collection that will facilitate historical research and inquiry for generations to come. This is permitted under Article 6 GDPR which allows us to collect data where processing is necessary for the performance of a task carried out in the public interest. When the interview is completed you will be asked to sign a Recording Agreement (below) to give us permission to include your interview as part of the project archive. If you do so you are agreeing that we can permanently retain and securely store your personal contact details as part of the

project. These details will not be shared with anyone unless we are obligated to do so for legal purposes, such as evidencing ownership or demonstrating a valid Agreement.

Your personal data (address, email address, phone number) will only be used by the project team to follow up with you about issues relevant to the recording agreement, to seek clarification or further details about aspects of the recording and to update you if any of the project terms and conditions change significantly. If you sign the Recording Agreement below without restrictions your named, recorded interview will be made available in the ways listed as a permanent resource for historical research now and in the future.

Under this legislation you have the following rights in respect of data processing – the right of access; the right of rectification; the right to restrict processing and the right to object. If you have concerns about your rights you can contact the Gabriel Coleman by email at colemaga@tcd.ie. If you are not satisfied with our response or believe we are not processing your personal data in accordance with the law, you can complain to the Irish Data Protection Commission. For more detail visit <https://www.dataprotection.ie/>.

Participation Agreement

The purpose of this form is to ensure that you are happy with all aspects of your participation in our project as outlined in the information leaflet you received. When you sign this form you are agreeing to take part in a recorded interview and you are allowing us to store and make use of your responses and personal data now and in the future in order to administer and archive your interview. **Signing this form does not give us any rights to publish or disseminate your responses.**

After the interview we will ask you to complete a Recording Agreement to formally give us permission to use your recorded interview for the purposes of our research project, to make it accessible online and to archive it for future generations. It will also give us rights to publish or disseminate whole or stand-alone sections of your interview.

NuReCycle Oral History Project

This project aims to understand changes to farm practices relating to fertilisation and grass conservation as well as on-farm perceptions of environmental and landscape change. The project will record face-to-face interviews with farmers, farm workers, and family members from across Ireland to understand their personal relationship with their land.

Your Personal Data

New data protection legislation (the General Data Protection Regulation [GDPR] which came into effect on 25 May 2018, and its implementing legislation, the Data Protection Act 2018) has changed the way in which we inform you about how your personal data is stored and processed, and how you can get access to it.

What will we do with your responses?

If you agree to participate in our project a member of the project team will arrange a convenient time to meet you to record an interview with you. Audio recorders will be used. You will be named on the recording as the interviewee. **By signing this form you agree to participate in a recorded interview where you are identified.** When the interview is complete we will ask you to sign a Recording Agreement to allow us to use your responses in a range of different ways outlined on that form. If you wish to review your interview before signing the recording agreement we will send you a copy of your interview to review and you can also request restrictions to the future uses of your interview at that point. You do not have to sign the recording agreement if you decide after the interview not to continue your participation in the project and even if you do **you can still withdraw your interview up to 2 week after the interview if you so choose.** If you do your response will be deleted in its entirety.

What will we do with your personal data on this form?

The data contained within this form will be held securely and not shared with anyone unless we are obligated to do so for legal purposes, such as evidencing ownership or demonstrating a valid Agreement. Your personal data will only be used by the project team to follow up with you about issues relevant to the recording agreement, to seek clarification or further details about aspects of the recording and to update you if any of the project terms and conditions change significantly.

You can withdraw from this project entirely by notifying us by email to colemaga@tcd.ie until the final date to withdraw from the project provided below. After this point your interview will become part of

the project archive and may be used in whole or in part in the ways outlined on the recording agreement.

Your agreement to take part

This Agreement is made between you (“the project participant”, “I”, “the interviewee”) and the NuReCycle Oral History Project:

Your name:
Your address:
Your email:
Your phone:
Date of recording:
Final date to withdraw from the project:

Declaration

I hereby agree to take part in an interview for the NuReCycle Oral History project and to allow the project’s researchers to process my recorded responses. I am fully aware that I will have an opportunity after the recording to consider whether to sign the associated Recording Agreement allowing my full interview to be made publicly available subject to any closure or restrictions that I might request.

Signed:

Name in block capitals:

Date:

Recording Agreement

The aim of this study is to understand changes to farm practices relating to fertilisation and grass conservation as well as on-farm perceptions of environmental and landscape change. Having already agreed to participate in an interview with the project team as indicated by your 'participation agreement', **this form asks that you now give us permission to add your recording to our project archive, where you will be named and identified as the interviewee.** You may add any restrictions or conditions to the future uses of your interview in the space provided below.

This Agreement is made between you ("I", "the interviewee") and the NuReCycle Oral History project:

Your name:

Your address:

Your email:

Your phone:

in regard to the interview which took place on (date(s)):

Declaration:

- I, the interviewee, confirm that I have read and fully understood the information leaflet sent to me outlining the details of the NuReCycle Oral History project.
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II. Transcript: Owen Roche, NuReCycle Oral History, Monaghanrim, Co. Carlow

Gabriel Coleman: [00:00:00] Just so I can have your levels, can you tell me what did you have for breakfast this morning?

Owen Roche: For this morning, I had some porridge and toast. That's my breakfast.

Gabriel Coleman: Just making sure it's picking you up. Yeah.

Owen Roche: So all this development here was done since, uh, all this was done since 2008.

Gabriel Coleman: These buildings?

Owen Roche: These buildings, yeah. So, uh, this was the bomb shed, that was the first one that was put up in the early 70s. And, uh, that wasn't, that was done without any grant aid from government or anything. But these buildings here were put up with grant aid. It was done in two stages, the first part of that shed was done in 2008. And the second extension was done and the silage pit in 2018, ten years later.

Gabriel Coleman: Okay. And did [00:01:00] you have any silage infrastructure?

Owen Roche: No. Before that we didn't have any silage infrastructure. We made hay. That was the sole, uh, feed for the cattle.

Gabriel Coleman: Up until 2018?

Owen Roche: No, no, until, until 2008. So we switched over around 2008 to making silage.

Gabriel Coleman: Mm hmm. And these are all the cows?

Owen Roche: These are the cows. This is just where we're standing here. This is where the old dwelling house was. I'll show you a picture of that on the wall inside. My sister Sue, she painted it, exactly from a picture, from a photograph.

So we, when we have extra grass, we make some silage bales that if we have a dry summer, that we may have to feed the stock in the summer, we store that there. But now, the main feed is kept in the silage pit. And [00:02:00] our enterprise here is, uh, suckler cows uh, to weanling. We sell the weanlings at nine to ten months.

We calve down from January to, uh, the end of February. We're trying to tighten that up, but that's the calving period. And then from that then, They grow on grass with the, with the mothers, the cows, and, uh, we sell them off to cows in, uh, October. Okay.

Gabriel Coleman: Okay. and beef cattle?

Owen Roche: All beef, all beef cattle, yes.

Gabriel Coleman: I don't, yeah, I've got, uh, most of my experience is all with vegetables, so. So the logistics of, of animal husbandry, you might have to explain a bit for me, as we go.

Owen Roche: Yep, no problem. Originally we had, because when I started, I had a small dairy herd. Yeah. And, uh, [00:03:00] because of where we're located, uh, we were giving the milk to Glanbia, but Glanbia could not come up the roadway. Yeah. So we used to have to bring the milk down to about three kilometers down the road. Okay. But that, that wasn't feasible over time. If you wanted to develop into a sustainable it wasn't feasible, so we switched out of the dairying and started to build up a suckler herd.

Yeah. So now it's predominantly limousine suckler cows. Okay. And, uh, we have two limousine bulls, which, uh, they're used for putting the cows in calves.

Gabriel Coleman: Mm hmm. Um, and so, when did you start? Because you were saying that Uh, when, when your dad brought, bought the farm, was it dairy or?

Owen Roche: Back then it was just tillage and, uh, dry stock as well.

Gabriel Coleman: Okay. And do you know what [00:04:00] kind of tillage they were growing?

Owen Roche: Normally it was just spring barley, spring crops. Spring barley, spring wheat, and oats. Back in those days.

Gabriel Coleman: And that would have been all the All the field would have been used-

Owen Roche: Only fields that could be. Some of the fields weren't suitable for growing crops. So they were left in grass. Okay. But anything that was suitable for growing crops, yeah. They were used.

Gabriel Coleman: yeah. Do you want to walk out to one of the -

Owen Roche: Yeah, but these are last year. These are, These are the remainder of the weanlings we sold in last October. They were the last born ones so they were a little bit too light to sell. So we keep them and we sell those in April. We let them put on some extra layers. So there's some bulls and these are some heifers.

Gabriel Coleman: And they would be indoors?

Owen Roche: [00:05:00] Indoors. We bring them indoors in- This year we had to bring them in about three weeks earlier because of the weather conditions. But normally we bring them in the

middle of November and house them then right through to 17th of March, depending on the weather. So, on this side then, this is the calving pen, so when a cow is close to calving, when we watch them and they're almost ready to calve, we'll bring them over here in case we have to handle them, to help them calve. And it's easier to handle them, we have headlocks, for safety, so that we can catch the cow in it, and if she needs a hand then we can assist.

Gabriel Coleman: They're gorgeous little cows.

Owen Roche: They're just born this week. Oh. And this one is due to cast in their calving over the weekend. This one.

Gabriel Coleman: Okay. So you're watching her? So when they're [00:06:00] housed indoors, they would get a mix of silage?

Owen Roche: Silage. Pure silage.

Gabriel Coleman: As well as meals?

Owen Roche: Only when they calve. Up to when they calve, it's pure silage. were just trying to maintain them. We're not trying to put condition on them, right?

Gabriel Coleman: Meaning have them gain.

Owen Roche: Yes. And then they would go out to then to go back around the pasture around the 17th of March okay, and there will be out there will be out then for all summer. As I say then we bring them in in November depending on the weather.

So all this area now was developed as part of the second stage in 2018. With the, with this part of the shed.

Gabriel Coleman: Yep. Yep. And the big apron and the silage.

Owen Roche: And the silage and a storage for, uh, the waste. Yeah. For dung from the cows.

Where we [00:07:00] store that on. And then we have tracks all through which feeds it back into the tanks underground. You can see, they're almost full now. But, uh, that tank is eight foot deep. Okay. So, uh, that holds all the winter effluent from the cows.

Gabriel Coleman: Mm hmm. Mm hmm. And then You'd, uh, bring it up and spread it back on the fields? grassland. And that would be in the spring,

Owen Roche: Bring it up and spread it out onto grassland.

Gabriel Coleman: And that would be in the spring or?

Owen Roche: Well, in our case, we wait till, uh, end of March. And then we put it out. When the land dries up, we put it out for silage.

Gabriel Coleman: Okay. Um, and then the, the silage affluent would also be, flow into the -

Owen Roche: Yes that all comes back, flows into here.

Gabriel Coleman: Yeah. Okay. That's another chapter I'm excited to write is about, about the transition from hay to silage. Yeah. Which, um, you know, [00:08:00] I'm sure we'll talk about with the land itself here. But when it was first kind of taking off in the seventies and eighties, farmers were building silage pits, but didn't have these drainage systems. And so it's going straight into rivers

Owen Roche: and it's going into rivers and everything

Gabriel Coleman: Um, so the idea here is that you have the silage pit here. But because it's all concrete? Yeah. It all flows in to the drain.

Owen Roche: It, you can see an apron around there, which is a, a groove, and then it's piped all the way underground into here.

Gabriel Coleman: Um, and all the grass that you're using for silage is your own from the different fields. Okay. Um, great. And so this is the forestry? That's the

Owen Roche: That's the forestry running down beside our, beside our land. So it's very close. So, recently what we see is, we see a big increase in the population of deer in this area. And it's [00:09:00] becoming a problem for farmers because, uh, uh, it's blamed for, uh, TB reacting in cows and so forth. So it's becoming a big problem. Like we never 20 years ago, you would never see a deer in this part of the country. And just last, uh, before Christmas, I went down beside the river and there were 13, I was eating the grass.

You know, it's just a big increase in the amount in just a few years. Yeah. So we use our own slurry tank for spreading the slurry on the, on the land.

Gabriel Coleman: And how long have you had that?

Owen Roche: We have that, uh, ten years.

Gabriel Coleman: Okay.

Owen Roche: Before we got the, the tanks in. It was all spread with a dung. It was like just dung and then spread with a side spreader.

But since we put in the tanks [00:10:00] for the slurry, then we purchased the tank for spreading it.

Gabriel Coleman: And this 2008 grant that helped you build out all this, what was the grant program?

Owen Roche: It was called TAMS 1.¹ So now we're in TAMS three. Okay. So, uh, we used, uh, TAMS 1 for the first part of the shed.

We, and you can actually see the first part of the shed comes to there. And then the new part comes here. So we used TAMS 1 and we got 60% covered by the government. And then we went TAMS 2 and we got 60% covered by the government as well. That helped, like. If you didn't get that, you wouldn't be able to put up those sheds.

Gabriel Coleman: So when you were growing up, the house was where the silage bales are? Yes, just over there, yep. And then this would have been [referring to the shed and silage pit] just more field?

Owen Roche: [00:11:00] Part of field, yes. Part of field, yep.

Gabriel Coleman: And then, so when, when you started dairying Um, can you walk me through what that transition was like, from your memory, what you remember of it?

Owen Roche: Well, from dairying, uh, we had, uh, 16 cows. That's how it was there, and we had a bucket plant unit, if you've ever heard. It's not like the modern machines now, it's just, uh, you put up a vacuum, a pipe, and it's a vacuum pump. And then you have this bucket which you carry, and you just put the bucket, the teats up on the cow.

But then you have to carry the bucket to put it into the tank. Where all that has automated, now you don't have that anymore. But, uh, that was, so, I started then to make little paddocks. And, uh, that was when the [00:12:00] the kids were born. And after about five, six years I was, because I had an off-farm income as well to support it, because there's not enough land, uh, to get a full time job.

Gabriel Coleman: And what were you doing off the farm?

Owen Roche: Off the farm, I was working in a factory in Carlow, Láppla. And, uh, so I used to milk the cows before I went to work. And milk them when I came home from work.

Gabriel Coleman: And where would that, those first paddocks have been?

¹ Targeted Agriculture Modernisation Scheme, providing grants to farmers to improve or buy farm building and equipment.

Owen Roche: Just here. Just right here. Down one of these fields, yeah. This field here and the field up over the shed.

Gabriel Coleman: So they were growing barley, and then

Owen Roche: Switched over. Switched over then to just milk.

Gabriel Coleman: And in terms of how that transition happened, so did you re seed the barley fields?

Owen Roche: Yes. We just re seeded the barley field and [00:13:00] grow grass.

Gabriel Coleman: So with ryegrass and clover or what was the mix?

Owen Roche: No, just clover and permanent pasture. Permanent pasture, because we're still doing hay at that time. So we didn't go in for the new varieties of grass.

Gabriel Coleman: Right. And remind me about what time was this?

Owen Roche: This was back in the mid 80s. Mid 80s up to, up to say 92, 93.

Gabriel Coleman: Mm hmm. and is this still permanent, or is this still that same mix, or have you started re seeding?

Owen Roche: No, no, we, every year we try to re-seed with better species and all, maybe we do five acres per year. Uh, to keep the grass, uh, up that's producing to the best it can. Now this field we're in. [00:14:00] There were actually four fields in this. So we took out, uh, boundaries, uh, and, uh, leveled it out. There was a lot of stone and things that we had to clear off, and we just got it into one field.

And that's my other son he's just built that house over there.

Gabriel Coleman: Okay. And, um, so when this, when you were transitioning this land over, um, is that when, so you had the paddocks and then later you had, you took out the hedgerows?

Owen Roche: Yes. During that time, we were, uh, trying to- The idea was to intensify and get more, more into the dairying.

And then my plan was that if I got set up in the dairying, I could give up the [00:15:00] job. Part time job and come back. But then, uh, with Glanbia, which is Tirlán now, uh, they would not, I couldn't develop enough, uh, they would not come to collect the milk at the house because of the roadway. And, uh, so that, that made the decision that we had to change.

Gabriel Coleman: Yeah, yeah. And how, how did that, I'm sure it was incredibly frustrating to put so much work into it.

Owen Roche: It was, it was. With the milk, like, with the enterprise we're doing now, you get a cheque once a year. Whereas with the dairy, you can get a cheque seven, eight to nine times a year. And that's the closest you get to, uh, an industrial job.

That you have money coming in all the time. Whereas when you get a cheque once a year, you have to spread that over twelve months and it's not so easy.

Gabriel Coleman: Right, right. [00:16:00] Um, and, uh, you were saying that the land down by, down by the river was drained. Did you also have any drainage up in this area?

Owen Roche: Not drainage here. No, because it's, it's actually self-draining because of the, the fall on the land. That, just down by the river, most of the draining, all the draining was done actually. Yeah. Yeah, yeah.

Gabriel Coleman: So it's a bit flatter down there.

Owen Roche: Yes, it is completely flat. We can see, without having to walk down the whole way, we can see it from down here at the bottom of this field.

Gabriel Coleman: yeah um, and there, would there have been any, in these hedgerows, would there have been any natural drains?

Owen Roche: There would have been old bunditches, there was a lot of fir bushes, a lot of rushes, all that type of scrub, you would say. Like, if you went down, uh, and tried to, say, at that time back in the day, you'd have cows going everywhere and you could spend [00:17:00] half a day or a day looking for a cow because she was just through all the scrubland.

Gabriel Coleman: So, um, let's see what I want to ask. Um, so I'm interested in the correlation between changing pasture species, grass species, and uses of the land, so for hay versus silage and the types of grass that you're putting down. Um, so when you're switching in 2008 or around then to, to make more silage did that change the, the way you were reseeding or?

[00:18:00] I guess how long was it permanent pasture?

Owen Roche: Uh, some fields here now are permanent pasture. So, what would I say? Going back to seventies. There are some fields on the farm that haven't been reseeded since the seventies. These fields, this field here was seeded in the early two thousands, and anything from here up was reseeded, down here was receded. The, the flat area that I told you that was, uh, reclaimed, uh, and drained. That hasn't been receded since, uh, the early 80s.

Gabriel Coleman: Okay. Okay. So there's quite a mix on the farm.

Owen Roche: Yes yes, It's got, there's old traditional, uh, paddocks. Mm hmm. And then there's new, [00:19:00] newer ones with new varieties of, uh, of grass seed. At the moment, we are introducing more clover into the pastures as we reseed, we're going, putting in more clover, and that's to do with the environmental.

Gabriel Coleman: Yes, yeah, yeah, to get some nitrogen fixation just from that. Yeah. Um, and so with the rotation of the cattle through the, through the land, when, when this was these smaller permanent pasture paddocks. Yes. Would you have just a, just a circular rotation through all the paddocks or?

Owen Roche: Yeah. When we had the old hedgerows in. Like you would use field here for three or four days or a week. And then move them into the next field for three or four days or a week. But then as the [00:20:00] numbers got up, back then it was easy because we had so few numbers. Mm hmm. But as the numbers increased the paddocks were so small, they were only suited for dairying. And for us, with the sucklers, uh, we needed bigger spaces. Yep.

Gabriel Coleman: And then for the haymaking, would you have?

Owen Roche: Yes, we save up. Now, because we're not into dairying, and dairymen, they like to cut silage from the middle of May on. But with the sucklers, we don't need that high, highest, um, say quality of silage.

We need a mixture of bulk and quality for suckler cows. And, uh, we, second week of, uh, June that's when we aim. So we save up, eh, the first or second week in April. We take all stock off the fields that we're going to cut silage. Yep. So, this field, [00:21:00] field up above, they will be used for silage.

So, when the cows come out on the 17th of March. They will graze this for three to four weeks. Then we will bring them down onto the flat areas down there. They will stay there for the summer. We will cut, save the sub. We will spread out nitrogen. And then we cut in June. Uh, three to four weeks after then, we can let the cows back up onto it when the grass regenerates.

Gabriel Coleman: -has recovered a little bit. And so when you're saying this difference between eh, quality in bulk in dairy versus sucler. Yes. You're saying you let the grass grow a little more.

Owen Roche: Uh, we let, we give, let grow a little bit more to get more bulk in it. Yep. And still try and maintain a good quality silage. But we don't need a real, uh, for producing milk like the dairy man.

Gabriel Coleman: Yeah, because uh, from what I've read, tell me if I've got this right, is, uh, that [00:22:00] when the grass is younger, it's more. Tastier and a bit more nutrient dense

Owen Roche: Yes, yes. And it, and it has more digestibility. Which the cows can, and that leads to performance on milking.

So this is now what I'm showing you. Yeah. There's the Slany River running down the along and the flat field down there. This is all, this area then is used in the summer for grazing.

Gabriel Coleman: Um, and this would also be reseeded.

Owen Roche: Yes. Now, this is the wood piece. If it's below that tree, our line, it comes down in a V and back. Our boundary goes straight down. But this is part of the wooded area. And here is part of the wooded area we saw on the map as well. Just through there.

Gabriel Coleman: And so when you were growing up, where you uh, this was just, um, bogland or-

Owen Roche: The flat down there was bogland, yes. Okay. And this was all, [00:23:00] this here was reclaimed as well. Uh, back those days. Uh, we, those big rocks. So, uh, we used to blast them with, uh, gelignite. We'd get in the contractors and they would drill holes in the big rocks and then they would blast them.

That was now back when, back before the troubles in, in Northern Ireland started, real big time when they put, uh, big controls on gelignite. But they used it. I remember, we'd come here and the guys would be drilling the holes and then a guy would come and you'd have one policeman just making sure you used all the gelignite that you had. That you wasn't keeping any. But, uh, all, all around here were all big rocks, and we blasted them. And they were all pushed back down into where the woodland is now grown up around to make grassland.

Gabriel Coleman: Um, and so what's it, I'm sure [00:24:00] there are politics around the river and around pollution and health of the water and stuff.

Owen Roche: Now we put very little, we stay back from the river when we're spreading either nitrogen or spreading slurry. Yeah. But we, because we're not intensive. We, as I said to you earlier, we don't spread our slurry until March, end of March. So, uh, and every, it's only every third year we spread slurry down on those fields anyway.

Gabriel Coleman: Okay. Okay. And has that changed over the years as different regulations have come in?

Owen Roche: Well, it's getting more and more, uh, regulated now with, uh, With the rivers. But, uh, from what we can see, uh, like that river comes through some towns up the, up the stream and we can see even here in the [00:25:00] years, that river was very clean all the way down along and you could see now there's an awful lot of growth of weeds in the bottom of the river and that's because of, uh, pollution. But it seems to be coming down, yeah. It seems to be coming down the river.

Gabriel Coleman: Yeah. And when did you first notice that change?

Owen Roche: I would say going back about 15 years ago. And before that it was like - I remember salmon, my father told me about salmon at sea. Fishermen put in those weirs, you see the way the water, they put in rocks across the river so that it creates air bubbles and the fish sit behind that and then they can fish them.

But he, he told me stories that you could see salmon two high behind those weirs. Now, salmon, I think last year there was about six caught in the whole fishing season down on that river.
[00:26:00] And I do remember back. In the 80s, when the salmon got this disease, it was called, and you'd go down and you'd see salmon rotting in the river. You'd see their tails falling off. You'd see. It was terrible. And, uh, since that, it never really recovered. Since those days with that.

Gabriel Coleman: Yeah, in the 80s, that's what I'm seeing quite a bit. Yeah. Um, in, in looking at the history. And, so when you put in the, the tiles down in this lower field.

Owen Roche: Oh yes, yeah. Um,

Gabriel Coleman: What changes have you noticed? In the river, in the land in-

Owen Roche: Well, that, that just takes, because that's such flat land all the rain water, everything flows off the hill down onto it. And it was kind of more like a soak. Uh huh. For all the water coming off all the fields.

Because [00:27:00] every field is, uh, water is going down towards that flat. So, there was a drain put along the side, on the inside, next to where the water comes down. And that was filled with stone, and then the pipes were just taken to the river. So other than that, it means that you can farm it now, before you couldn't because water was coming everywhere and it wasn't controlled. So, if you went in with a tractor you just sank down. You just get stuck.

Gabriel Coleman: You'd just get stuck. Um, would we be able to walk up to one of these areas that's still permanent pasture?

Owen Roche: Yeah, this field here now was permanent pasture. That one. This, that

Gabriel Coleman: That one we're looking at now.

Owen Roche: This one here, yes.[00:28:00] That's, that's never has been, uh, touched since the 80s. All we do is we put, as you can see the tracks on it. Uh, we put out some, uh, dung on it. Farmyard manure. Uh, and, uh. Because of the wet winter, where we never had springs, you see here, it's just tore up a little bit.

Because the springs are high this year. Yeah. And, uh, the water's very close to the top of the ground. But we just spread dung on this, and we put out some nitrogen, but that grass is permanent. Okay.

Gabriel Coleman: Yeah, I'm trying to get my, my eye trained. Do you, like, when you're walking around, or driving, like, can you tell the difference between

Owen Roche: Uh, not really. Yeah. You can only tell the difference if you have rye grasses in. Yeah. Rye grasses are a much tougher And, and, and, [00:29:00] and thicker stems on it. And that's, that's really for silage.

Okay. So you can tell that straight away with the leaf, it's a much bigger and broader leaf. Yep. But this leaf, as you can see, is a narrow leaf. And it's much thicker on the ground. And you'll see the same down there. Okay. Whereas the silage, the big dairymen now, they would, the leaves on their grass would be three times the size of that.

You know, and it says, it's ryegrass. Now, for us, that wouldn't work too well, because ryegrass, you do have to reseed it after a maximum of four to five years because, the intensive silage, if you're taking two to three cuts off it every year, just wears out the grass.

Gabriel Coleman: Yeah, so what kind of grass do you have planted here?

Owen Roche: This is just a mixture, a seed mixture of, uh, normal. Grass and some, uh,[00:30:00] normal, uh, when I say now what the mixture in it is, uh, this is perennial grass. Okay. Just perennial. Yep. It's not the ryegrass. Yep.

Gabriel Coleman: Um, and would you have ever used, like you said, you were, you've used different seeds over the years? Would you ever use ryegrass at any point?

Owen Roche: No, no, because. As I said, we're not one that intensive, and even when we were dairying, we were so small scale in it, like, no, we never got.

Gabriel Coleman: Maybe we can talk a bit about, uh, like nutrients and spreading [00:31:00] silage and, uh, nitrogen and, uh, manure, how that's changed over the years. Or if there have been changes.

Owen Roche: There have been changes, but it's really down to the mix they put into the different fertilizers. Like, from our 10-10-20 was an old stable mixture of fertilizer. And, uh, that is for years and years. Now that is when you would reseed. You would put out some 10-10-20 on it. You don't want a big flush of nitrogen in it. You just want P and K and a small bit of nitrogen. And that gets the grass to grow. When it gets up then, you need more nitrogen. So you would change from a 10-10-20 mix maybe to a 24-6½-5. So you can see the difference in the P and K [00:32:00] and the nitrogen. The nitrogen has gone way up. And that is to boost the grass for growth.

Gabriel Coleman: And would that also be different with more intensive farmers? They'd be using a lot more?

Owen Roche: Yes, they'd be probably using a lot more fertilizer. Yeah,

Gabriel Coleman: and nitrogen specifically or just -

Owen Roche: Nitrogen, yeah, mostly nitrogen to boost the grass.

Now they would put out, uh, probably a separate They would put out potash, uh and potassium maybe in, before, in October, November, December. Yeah. And they will come with a flush of nitrogen then in the springtime. Okay. Whereas we go once with fertilizer, we get the mix of nitrogen, P and K, together. Mm hmm. Where non intensive farmers will go with P and K, and then the nitrogen separate.

Gabriel Coleman: Yep. And you just take the [00:33:00] one, the one silage cut?

Owen Roche: We take the one silage cut.

Gabriel Coleman: But more intensive would, they would maybe do multiple.

Owen Roche: They could be doing up to two or three. Yeah, and,

Gabriel Coleman: Yeah and nitrogen between all of those.

Owen Roche: Yeah. And our stocking rate, this, this new thing that's out now about reducing the nitrates. Do you know anything about that coming down to 220 from 250? Right. And there's a big lot of.

Gabriel Coleman: This is the derogation.

Owen Roche: Yes, derogation. There's a big lot of emphasis on that now. But that is because you have dairy farmers, which went like from a hundred cows to two hundred, three hundred cows. And uh, so they put out so much nitrogen just to support that stock.

But now they're in trouble. And that has an impact because if I want to go rent a field. Uh, [00:34:00] I can only see the value of renting a field to be maybe 200 a year for a per acre. And then a dairyman comes in because he has getting his money nine times a year compared to me getting it once, he'll put 400 ah, on the same acre.

For dry stock farmers. That's why you always hear about dry stock farmers, their turnover in the year compared to dairy men and even tillage men is so low in comparison. So what they're really doing is they're driving bigger and bigger farms. Bigger and bigger. And, uh, that's an issue, I think because young people are not going to get in, get a chance to get in. Right. Because the size of your holding, it has to get larger and larger to support and make it viable and if you can't [00:35:00] get a chance in the market. But I blame, I blame two things. I blame the government policy. I blame banks. And I blame the, also the dairy co-ops because the banks force money.

If you, if I went in for a loan, for instance, I would have to show them so, so much, uh, paperwork to show how I'm going to pay it back. If you were dairy, they'd love that because they

know I'm going to get a cheque nine times a year. I have to give them a cheque. I have to wait for once a year. So the banks push money on dairy farms. And then they develop, get bigger. The co-ops, they were saying to farmers, get more milk, get more cows. We want more milk. We'll take more. And then, now, a big halt is coming. So, [00:36:00] it's not the farmers fault. They're just following what they're being told.

But, yeah. It's getting confusing now because there's so many regulations. Like there's not, there's no policy that's laid out for, and if you're farming, you need a minimum 10 year strategy, because if you get into cows, you can't get into them overnight. It takes a long time to build up a herd number, the number of cows, and it's not like any other business. If you're in farming, from this year to next year to the following year, you don't know what your income is. Whereas, you have a nine to five job, your wage is going to be the same this year. It's definitely not going to go down. Whereas in farming, this year you could have a good year, next year you could have a bad year.

Gabriel Coleman: That's been the interesting thing about the history is, uh, it [00:37:00] seemed like this, this logic of use more nitrogen, increase your stocking rate, it's coming at the same time in in the 80s at least when I'm looking now as, there's a contraction in the farming sector and smaller farmers are having a harder and harder time. But the logic of the government is no you just need to put more money in, get some more nitrogen on your fields.

Owen Roche: That's it.

Gabriel Coleman: Um, but that's it's only possible for-

Owen Roche: It's only possible for the big farm. Yeah, big farmer gets bigger and bigger and, like, I know an awful lot of dairy men and they have had the same number of cows for 15 to 20 years and they're making a nice living. But greed comes into it, and you just get bigger, bigger and bigger and, uh, uh, like, People lose sight of it.

What is enough? When are you, [00:38:00] when are you starting to do damage to the environment? But the problem is everyone then has to pay for it. Not just the polluters, but everyone pays.

Gabriel Coleman: yeah, yeah. So this this derogation changes, that's affected you as well?

Owen Roche: Yeah. Not us because derogation doesn't affect us because we're not that stocking rich. Right, yeah. Doesn't have an effect on us at all. Yeah. Um, but if you're intensive farming, yes. Yeah. It does have.

Gabriel Coleman: So, you talked about getting into silage when you were doing dairy to kind of enable you doing, er

Owen Roche: To silage was basically, uh, partly due to weather. Because it's so difficult to make, get a span of a week or a week and a half to make hay

Silage, if you have two days, yeah, you can get all your silage [00:39:00] made, put it, and normally it's a better quality. You have to have, you have to be very lucky to get top quality hay. And it's all down to the weather. Yep. Whereas with silage, and top quality hay is the same value as average silage. Whereas top quality silage is better than hay, if you know what I mean.

But it's really basically down to weather. Hay is nice, but to make it, we do make hay, small bits of hay, because we feed it to the calves from say, after being a month old, we're putting some hay into them, and they like it. Um, as I said, getting the weather to make hay is an issue.

Gabriel Coleman: Yeah. Yeah. And so I'm curious that you switched into silage, so relatively recently and [00:40:00]

Like from what I've read, like the government has been pushing silage and An Foras Talúntais, places like that have been pushing silage since the seventies. Yes. That and a lot of farmers switched over in the eighties. What kept you-

Owen Roche: We weren't intensive. Yeah. It's much cheaper to make hay than silage. You had to have, uh, a concrete and have it covered properly, all this with hay. You just shove it into a shed and that was it. If you got the weather, that was it. Much cheaper to make. And, uh, really I was ignorance of not seeing what it could do and how simple it was at the end, but it was the big, the big thing was the cost of it at the time.

For smaller guys, the cost of it. Okay,

Gabriel Coleman: just the initial investment in the, in the silage pit.

Owen Roche: In the handling and all like that for [00:41:00] silage like compared to hay.

Gabriel Coleman: Yeah. Okay. Um, but you wouldn't go back now that you're-

Owen Roche: No. Just your small little bits of hay. Your set up. It took years to set up.

Now once you're set up, you wouldn't go back. We still cut hay. We still make hay. Small bits of hay for, for the smaller cattle in the winter like we do. Yeah.

Gabriel Coleman: And it is good to see like that the set ups are so so good with the effluent and all this stuff. There's no no risk of run off or anything like that.

Owen Roche: Well that's what we try. Like, uh. When we set up the silage pits and all like that, we put stuff in underground and they're skirting around. So it takes it all from there straight into the tank. And then, in March, when the, the, as you can see, we spread some dung, but you can see the tracks of the tractor, because the land is still soft.

But that's why we only have farmyard manure. [00:42:00] It's too wet. If you put out slurry on this ground, you can imagine it would just flow straight down.

Gabriel Coleman: Um yeah, any other things while we're, while we're out in the field? Uh, any other fun memories, or?

Owen Roche: I remember my father years ago. He never had a tractor.

He worked with horses. And I remember being a child here, and in this field here actually, he cut a tree that had a fork on it like this. He nailed down some timbers on it. Yeah. And we used to take the stones out of the field on that, drag them to the ditches. That was my earliest memory.

Gabriel Coleman: Yeah, Sue was saying that that's, uh, um, one of the biggest, one of the biggest changes in her memory is, is the mechanization. Yes. And the changes that made it to the.

Owen Roche: [00:43:00] Oh, God. Yeah. But, uh, as you can see, like, uh, we can see it from where we started here now, uh, the changes to have, but I will say if I did not have an off-farm income, none of that would have happened. You have to have so much yourself like, uh, until you got the stocking numbers up. Yep. So that you had the cash flow to pay back the loans. Uh, that wouldn't have happened. And, to get the stock numbers up you had to have the sheds. But then You know, one, the cart before the horse kind of thing.

What enabled us to do it was the fact that I had the off-farm income. Come and I could use that to support it till we got up to a level that was able to support itself.

Gabriel Coleman: And when was that that you stopped working at the factory and you were able to farm?

Owen Roche: Oh, I'm still working.

Yeah, I [00:44:00] work for myself. I worked in In Carlow, uh, in design office in tool design for the auto industry.

Gabriel Coleman: Oh, okay. That's what my dad does.

Owen Roche: So, I design the tools that build the parts for the cars.

Gabriel Coleman: Yep, my dad works in machining as well. He's done everything from airplane parts to parts for eye surgeries and now my brother's into that as well.

Owen Roche: Joe works with me now. He, uh, we have an office in Carlow. Uh, at the back of the college, the technical college, and uh, six of us, we left, I left Lppla when it closed down in 2007, and started up, and asked a couple of guys to join me, so we were in that field of designing, and uh, since [00:45:00] 2007, so we're still, I'm still there.

And, uh, but now we work from home. We still have the office, but everyone wants to work from home. Right. Yeah. And, uh, uh, you can do it now because you have the Skype and you have Teams and all this kind of technology to allow you to do it.

Gabriel Coleman: Yeah. What's the software used for the designing?

Owen Roche: CATIA. Yeah, a specialist, a specialist software used in the auto and the airline industry. Oh, okay.

Gabriel Coleman: Yeah. I think my dad has mostly worked with Solidworks. That's his main, his main one. Um, great, well, I think we can head back in and

I'll stop the recording.

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Owen Roche: still in it, which is very good for the animals. Like that's good. But then sometimes you'll get hay that's completely dead. So you see no feed value. Right. It's like straw. [00:46:00] Yeah. Everything is gone out of it. You want to keep the chlorophyll green as much as possible in it so you can see the, the cast of green off it.

Gabriel Coleman: Yep. And so it's trying to strike this balance in the weather where you can still have some nutrients, but it can still dry in the field, and I see. And, uh, we were talking yesterday about not just changes in, in the industry from hay to silage, those transitions, but transitions within haymaking itself.

Owen Roche: Uh, well, haymaking itself is a traditional baling kind of traditional round, round baling from the old square baling days. We went from, when I started, we used to make cocks of hay. So, we used to do with a horse. Horse would rope the hay with, uh, you had implements behind the horse for doing the, and then it was all physical work. You make cocks of hay in the field. Yep. [00:47:00] You go draw them in and then you throw it up into the shed loose.

Whereas, then I went to small square bales. And then it developed to the round bale.

Gabriel Coleman: Yeah. And when did those transitions happen about?

Owen Roche: Oh, say, uh, early 70s we were still making hay full time. Then I went to bales, to small square bales in the 80s. And then in the mid 90s ent to the round bales.

Gabriel Coleman: Yeah, and that all required different equipment.

Owen Roche: Oh yeah. Different developments in, uh, agricultural machinery. Yep.

Gabriel Coleman: Yep. And did you have any aid to buy those machines?

Owen Roche: No. Well, for us, we make such small, we just have, we cut it ourselves, and we turn it ourselves, which means you turn it over, back and forth, but we get contractors in [00:48:00] to make the bales for us.

Gabriel Coleman: Okay. Yep. Um, and would those transitions in, in the way you make hay, would those have changed the relationship, like the, the way you treat the pasture?

Owen Roche: No. No. It just got more mechanised. Yep. Uh, even when you made hay back in the day. What we thought you had much longer summers. Yeah, and you had more time to make it.

Yeah, we're now with the climate change it's very fast. It's not predictable when you can yes, you have to watch the weather Yeah, when you when the hay is getting near that you want to cut it Yeah But you you could have a spell of a month that you can't cool as the weather conditions are not going to allow it You need it as I said, you need at least a week projected of good weather before you cut your hair. Yeah

Gabriel Coleman: And then with, with making silage since 2008, that's changed the types of grasses that you sow or?

Owen Roche: The [00:49:00] grasses, uh, yeah, uh, more clover in the grass. Okay. The big thing was, uh, silage can be done, a guy comes here, contractors. It's done in four to five hours.

Whereas with hay, from the time you cut it, you have seven days. Yeah. And that's the big difference.

Gabriel Coleman: And making the silage, do you have to use more inputs than or not for the scale you're doing?

Owen Roche: You would put more nitrogen in. Yeah. More fertilizer, yes. Okay. Yeah.

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Gabriel Coleman: So I know a lot of this probably is, is more your dad's, um, your dad's work. But from, from what you can remember, like, what sort of, uh, what sort of institutions [00:50:00] was your dad working with or listening to for guidance?

Owen Roche: Back in the day the guidance we had was from, uh, basically when we wanted to reclaim where I told you down beside the river, all that, we had, uh, inputs from, uh, Barrett.

What was he from, Ber?

Bernadette Roche: Teagasc? Was it Teagasc? What was his name Owen?

Owen Roche: Barrett. He, he was the guy that looked and we did up a plan for where we should put in the drainage systems and all to bring the water across into the river and all that type of stuff. So that would have been Teagasc back in the day.

And we have maintained links with Teagasc all the way through. We still go in every year. Sit down and have a discussion with them about all the [00:51:00] new schemes. Explain some of these new schemes. Are there any benefit to us? Would it be beneficial for us to go into them? From that point of view, we get advice from them.

So, really, from that point, Teagasc is our main advisory.

Gabriel Coleman: Yeah, and there's, so the advisory service. This is through Teagasc now, right?

Owen Roche: Teagasc, yes.

Gabriel Coleman: I think they used to be separate things back when it was An Foras Talúntais back then.

Owen Roche: Yes. Now An Foras Talúntais wouldn't have, it wouldn't be of any benefit to us.

Because we wouldn't be, uh, like, it'd be more related to, uh, guys planting trees and stuff like that. Now we do have the fisheries board which monitor the river below. Right. To make sure that we're not at. polluting the river and all. So, that would be the other interaction. [00:52:00] We don't have much interaction with them because, uh, we're not doing anything that we shouldn't be doing.

Gabriel Coleman: Yeah. Yeah. Would there have been any, like, um, like, I've read about these farm, farm education schemes?

Owen Roche: Well, I went to Agricultural College back in 1970. 77, 78. I was in Multyfarnham up in Westmeath. I spent a year up there doing agriculture. That's when I came back here, uh, thinking I could be full time on the farm.

So, I did do an agricultural course. And the two guys have done green certs courses as well in the farming. And, uh, but that's where I started, uh, that's where I got my basic education in farming was in, uh, Agricultural College. Okay.

Gabriel Coleman: And this has been, uh, a few years before that, but I've looked at, um, the [00:53:00] RTE program, Telefís Feirme. Would you remember that being on, to, you know? Yeah. It was 1960. Yeah, yeah. Basically was the year it happened, so it's a while back, but. Yeah. Um, it's been a really interesting source because it was this effort of RTÉ and the Department of Agriculture and An Foras Talúntais to do basically a farm school via television.

Yeah. Um, but you or your dad would not have.

Owen Roche: No. No. Like we, we didn't have a television back in the 60s. You know, back then. Like, uh, I'd say we got television here in, uh, Early 70s. That would have been the earliest. Yeah.

Gabriel Coleman: The way they ran it, it seems like people would go down to the local, um, Macra na Feirme, and they would rent a TV. Yeah, yeah. And it was like, basically you'd just watch this hour, er, 40 minute [00:54:00] program. Yeah. And then have a discussion with, um, but you wouldn't know anything about that. No, no, no. Um. Yeah, that's part of the thing. I'm like, okay, how influential are these programs? They're lovely to watch.

They're, it's all 1960s.

Bernadette Roche: What's that on? How do you get into those programs? I'm sure you can see them now. Can you bring them up from anything?

Gabriel Coleman: Yeah, there's, there's some clips on the RTÉ archives.

Bernadette Roche: Or, that's where you get them. Must have a look at those. Sometimes on TnaG, TG4, TG4, whatever.

There's fabulous programs about the past. Yeah. How men with basic, basic stuff, how they struggled and got on.

Owen Roche: Ear to the Ground, that was the main one. That modern one. Ear to the Ground. That's a development on all that.

Gabriel Coleman: Yeah, who was the, who was the host of it? [00:55:00] Um, Justin Keating. Oh yeah. Who ended up, industry and commerce.

They're so much fun to watch, cause it's just this lovely, lovely little program.

Owen Roche: I must go back and look at that now.

Gabriel Coleman: Yeah, well, the RTÉ Archives website, it's so much fun. Yeah. And they do little daily, you know, today in history kind of stuff. Um, would you been subscribed to the Farmer's Journal at all to get that?

Owen Roche: Oh, we get the Farmer's Journal every week. Yeah. Yeah, we do. Yeah, we did. And we subscribed to the IFA as well.

Gabriel Coleman: Okay. Yeah. And would those have been useful, like?

Owen Roche: Uh, Oh, the journal, yes. The journal keeps you abreast of everything and if you would read that and it would prompt you that okay, the schemes are [00:56:00] coming and

closing dates on schemes and then other things about phosthylase² in fertilizers all that type of stuff.

Prices of stock which is very important. Yeah. I think the journal is great. A great communicator I think for farming.

Gabriel Coleman: And this transition to starting to make the, the two schemes to build out the buildings. Um, and the silage pit and stuff, that would have been just through government?

Owen Roche: That would be through government and the TAMS, as I said, they had programs, TAMS 1 and 2, and now they're into TAMS 3. Yeah. So, um, from that, like, once you hear about it, then we go to Teagasc.

Uh huh. And then we discuss with Teagasc, what we're going to do. So you have to put a plan together. Of what you want to do for the next five years. Mm hmm. And, uh, Based on that, then you submit your [00:57:00] application to the department and they will tell you whether yes, you have a green light to go, you will qualify for the grant, you do everything correctly.

Gabriel Coleman: And would there have been anyone helping you put together that plan or?

Owen Roche: Oh yeah, Teagasc. You would give them, this is your idea, and this is what you want to do. Then you go to Teagasc and they will tell you, okay, you can do this, this and this, but you can't do this because this will throw you out, you won't get qualified for the grant, but you must change it. So you work together. You work together, sort of, uh, to come up with the best solution. Right, right.

Gabriel Coleman: Um, and what about networks, just the community, the neighbourhoods?

Owen Roche: Um, say, the local IFA, but I would say that because we work off farm, It's just that we don't have that much time to do that.

Now, [00:58:00] our neighbours, we discuss with the neighbours, have chats and all like that about what's going on and what they're thinking of doing and would it suit you and all that. We do that, definitely. But not officially going to meet up and have a night for that.

Gabriel Coleman: Like, have there been any decisions that you've made that have been, you know, through that network?

Owen Roche: Yeah, like I mean, there would definitely be, you couldn't pinpoint, but discussions like about, as we said earlier, what type of grass are you sowing, what type of silage, what mixture are you putting in, that type of thing, and how, from their experience, if they had done it the year before, was it a good thing, was it a bad thing?

² Unsure what this could be?

If we saw a crop, um, what varieties, uh, suit there, the land best, and that type of thing.

Gabriel Coleman: Mm hmm. And from what [00:59:00] you remember of your dad, would those relationships have been similar?

Owen Roche: Yeah, they would have been. They would, not They would have been, because at that time At night to go from house to house. You know to be three or four farmers me up in the house and just for a chat Like, you know when there was no televisions, nothing like that was only stories.

So definitely there was a communication and obviously farming was the whole topic like you know, that's how Learned from each other.

Gabriel Coleman: Yeah. Yeah, especially when he was buying.

Um, what would you say has been the most influential source of information in, as you've made decisions around the farm?

Owen Roche: Um, probably the most, my, in my case it was to make things simple. Yeah. Make [01:00:00] things that, everything on the farm is done to make it that. time efficient. That, and then following on from that then, efficient and, uh, but time was the big thing. Because we work off-farm. Mm hmm. Time was, I remember when I started, we didn't have any of those sheds, so the cows calved down beside the river where we were after looking.

So I come home with a flashlight, go down with a flashlight. If a cow starts to calve. You have to stay there, but you have to try and catch her in the field and, uh, help her calve. And, normally, it could be a miserable winter's night raining, and, so, from that point of view, it was always in my head, make things simple.

Yeah. Okay. Make things simple.

Gabriel Coleman: Um, and again, when were those buildings put in? The first? The first one was 2008. Um, yeah, geez, I can't imagine. I, I wouldn't be [01:01:00] up for that. We're going to have a full day of work and then helping a

Owen Roche: Come home and then at night get like a flashlight.

You have no quads, nothing like that, like that could go down. So you walk down there. And you can't imagine walking down there at night in the rain. And then see a cow that would be in difficulty and you have to come back, get a rope to pull the calf, and yeah, they were all, happened many times.

Gabriel Coleman: Busy, busy, busy. But, um, and, so were you ever involved with the co-op, or no?

Owen Roche: It's not big enough production, no. As I said, we supplied milk back in the early 80s to Avonmore. Yep. That was, they've changed now to Tirlán. But as I said, it was a real, it was an awful lot of effort because I get, before I go to work we milk the cows. Ber would get up at four o'clock in the morning, drive down to the [01:02:00] bridge, down over the Slaney, and she'd wait there for the milk tank to come, then come back, we'd wash it out, and go to work and then come back, and milk the cows.

It was just But at that time, like, money was tight with everybody, and you couldn't see another way of making a living. It's only as things develop, you can see other ways of doing it. Yeah. Yeah, yeah, yeah.

Gabriel Coleman: So, so at that time it was, dairy was just, it's just, this is what we've got to do.

Owen Roche: Yeah, because it gave you, as I said, a check for nine months of the year. Either big or small, but it still was money coming in. Yeah, regular income.

Gabriel Coleman: Yeah, yeah. Um, and so when you're getting, uh, whether it's fertilizer or concentrates or stuff, where would you buy that?

Owen Roche: I buy that in, we do all our business through, uh, Brophy's Agricultural in Tullow. Okay. So we buy all our fertilizer there, we [01:03:00] buy our mealstuffs for the cattle in the winter.

Uh, anything we purchase for the farm, it's nearly all a one stop shop.

Gabriel Coleman: Yeah. Okay. And has that been kind of the, the place?

Owen Roche: Yes, it's gone back. As I say, back into the 70s as well.

Gabriel Coleman:, and what sort of fertilizer, what sort of fertilizer do you buy now?

Owen Roche: I, we buy 18-6-12. Okay. Which is a, a mid-compound.

It's a very, um, common, uh, fertilizer. We use that on the grassland. And then we use 27-2½-5 five for the silage ground. And then we put slurry out as well, as I said to you in March, we will spread the fields with slurry. And then we put the fertilizer on top of it, maybe two weeks later.

Gabriel Coleman: And what brand would you buy? Do you have any loyalty to a particular brand?

Owen Roche: No, there's different brands. There's [01:04:00] Yarrow, there's Gouldings. It depends really on what It's in the co-op at the time you go in. Okay. Into Brophy's.

Gabriel Coleman: Yeah. Yeah. Yeah. Um, I ask because I, I'm doing this chapter on NET and it seems to be, I'm a bit, I'm not sure about things with them because it was this, uh, semi-state enterprise. The goal was for it to support Irish farmers and stuff, but it seems like it was. They had to run it like a business and try to make a profit. So it seems like it was a bit expensive, fertilizer. I don't know if you would have bought it.

Owen Roche: Back then, see we wouldn't, no really. What we did know was that it was a crying shame.

It's the same as the sugar beet. We used to grow some sugar beet here back in the 70s. A small acreage, four acres. And all farmers all around, we had a big sugar [01:05:00] growing business in Carlow. We had a sugar factory which processed it. But there were so many jobs in that. But that, that was a big mistake by the government to get rid of it.

Because at that time, I was travelling for the company I worked with. And I go to Germany. And Germany was a big industrial country. And yet, when you drive, you would see farmers bringing beet into small sugar factories. And I said to myself, how Ireland is out on the outside of Europe and the sugar beet supported all the southeast part of the country because it was an income in the winter.

Sugar beet is in the winter. Then when they processed the sugar, you had the, the waste off the sugar was put in the bags, fed back to the cattle again. And the guys, you had guys with, uh, drawing the beet to the [01:06:00] factory. It was a big industry. And they let it go. I was just going, and that was a huge mistake, I think.

Now, a couple of years ago, they tried to start it back up again. But farmers weren't interested. Once you, once you lose the skill and everything that's there to try and come back 15 or 20 years after and reintroduce it, it never works. And that's why I said the thinking, that's the biggest problem, joined up thinking.

You need a 15 year policy. You don't need a five year policy. For farming you need a 15 because it takes so long to change over.

Gabriel Coleman: Yeah. Yeah. Especially as you were saying with the infrastructural investments that people make. Um, yeah. So you would say similar with NET? Yes. NET, the sugar industry in Ireland as well.

Owen Roche: That was a, a should never have closed. Yeah. NET would bring in fertilizer. Last year we [01:07:00] paid nearly three times the price for fertilizer because of the war in Ukraine. Uhhuh, if we had had our own fertilizer. We could have maintained. and it's only when things like that happen. Yeah, you realize that it was a big mistake to let that go Things like that have to get government support as well as trying to be viable You have to be viable, but it needs government support as well.

Yeah in the long run like right

Gabriel Coleman: No, it's an interesting story. I'm I'm really loving writing the chapter. I'm ready to be done with it. Yeah I've been thinking about this too long, but that, you know, because of the oil crisis in the early 70s, they got into a bunch of debt and then they expanded out to the Marino Point facility, which got them into more debt. And so then it's, it's so interesting to read the different departments, like the Department of Agriculture is, we need to support this, we need to support the farmers. [01:08:00] And then the Department of Energy is like, well, we could be using that gas for, and then the Exchequer is saying. They're in so much debt, we can't.

So, uh, yeah, it's a very interesting story.

Owen Roche: And it shows now, if you had your own fertilizer, if you had a beet, still the beet industry in this country, like, they said that the sugar beet industry wasn't viable. But, as soon as we shut down our sugar beet, then importing is, the cost of sugar went up three fold. If they had to went up even half that. The whole sugar industry would have been viable in the country.

Gabriel Coleman: Um, and so with that, like how, um, how have market prices and, and things affected the way that you'd buy inputs, especially fertilizers and stuff, through the years?

Owen Roche: You have to be very rigorous last year on fertilizer because it just got, it went so fast.

expensive [01:09:00] over a two year period. Uh, but, uh, other than that, we tried to cut back. We use slurry and that had reduced our, uh, reliance on artificial fertilizer. So we reduced our artificial fertilizer inputs by using slurry.

Gabriel Coleman: And this is just this past couple of years. Yes. Yeah. And you're doing, are you doing like a back of the envelope calculation of.

Slurry has this much nitrogen, so we can buy this much less.

Owen Roche: Yeah, exactly.

Gabriel Coleman: Um, and would you have always used nitrogen on the farm, or?

Owen Roche: Eh, we would have, but not to the same extent. Um, like, um, as I said, with hay, you didn't put as much fertilizer as with silage. You need more, um Fertilizer for silage than hay. So in that regard, we use more artificial fertilizer than we would have [01:10:00] back in the years.

Gabriel Coleman: Yeah. So that would be the big transition.

Owen Roche: Yes, and stocking rates as well. Okay. Like if we went from 20 cows up to 40 cows, well then you're going to more, need more artificial fertilizer as well.

Gabriel Coleman: Yeah, yeah, yeah. Just to maintain that. Yeah. So. Um, back in the 70s and 80s, there wouldn't have been too much change in

Owen Roche: Back in the 70s and 80s, like, you had very low stocking rates. And, uh, you know, with hay, you didn't put near as much fertilizer, artificial fertilizer, because you didn't need as much hay for support.

You had less livestock, so it kind of had a knock on impact.

Gabriel Coleman: Yeah, so these, uh these changes in fertilizer prices because of the oil crisis and different things?

Owen Roche: Oh yeah, big input. Big input on farmer's income. Because you're paying double, maybe triple, what you [01:11:00] paid two years earlier for your inputs. Yeah, right.

But the price of cattle didn't go up when you go to sell. They didn't go up that price.

Gabriel Coleman: Mm hmm. Mm hmm. But for yourself, since you didn't have the higher stocking rates, would it have still affected you or the farm?

Owen Roche: Yes, I would. No, I would, because, um, you could see that the income from the farm was reduced quite a lot in the last, not just the year gone, but two years before that.

Yeah. Because of all the input costs going up so much.

Gabriel Coleman: But back in the 70s and 80s when stocking rates were lower? Yeah. It was?

Owen Roche: Yeah, fertilizer wasn't a big impact on it then.

Gabriel Coleman: Okay, yeah. No, it wasn't. No, that's the important stuff about doing this is that, that's the narrative that I've heard from the sources is that, you know, with the, with the oil crisis, it completely made farmers lives a lot more difficult, but that seems to be, I mean, obviously it would have to [01:12:00] some extent for everyone, but it would have been much more difficult for the intensive farmers who are, have higher stocking rates already.

Owen Roche: Yeah, it would of course.

Gabriel Coleman: And then of course you have the off-farm income, that's Yeah. Helping keeping you going.

Owen Roche: Exactly. Yeah. Yeah, and and you can see now there are more and more farmers Working with an off-farm income. And as I said, you're a large scale farmer To clear 40-50,000 a year In farming, you need to generate an awful lot of income because of all the inputs that are put into it.

But to get a job and clear that, like, I mean, it goes straight into your bank account every month. Big, big, big difference. And it's the same every year. With farming, you may be here, down here. You might be down here for two years, go back up again one year. But you have to average your household for four to five years, what your income is.

Gabriel Coleman: Yeah. [01:13:00] So, are things looking okay this year?

Owen Roche: Yeah, yeah, so far it looks okay. Good. Yeah. Good to hear.

Gabriel Coleman: Yeah. Yeah, and would you, you talked a bit about renting, like the difficulty of renting a field. Would you rent?

Owen Roche: If we got land close to us, yes, we would. We would, but not to pay the ridiculous prices that are being offered for it, like, I mean, and the reason land has gone so expensive is the intensive dairy farmer Uh, they need, for their nitrates, they need extra land.

So that's why they're paying over the cost. So they're paying double the price. Okay. And it has drove land up. Okay. So much that they need it to offset their, their nitrates, uh, impact.

Gabriel Coleman: Meaning, meaning the slurry that they need to spread. Yes. I see.

Owen Roche: They need to get rid of the slurry and they need the acreage as well so that they can spread out. If they can rent 20 [01:14:00] acres, that means they can keep maybe 10 or 12 cows extra. That's the reason for it.

Gabriel Coleman: I see. I see. So it wouldn't be Like, would you be able to do it one or two times every few years?

Owen Roche: Renting? Yeah. Uh, no. We Because if we want to go rent, you want to rent 10 acres.

Uh, for a minimum of 10 years. You would have to do that because to rent land, then you would need to look at your business and say, okay, so we're getting another 20 acres. So now we can get maybe 10 more cows. So then you have to invest in the cows. Yeah. And then the land you rent, you have to, uh, maybe have to fence it.

You have to put inputs into it if you want to keep it for 10 years. , you get your money back out of it. But if you rent something for two years, you're not going to do anything with it. Right. You're just going to spread fertilizer on it, put stock on it, you're not going to maintain it.
[01:15:00]

Gabriel Coleman: Yeah. And so when's the last time you would've done that?

Owen Roche: We haven't rented land. Well, we rent from an aunt down here. Okay. Our land is right in the middle of ours. So, but it's only six acres and we've been doing that for 20 years. That's all, but not when I, that's all, that's all the renting we do on land.

Gabriel Coleman: Um, trying to think, I think that's pretty much all I've got.

Any other things that you feel like it's important to?

Owen Roche: No, I still stress that the joint up thinking between government and agriculture needs to be more. It just needs to be more joined up, and over a longer period. There's three to four, five year plans, and then they change direction. You go and start doing something for five years, and then you change [01:16:00] direction to do something else.

And then after that five years, you change direction to do something else. It's just leading to uncertainty in the farming and farmers becoming disillusioned. You can see now that over the West, suckler cows, which we're in, they are declining year on year. People are getting out of it because the business is so tough business.

The West of Ireland, where an awful lot of sucklers, the land only suits suckler cows. Farmers are getting rid completely out of it. And it's totally because of all the paperwork that's involved in it. And they don't feel that the returns don't justify all the work you have to put in. Just on paperwork.

To follow the regulations and all the things you have to do.

Gabriel Coleman: So, more holistic, long term. Yeah. Yeah, I [01:17:00] think that's what the history is showing as well. I guess the last thing is, uh, about the NuReCycle project that I'm in as a whole. Um, we're hoping to get people's kind of ideas about it. So, I'm doing this sort of history background work, trying to reconstruct things, and then the other people in the project are trying to develop this, um, intervention that farmers could use, um, to help mitigate any pollution.

So, the idea is that you'd have, like, along a drainage ditch, you've got your buffer strip planted. And that you could, um, harvest that buffer strip and turn it into biochar, basically burn it into charcoal. And that would be used as both a fertilizer, because the buffer strip plants would take up nitrogen, so you can spread that charcoal on the field.

Um, and then there's [01:18:00] also, they're doing experiments about trying to treat that biochar and then put it in the water to take up nutrients. So that, because charcoal, it accumulates other things. So you would have this kind of reactor. Yeah. That you would put in the, in the ditch or in the stream and that would, uh, pull phosphorus and nitrogen out of the stream.

And then again that could be spread onto the field. Yeah. Um. Basically, we're just kind of wondering your brutally honest opinion on that as a farmer, like, would that be something that you'd have interest, what, like, if you were incentivized to do something like that, um, or what critiques of the whole process you have in terms of its feasibility?

Owen Roche: It's very difficult to give an answer to that question, to be honest, because, um,

Yeah, exactly. What would the benefits be to the farmer is one thing. [01:19:00] And then what are the inputs required to do it? uh, that would, that would be the two things I would see. Yeah. That, uh, like the incentive would be the big thing and, and the long term. What is the long term goal of the project?

Yeah. And, uh, then what the inputs from the farmer, what are the inputs required from the farmer?

Gabriel Coleman: Right. Right. So if this was a program, would you get compensated for it? Yes. And then how much work would it be? Yes.

Owen Roche: Yeah. Yeah, yeah. Because there's always work in it, like Yeah. People forget about the work that's involved.

Yeah. In any of these schemes, like, um, and in these days you have to be compensated for the work you put in. Yeah, right, right.

Gabriel Coleman: Um, yeah, it's interesting. I think they're, like, all the individual projects are very cool. Like, the microbiologist on our [01:20:00] team, Brian, he's from out in Galway. Yeah. His dad is a horse farmer.

Gabriel Coleman: And he's looking, he and the botanist are looking at how mycorrhizal fungi and bacteria can help plants and buffer strips take up more nitrogen and more phosphorus. So, trying to think about how, how we can make buffer strips better and more efficient. And then this idea of, of biochar is, is really interesting and figuring out ways to make, to recycle those nutrients back into farms.

Owen Roche: Yeah, it's just and how does the charcoal work? Like you have to burn that too.

Gabriel Coleman: Yeah, you'd have like a charcoal kiln.

Owen Roche: Yeah, but it's not not polluting the environment anywhere. Yeah, it would be carbon.

Gabriel Coleman: Yeah, um, I think because it's it's a charcoal kiln you're trying to preserve a lot of that carbon in the charcoal so there wouldn't be a lot of exhaust off of it [01:21:00] I think it's burning at a, at a very high heat to just char, um, but yeah, the, uh, it's, it is an interesting one because it's, yeah, it's trying to focus on nitrogen and phosphorus pollution, but there's the carbon aspect as well.

But then that would also, the charcoal would also reintroduce carbon into the soil, which is good. It's an interesting project. I'm glad to be a part of it and it's, it's very fun for me as I'm, uh, as I'm

doing the history bit to have connections with all these people from other backgrounds and expertise.

III. Transcript: Patrick O'Brien, NuReCycle Oral History, Belclare, Co. Galway

Gabriel Coleman: [00:00:00] Okay, so just so I can make sure it's actually picking your voice up, can you tell me what you had for breakfast today?

Pat O'Brien: Um, I, I had porridge, brown bread and tea.

Gabriel Coleman: Very good. Okay. It's picking you up. Um, but yeah, so you were saying about...

Pat O'Brien: I'll start now, so, yeah. Uh, I was born about a mile and a half from here on a farm that was a large farm in comparison to other farmers here in the West of Ireland, other farms. It was a farm that consisted of 265 acres. My father and uncle farmed together. My uncle owned half and my father owned the other half. And, uh, there was 12 of us in the family. Uh, and at that time, it was a different, different era compared to now. Everything, all, [00:01:00] a lot of the labour was intensive, it was hard. At that time, my father, he was very, he was before his time, I suppose, in relation to, uh, climate change and all this. He, he sowed, um, uh, planted a plantation at the back of our house, about three acres of plantation. which consisted of spruce.

He, he loved trees and he was very, very proud of that plantation. And then, uh, the corn was all sown by hand. You, you put the seed in, in a, a bed sheet and tied it around his back. And you pulled it in front of your body and you shook it on the ground. And everything was done, a lot of the work was done with horses as well. Beet was [00:02:00] sown, sugar beet, and that had to be all, um, cultivated with horses. The hay was cut, um, with horse machines at the time in and turned, with, with old machines pulled by horses. Cocks of hay had to be made. And five or six of the neighbours used to help out and they'd help out. The neighbours, everyone cooperated together in, in, in villages and it, it was all intensive.

Very little fertiliser was put out. The land was, you could say, old pasture and, um, stocking rates were very low at the time. There was no such thing as intensive farming, and you could say 18 cattle was, was the most they used to [00:03:00] keep, and then they used to keep replacements, buy in replacements, and about 80 ewes. In comparison to today on that farm you could have 250 ewes and 80 cattle.

So that's a comparison. I was born in 1959 so that would be in the 70s and 80s and the sheep were shorn by hand at the time as well. They were shorn by hand Yeah. And the neighbors used to help out as well, and they'd have a half barrel of Guinness and they, they used to drink Guinness to give them in energy, whether it did or not, I don't know. But, uh, these were the times they were in it.

The, the binders were used for cutting the corn and then, uh, they had to, to make, um, [00:04:00] stokes. Where five or six, uh, shaves were put together, stokes, and, and then they were brought in and they had to be made into stacks. And then a thresher would come and there'd be a lot of the neighbours would be, you know threshing. With the thrasher [they] would be there throwing the stokes into the thrasher, the shaves and the seed had to be filled by bags at the back of the

thrasher. It was all labour intensive, hard work, but looking back on it, I think, uh, it was more enjoyable than today.

People, uh, connected with each other and they had great relationships with neighbours and, and friends who all helped out. And in, in comparison to today, everything is done by machinery. Everything is intensive. Uh, a [00:05:00] lot of fertilizer put out on the land, but then again, uh, farmers can't be blamed because, uh, Governments at the time and the Teagasc was a government agency that promoted to increase, increase stocking rates and farmers did increase and kept increasing. And I suppose then Europe began to see the huge increases and they brought in quotas. And the quota was that you were restricted to a stocking rate and, uh, dairying became very intensive where there was only one cow to the acre. There was probably three cows or four cows and all this has probably, all has [00:06:00] affected, um, farming in general and probably climate change, water quality. Water quality where huge slatted buildings have been built, sheep houses, more um, slurry from cattle that's produced in slatted tanks being spread on land.

And I just can recall when I was a young fellow near the plantation, you'd hear corncrakes, um, you'd hear them, the noise and screeching and the, the funny screech that. We were only young. We didn't realize what was screeching, but they were corncrakes because there was no fertilizer put on the land and there was high grass probably would be three foot higher around the plantation. [00:07:00] And it was a great place for wildlife.

So, just in comparison to today, it's a different lifestyle entirely. In relation to rural Ireland and farming, there's not that connection or bond between neighbours like there was one time, going back in my father and uncle's time. They don't bond as much. Everything is done as I said earlier on by huge machinery. It's more intensive. Everyone is busy. Everyone is probably more money orientated. And I don't know if the health of farmers hasn't improved from that time. Maybe so because there's probably more research now. But at that time, [00:08:00] I never heard farmers at that time talking about, uh, diabetes much. Uh, cancer was mentioned, but diabetes and high cholesterol. And recently I was talking to a doctor and he said one time he said, uh, high cholesterol wasn't mentioned, or high blood sugars because farmers worked hard out in the field. And they probably used up all their energy and burned off all the excess fats in their body and there was no cholesterol or high sugar ever mentioned.

Nowadays, younger farmers, the, the food is different. At that time as well, going back in the 70s and 60s, farmers produced their own food. There was, eh, wheat. The wheat was [00:09:00] harvested and threshed and then it was brought to a local miller who, uh, milled it further then into, into full flour, and they made their own brown bread. Cows were milked by hand. I milked a cow myself. Two cows every evening. For the house. And, uh. My mother used to make, um, our own butter. We had a separator, and I remember, uh, separating the milk. You'd twist a handle around in the separator, you could be half an hour, and then when all the cream was there for a few days, you'd put it into a churn, and you'd churn it, and you'd make your own butter.

They had their own pigs as well, they're buying four or five banbhs. And they, they used to rear their, their, their, um, the banbhs, the banbhs into [00:10:00] pigs and neighbours would come again and the pigs would be slaughtered and, uh, cut up and, um, the bacon would be preserved in, in a big round barrel. I remember my father and uncle that put layers of salt over the bacon on top of one another until the barrel would be filled with the bacon and that did for a year and a

half. Then in, back into the year when the weather would get cold, they'd kill a weathered hogget or two and they'd hang it up and put a blanket around the, the hogget and, and the hogget or two in a shed and they'd cut it up and they'd give some away to the neighbours who helped out and vice versa, when the neighbours would kill their own hoggets or their own pigs, they'd share it around with the other [00:11:00] neighbours.

So, these were the times that were in it, and they kept their own corn as well. Their own oats was fed to the ewes prior to lambing and after lambing. The lambing percentage wouldn't be as big at that time. There was, I suppose the research wasn't there to, uh, get the ewes to have more lambs. The percentage would be about 1.2.

Gabriel Coleman: Mm hmm. So they were still raising lambs, but it just wasn't as...

Pat O'Brien: Yes, and, and they'd keep their own replacement for breeding, their own ewes lambs for breeding, again, they were called hoggets. And they used to do their own topping, top the land with an ordinary, uh, finger béar mór. That would be, um, around Galway Race Week, the end of July. [00:12:00]. The land would be, there'd be a lot of silverweed on the land and thistles, and it wouldn't be overgrazed so it was a great place for birds and pheasants and foxes.

At that time we had, there was two turloughs in the land. There was a middle turlough and they used to call a féar turlough and a turlough hill was a high hill. And they had, there was no group water scheme at the time, so They had a huge tank at the bottom of the hill with a concrete, um, concrete run on it so that when the rain had come, the water had run on the concrete run into the tank. And then they had a small truck for the cattle to drink out of it.

Gabriel Coleman: And what was the scheme that changed that?

Pat O'Brien: The water, the group water scheme came in then, [00:13:00] and then tractors. We, we, I remember, uh, they bought a tractor, probably the first in the parish to have a small TVO tractor. And they used to have a cock lifter then. And the horse, the horses were beginning to be phased out. And they'd bring the cocks of hay in with the tractor and the cock lifter. Me older brothers used to do that. And, uh, it, then they got a tank where they'd go to lake to pump the water. There was no, the water even in the house was there was a tank and they'd have a little pump to pump it up to an overhead tank in the attic. So if, if the summers were very, if they were very dry and warm, um, you'd have to, um, start, uh, rationing the water.

And, um, [00:14:00] then as I said, the tractors came along, they started going to lakes. There was a lake nearby. And they'd draw a tank water and, uh, pump it into the tank for the house and for cattle as well, when, if there was a drought or a very warm summer yeah. They'd have to draw water for, for cattle.

Gabriel Coleman: And around what year would this have been?

Pat O'Brien: That'd be around, uh, the late sixties, early seventies and earlier maybe. Yeah. So. There were different times, and the plantation was a great place for us. There were six lads in our

family, six girls. And we used to play cowboys and Indians in the plantation. And it was great fun growing up.

But nowadays the plantation is gone. If my father came [00:15:00] back and seen his lovely plantation was cut away for timber, I don't think he'd be too happy. So he was, um, he was very much into rural life. He loved, fishing. There was a few rivers not far away and he used to fish and often I remember him coming home with eight or nine lovely trout and eels. We loved it and we'd have fish for the tea. So it was, it was a, it was a great lifestyle.

We were very happy growing up and nowadays I think, uh, the lifestyle has changed. There's creches and there's all those play schools and it's a different, a different world.

Gabriel Coleman: From being a kid.

Pat O'Brien: From being a kid growing up on a fair.

Gabriel Coleman: Um. Yeah, and so who is managing this land you grew up on now?

Pat O'Brien: [00:16:00] Uh, I have two brothers. They inherited the land. One inherited my father's place and my other brother inherited my uncle's place. They have about 126 acres each. Some of them purchased, one brother purchased some land and um, I still, um, I inherited a place from an aunt about a mile and a half away. Not as big a farm, 80 acres and I farm here and my two brothers are only a mile and a half. We still work together, help out bringing in silage and doing different chores.

Gabriel Coleman: And that's one of the, one of the things I'm focusing on in my history is the transition from hay to silage making as a dominant practice.

Pat O'Brien: Yes hay, the hay I remember as a youngster you'd bring the cocks of hay and they used to make sheep cocks that time. They'd make a sheep cock out in the field [00:17:00] and the sheep would all eat around the sheep cock and a lot of it would be wasted too and then they'd have to bring hay to the to the cattle. They'd have cattle but they used to have a field preserved in in late summer for winterage it was called and they'd have 18 store cattle there in the winterage and that would keep the cattle going up in the spring and then they'd have to start firing them, uh, going with the hay to them and bringing, bringing, uh, forking hay.

But then that all came to an end when, when silage, um, began to replace hay. And I remember the first time the, the square baler came in. The square baler, um, made a big difference, um, to replace the cocks of [00:18:00] hay. Mm-hmm. Even though it was laboursome, because I worked in Galway, uh, in, in a factory and in the evenings I can recall far and nearly a thousand bales of hay. We, we'd bring in the hay, it was baled with a baler. It was still hard work to hay. But then I, I can recall my father and uncle and my brothers, didn't they make square bales of silage. And they covered it with plastic and sealed it off. And they found that a great advance to the square bales of hay.

And especially it cut down in labour. And then the silage harvesters began to roll where it was caught with a silage harvester and blown into a trailer and made, they used to make the, [00:19:00] the silage pits on, on, on the field, which, um, had to be phased out due to, um.

Gabriel Coleman: The runoff.

Pat O'Brien: The runoff of, um, um, from the silage. And that, that, the grants began to roll in. Effluent that used to run off the silage and used to burn part of the field. And it wasn't, it was pollution and not great if it got into streams or lakes or anywhere for water quality. So then the grants began to roll in. Um, we, we, when we joined up, entered the EU in the seventies, um, the money began to roll in from Europe mm-hmm for all the, the, all [00:20:00] these, uh, grants for buildings and, uh, slatted sheds and silage slabs. So the silage slab did replace the silage on, on, on the, from the field and was put into a silage slab and the effluent, uh, ran into an underground tank that you had to construct in order to take the effluent from, uh, the runoff, from the, from the silage. And that that was, um, big improvement. It cut out a, a huge amount of labour because the tractors were there to cut down the silage and feed the cattle. Everything was done with a tractor and loaders came and farming became intensive, began to become intensive. And, uh, uh, the amount of labour was, was, was [00:21:00] reduced drastically.

Gabriel Coleman: I just want to clarify a couple of things. So you were saying they were making square silage bales. So they were still using this square baler, but with the, with the young grass.

Pat O'Brien: Yes, though. Yeah, there were, uh, the square baler was mostly for hay but they started making, uh, silage bales with it. And again, it was, it was something new. Uh, not, not, not many made silage bales. I suppose it was my two brothers who taught that and they probably convinced my father and uncle that this would cut out a lot of the hard work and labour and it, then it followed on from making the silage with silage machines and blowing it into a trailer and tipping it up and it was put up by a huge loader into the silage pits.[00:22:00]

Gabriel Coleman: And around what time was this?

Pat O'Brien: That had started, I suppose, in the seventies.

Gabriel Coleman: And then you said the grants started coming in mid 70s?

Pat O'Brien: They did, yes, and the binders, all the machinery, I remember the binders were all left in the shed and there was no more stacks, so the combines began to roll in and the combine cut the corn, it threshed the corn, it threw the straw out, everything was done in one go with the combine. So that reduced labour drastically as well. And cattle and sheep numbers began to increase and fertilizer, I suppose, the fertilizer was beginning to roll in as well and it wasn't expensive at the time, [00:23:00] more and more started going out and I suppose I never, I can't recall hearing the, the, uh, the, uh, the anyone saying they heard a corncrake screeching, I think, for 40 years, I'd say.

Gabriel Coleman: Yeah, yeah. Yeah, that's what I've found and what folks have said is that transition from hay to silage, you don't have those tall meadows as commonly as you used to.

Pat O'Brien: And just to recall there, going back, when they had the winterage for the cattle back in the 70s, early in the late 60s. Um, I, we used to see partridges, they were a bird, a lovely bird, uh, where the, and I haven't seen a partridge since, I'd say the late seventies as well, because of all the intensive farming, the fertilizer, I suppose. [00:24:00] Everything, the silage cutting, the ground was cut bare, and there was no wintrage. Wintrage was eliminated completely.

Gabriel Coleman: Right, yeah. And by wintrage you mean?

Pat O'Brien: Wintrage was, what I said earlier on was, it was fields that were taken up in late summer, and they weren't eaten until, they weren't eaten until Christmas. They'd have enough grass to keep them going that time because stocking rates were, were very low. And then after Christmas, they'd put them into the winterage. would keep them going up to, um, spring.

Gabriel Coleman: Okay, so this was grass that was cut and preserved and stored?

Pat O'Brien: Yeah old, yeah, to be strong grass. To be, five, four and five inches high. Strong grass. Fully mature. Yeah. Yeah. Be very mature grass, strong grass. Wouldn't be [00:25:00] very suitable for sheep, but cattle would live on it. And then, um, going back to the turloughs. The turloughs at that time, there was, uh, hawthorn bushes. There was huge swaths of hawthorn bushes in the turloughs. And then, as I said, the grants began to come in. They got a grant to bulldoze them. So, all the hawthorne bushes were bulldozed. The land was reseeded. Those big D8 bulldozers, the big D8 bulldozers came in. And the land was, was all reseeded and well, there was only 18 cattle.

Pat O'Brien: I'm in the ACRES scheme now. The ACRES scheme is a very good scheme. If you look around I can show you the improvements in the place that I've made in relation to those environmental schemes. I've sown hedges. I've sown hedges, I've fenced off drains, I comply with low input pasture, I sow, sow wild bird cover for birds. There's no, no fertilizer put on it. It's, it's, it's organic, you could say and all those things matter [00:27:00] for the environment. We, we get paid to do this, this scheme, it's part of a farmer's income now. You reduce your stocking rate and you have to comply with the rules and regulations. There are, the Department of Agriculture do have inspections, so I was inspected for the REPS scheme. And, um, I was, um, uh, this farm here then at the time my planner asked me could he put it in as a demonstration farm.

The demonstration farm is, is a farm that has to be um, authorized by the department. And, um, I had an inspection and it [00:28:00] passed the criteria for the demonstration farm. So I was registered with the department as a demonstration farm for REPS and any planner or Teagasc could come here with a group of farmers to walk the farm and discuss what I've done on the farm and I was happy with that.

Gabriel Coleman: yeah, I'm very curious about REPS and the other schemes.

Pat O'Brien: And if you just look out the window there, I found a beech hedge. And, uh, I, I, I like, um, trees and hedges. I've got all those trees growing around the house. And in spring and summertime, early in the morning, you can hear all those little birds from your bedroom window whistling. And it's lovely [00:29:00] to hear the birds.

Gabriel Coleman: Yeah. So how were you first informed about REPS? And what, what was it that convinced you to give it a go?

Pat O'Brien: Well, my planner got on to me and then I read about it. We have a paper that comes out weekly, the Farmers Journal. That's a very, it's a very educational paper as well for farmers. It gives them all the insights into different schemes and then I got interested in it because, um, it, it was going to protect, it's all about protecting the environment and about climate change, you know. Well, climate change wasn't mentioned at the outset. The first, uh, environmental scheme, that much. But now, climate change is a big thing, and water quality. Just recently there, we were doing a beef knowledge [00:30:00] transfer scheme, and our planner had a lecture from NUIG, giving us a lecture on how to protect our water courses, and how to improve water quality, and it was very, it was a very interesting lecture.

Gabriel Coleman: Um, and when you say your planner, that's like from the Agricultural Advisory Service?

Pat O'Brien: Well, there are Teagasc Teagasc is, is, um, that's a government agency. It's part, they, so they pay, it's financially run by the government. But I'm with a private planner. Okay. They are called agricultural consultants and they, they're approved by the government to draw plans and Okay. Whole meetings and,

Gabriel Coleman: And it's this been been the same person that you've worked with through the years? [00:31:00]

Pat O'Brien: It is, yes, the same planner for a number of years.

Gabriel Coleman: Yeah. Yeah. Um, with REPS, was the financial, uh, the payment, uh, large incentive for yourself or.

Pat O'Brien: For REPS it was 5,000 a year. This new scheme now, ACRES, it's um, you can get a maximum of over 7,000 for a general acres it's called. But then if you're in, uh, Um, if you're in Connemara or National Area of Conservation, you can draw up over 10, 000. But in, um, it's called, um, community area, there's so many farmers together, they can draw, draw down that money as well, so. I'm in ACRES [00:32:00] General, so, I draw it down. over 7,000, I think 7,400 a year, which is good.

And yeah, you have work to do. I have to sow a hedge now, and I have that clear. I have hedges sown, but I have to extend the hedge. And I had to sow the wild bird and walls, keep the walls lifted. Walls can fall from stock, or they can fall from weather, storms and different things. So there's a lot of maintenance to be carried out. You have to keep your place tidy and prevent runoffs from effluent or dirty water from ground, groundwater that's dirty.

Gabriel Coleman: And what was it like being one of these kind of early adopters of the program? Like in your [00:33:00] relationship with other farmers in the area and with...

Pat O'Brien: Yeah, they, um, a lot of farmers didn't, um, especially the extensive farmers that wouldn't be overstocked, they got in to ACRES but if you're a very intensive, uh, you probably wouldn't be able to comply with rules and regulations. But now there's 60,000 farmers in the new scheme. so dairy farming as far as, um, they'd have to reduce stocking numbers.

Gabriel Coleman: So there was a trade-off between the intensity and

Pat O'Brien: Yes, and the extensive the. And they want to protect the birds as well. All those birds.

Gabriel Coleman: Mm-hmm . And, um, were there any, like you were saying, you had folks visiting the farm as a model farm, uh, [00:34:00] to stories about folks coming out and, and learning about that.

Pat O'Brien: It's not really a model farm. They didn't really want, um, the department, they didn't really want to model farm or where you could eat your dinner out in the yard. They wanted something between a model farm and a well-kept farm, or a kept farm. Because not all farmers can be model farmers. You'd want to spend 24 hours a day, sometimes out. You could spend 24 hours on the land and you still wouldn't get everything done.

Gabriel Coleman: Yeah, yeah, yeah, yeah. So they wanted, like they were interested in you because you were adopting the program, but then you were also operating the farm as normal? Something that other farmers could see as achievable?

Pat O'Brien: Yeah. But the numbers, um, there was a number of, uh, a number of farmers came with the planner and I noticed that the [00:35:00] numbers were increasing each year in the five year plan that I was in at the time. That where only maybe 10 or 12 the first year, there was 30 the second year, so on. And a lot of farmers now are interested because it's part of their income as well and they can cut back and they have to cut back in stocking numbers, in stocking units and farm probably extensively rather than intensively.

Gabriel Coleman: Mm hmm. Um, I guess I have one more kind of institutional area of interest, which is going back again, this is the 60s, but, um, would you have any, uh, awareness of, uh, what's it called, Telefís Feirme? It was a flagship RTE program.

Pat O'Brien: Oh, there used to be a farming program on there, Landmark.

Gabriel Coleman: Oh yeah, Landmark as [00:36:00] well.

Pat O'Brien: Down through the years. They were good, they were very good, lovely programs to watch, and good programs to watch. But then then, I just forgot there to mention that the government back as well in the 80s, or late 70s, right, they set up agricultural research farms, they

were called agricultural institutes, and they had one in Athenry, it's there all the time. And they had one here on the, as the crow flies about three miles away in Belclare. And it was good for employment. A lot of the local farmers worked in it. They were smaller farmers and it gave them employment and they did a lot of research there. And they used to have open [00:37:00] days there.

Gabriel Coleman: So it wasn't a closed off research institute.

Pat O'Brien: Yeah they leased the land off a number of farmers and they built sheds. Oh, they spent a lot of money on those places and gave employment to farmers. I have a brother that was going to college and he worked there for the summer. And he used to enjoy working there because it was outdoors. They had a dairy there, and they had a beef unit, and they had a sheep unit, and there was a lot of professional people there, doctors, agriculture, who worked on research, and Yeah, it was good for the area, and good for farming at the time. But nowadays, I suppose, with the climate change, and with the reverse, you could say, back to more extensive farming than intensive farming. Uh, [00:38:00] I suppose the Institutes, if they were running, would they run in Athenry? I don't know, would they be encouraging much intensive farming? Because the way the world has gone, everyone is talking about severe winters and storms and flooding and so on. That's creating havoc all over Europe and the world.

Gabriel Coleman: Yeah, yeah. It's a point of, um.

Pat O'Brien: Tillage. But they'd have, they'd have bigger farms and better land probably than we would have here in the West of Ireland. A different way of life up there. I'd say it moves faster than the West.

Gabriel Coleman: Yes, well this is one of the things that I'm thinking, like I, there's a chapter I want to write about, about REPS and GLAS and ACRES, these agri-environmental schemes, and my thought is that the, the adoption of them would be different out here in the west versus [00:39:00] in, in the East.

Pat O'Brien: Well they would and here in the West, I'd say, the take up on REPS, GLAS, and ACRES. I did forget that word, GLAS. And ACRES. GLAS came after REPS and now it's ACRES. The uptake would be huge here in the West compared to the East of the country or the South of the country. But the farms are smaller here and the land wouldn't be as good and we wouldn't be as intensive as the East or the South.

And then there was this payment, it was called headage years ago where people in severely disadvantaged areas or disadvantaged areas and we all around here is classed as severely disadvantaged we get, um, it's called the area natural constraints [00:40:00] now. It used to be called headage. It was to compensate farmers probably for trying to farm in disadvantaged, disadvantaged and severely disadvantaged areas. So we were getting, um, extra funding from the government. I think it came from the National Exchequer, it didn't come from Europe to compensate us for where we had to farm.

Gabriel Coleman: Yeah, yeah, and would that have affected the, um, I guess eagerness with adopting the agri-environmental schemes that folks were already receiving money for the government? Or do you think it would not have had much of an effect?

Pat O'Brien: Uh, it would have no effect. People would still, uh, go into the ACRES and GLAS and, and REPS. It would have no effect.

Gabriel Coleman: Yeah. Yeah. Yeah, it's [00:41:00] something I, I still have to do a lot of research on that part. But I'm very interested in that kind of adoption.

Pat O'Brien: The size of that field full of bushes and, so you'd find it hard sometimes to get out or especially when we as young lads would have to bring the tea up the, is it recording? Yeah, yeah. We'd have to bring the tea up to my uncle up the far end of the land and we'd have to go through these turloughs and there'd be green spots going through the trees and the cattle could be in the trees. See the Turloughs were, twere used to flood during the winter time. And then during the summer time, they were, they were great for grazing. But, uh, they were great, um, they were like a house in wintertime for the cattle, you see. There wouldn't be a whole lot of cattle back in the late 60s and 70s. They'd only have [00:42:00] about 18 cattle. Yeah. And the cattle, it, it, it would be warm them in, in, in those, in the hawthorne. It was like a small forest with Hawthorne.

And they were all bulldozed away then, when the grants, there was a great grant to, to reclaim land and to make it into fertile grazing land, or even for corn but in wintertime then it still used to flood and all the wildlife, swans and all, duck and everything, it'd be there during the winter in the water. But now, those turloughs, during the summer, you won't see much wildlife on them because they're heavily stocked with cattle and sheep. That's the difference between the 70s and the [00:43:00] 2000s.

Gabriel Coleman: Yes. Yeah. And so during this time, you were working then? Siúcra, right? Brian was saying.

Pat O'Brien: I worked a year in Galway in, in, in, in a factory. I was a welder, but I, I didn't like the indoor life. So, then, um, I came home to go farming and the two brothers were there as well, but I had ends place here, but I, I wasn't living in it at the time. We used, sow corn in my aunt's place about a mile and a half away, and then we used to grow a sugar beet for the sugar. There was a sugar factory in Tuam. And I got a job there during the processing season that used to start the end of October and used to go on up to Christmas. I spent, I was, um, five years in [00:44:00] the sugar factory during the processing season. I worked in the laboratory going around taking samples and then you'd have to work around the clock. There was three shifts. There was the eight to four shift, the four to 12 shift and the 12 to eight shift.

And it was, it was great for, um, local employment and for the town of Tuam. Because it employed a lot of part time farmers, there were smaller, small farmers, that grew two or three acres of beet and then they'd get the job during the processing season when the beet was gone in for producing sugar. And then there was by-products, pulp, and beef nuts being made as well, and there was wet pulp and all this. It was a busy place and from our place [00:45:00] out in Kerala Strand, we'd be about seven miles from Tuam. And on a calm day, you'd see the steam from the sugar factory going three miles up the sky. And it was a great industry and the history of that

place was it was De Valera that opened that sugar factory in Tuam. De Valera said at the time, Eamon De Valera, that he didn't open it to make money, he opened it for social reasons, to give locals employment. But, um, it's closed now, and Carlow is closed, and Mallow is closed, and Thurles is closed.

So, there's no sugar being produced in Ireland now. They're importing it in, cane, from this cane they produce abroad. And it's a great loss. Great loss to the [00:46:00] local area. And I worked there and the money was good and it was tax free because you weren't earning more than three and a half thousand. And that was a lot of money at that time back in the eighties and seventies. And then I was able to feed stock when I'd come on the 4 to 12 shift. You could do a morning's work before you'd go in there. It was a great industry, great.

And it was great for the land, the sugar beet. Sugar beet, because you'd have a great, uh, you'd have a great crop again, a rotation crop the following year because the land would be rich from, from, uh, producing growing sugar beet. But that's all gone now, there's no more sugar beet, just old fodder beet alright for feeding the stock.

Gabriel Coleman: And so you were working part time at the factory [00:47:00] as well as part time farming, but not on this land?

Pat O'Brien: Yeah, I was.

Gabriel Coleman: It was here?

Pat O'Brien: Here as well. Well, I was working this land, we farmed it all together between my brothers and my father and uncle.

Gabriel Coleman: So is this part of the larger holding that you grew up on?

Pat O'Brien: No, it's not. This is separate. The larger holding is where my two brothers live.

Gabriel Coleman: And so, how did, when did you first start working this land? What are your early memories of it?

Pat O'Brien: I started working this in, about 30, 40 years ago, so, I'd say I was about 24, 23 when I started working.

Gabriel Coleman: Yeah. Yeah. Um, and, I guess maybe we could go out maybe after lunch or something and talk a little bit about, because I want to go out and [00:48:00] Yes. Just chat about, you know, how things have changed specifically in this landscape, but, um, let's see, some of the other things I'm curious about. So you were involved with the IFA pretty heavily?

Pat O'Brien: I was, uh, involved with the IFA for a short period. Well, I was involved in the local branch here, I was five years chairman at the local branch. And then from, you're an officer at the local branch you represent your local branch at a county executive meeting. That's where

every branch would have two or three delegates, the chairman and secretary, and there'd be a third delegate from each branch that would attend the county executive. I represented Galway on the Industrial and Environment Committee at a national level. There was one from every county.

Then, [00:49:00] uh, I got involved in politics. And I, when you get involved in politics, you have to step away from the IFA because it's non political. So I, I ran for the, for Galway County Council. Unfortunately, or maybe fortunately, I didn't get elected. I came near enough to it, but I had no political background and, uh, I could have ran the next, at the next election, and I, I, I probably would be easily elected because I'd only half my own parish and the constituency boundaries were changed and I'd have all my own parish and I'd have a, a lot of other parishes that I hadn't at the time out. Headford and Claran, going back to the lake.

I had none of that. But I did very well [00:50:00] in my own, half of my own parish. I ended up out of 730 votes, I got 500. And a senior politician at the time said to me, Pat, if you get 300 number ones out of your own parish, you'll be elected. But I ended up with 1100 votes, which I was near enough at another 140 or 150 number ones I'd be elected a local councillor for the Tuam electoral area.

But, uh, I'm not sorry because I, I feel that I love farming and I, I, I like out in the land. And I probably would have to neglect something because, you couldn't keep answering your phone and attending meetings and gone every night of the week and farm, so I don't regret it.

Gabriel Coleman: As far as the, because I'm interested in the relationship of farmers with different organizations [00:51:00] and how these changes to the land and to practices came through different relationships. So what would you say, like, how would you describe the significance of the local IFA to farmers here, or?

Pat O'Brien: Yeah, well, the local IFA is, is good for, for farming, and especially, um, it's good for, for farmers that are living in isolated areas, because it gets them out for their mental health to meet other farmers at county level every month and even at the local branch. And another thing in relation to the IFA at local level and at county level and at national level, is it's very educational. You learn a lot about schemes. [00:52:00] You learn how the IFA lobbies national government and local politicians.

They lobby them for, on different issues. And, uh, the IFA, one time it was a very strong lobby group where it could nearly change a government at a general election. But nowadays, uh, the IFA don't seem to have the power it used to in the past. It, it, it, it was, it was one of the, the strongest lobby groups in, in, in Ireland or even across Europe. Um, the farming bodies that represented farmers were, had a strong voice, but, um, in relation to, to the today, uh, 2024, the [00:53:00] IFA are, are, are not a powerful group when it comes to changing a government at a general election. They don't have the voting power in rural Ireland. The cities have the big, bigger say when it comes to an election.

Gabriel Coleman: You were saying about their, um, educational uh, work as, like, as well as lobbying, getting, getting farmers together and, uh, helping to educate them about different things. Do you have any, like, um, specific examples or things from your own experience?

Pat O'Brien: Well, if you, if you take the, the new scheme now there for cows and, and suckler cows, this SKEPS scheme, that, uh, can be complicated for farmers in relation to all the rules and regulations offered and the IFA do hold meetings, regional meetings [00:54:00] and they bring farmers together and they explain how it works and what the penalties would be if you don't comply to the rules and regulations and that's, that's very good in relation to education and giving farmers the knowledge to be able to apply for those schemes and to do things.

WALKING THE LAND

Now this is the sheep shed I use for 11 ewes. I've got the pens are taken up at the moment. These are rams. Ram lamb.

Gabriel Coleman: And when was this built?

Pat O'Brien: This was built in the eighties. About thirty years ago, thirty-three years ago. Now this silage slab here, I did make a pit of silage, but [01:20:00] I didn't make it this year. I made round bales. You see, when you make a pit of silage, Gabriel, there's a bit irky, you know, the effluent flow runs into that channel. And then it goes into that pipe over there. And it runs in here into the slatted tank. It's stored in the slatted tank. See, slatted tank.

Gabriel Coleman: And so then you can spread it back over the fields.

Pat O'Brien: Yeah, it's agitated with slurry. See, this is a slatted shed. You put cattle in there. They weren't, going back now to my father and uncle's time there was no such thing as a slatted shed. They were, they only came into force the 70s, late 70s they started building.

There's another [01:21:00] shed here, another slatted shed I have for suckler cows. That's a creep, creep area here. Them tires are used for covering a silage pit. See I didn't make silage, I have a small bit. The creep area and the paved silage pit. The cows creep out the gate.

Gabriel Coleman: Okay. That's there for And so this was all part of the same, like the silage pit and the building was all the same development?

Pat O'Brien: Yeah. Yeah. And that's the dungstead. You know where you put-

Now see that hedge? Yeah. I was in the Farmers Journal with a picture from when I joined the REPS, sowing that hedge. I sowed that for, for the REPS. [01:22:00]

Gabriel Coleman: What kind of a hedge is it?

Pat O'Brien: And then I sowed that hedge going in that laneway.

Gabriel Coleman: It's a whitethorn. And you're in the farmer's journal?

Pat O'Brien: Yeah, I was in the Farmer's Journal. Yes, I was in the farmer's journal with that picture. That hedge was only that high then.

Gabriel Coleman: Okay. I will have to look because I have, it's one of my sources, I look at the Farmer's Journal archives.

Pat O'Brien: This is going back how many years ago, I don't know how many years.

Gabriel Coleman: Oh yeah, but I've got it back all the way. Well if you look I'll find your picture.

Pat O'Brien: You could see me. So that's my land down there where the suckler cows are. And you see the hedge. I owed that hedge, and this hedge. You see this hedge here?

I'll open this. You see where the suckler cows, the cows are. You see there's a hedge along there. Yeah, I sowed that and see that other head [01:23:00] I sowed. I'll bring you down now in a minute. Come on.

Gabriel Coleman: Yeah

Pat O'Brien: I sowed this orchard and I sowed that hedge, and I didn't have to sow that hedge there but I sowed that. Now that's a bit of silage I'd left over from the, the pit of silage. Now there's a bit of water running out there, but there's no effluent coming out in that round there right now for the moment.

Step in over this whole thing. See that's where you get the, [01:24:00] that's what you'd call now, uh, Gabriel, like wintrage that have years ago not eaten and they'd, they'd cattle in it for the winter.

Gabriel Coleman: Ah, I see, I see.

Pat O'Brien: You know, a whole bit north of there now. I sowed that for, for REPS or ACRES or, or GLAS, one of them.

Gabriel Coleman: One of them, yeah. And do you pick any of the apples?

Pat O'Brien: We do, yes. And I've sown all that hedge down along there. See, that's what's big. Hedges are, are great for wildlife. They run under them, and foxes run under them and birds. There's no nothing to upset. [01:25:00]

Gabriel Coleman: Now, what could you say about what's changed in terms of the, uh, the pasture itself and the kinds of different grass species, clovers, um, has that changed much since, sorry there, has that changed much since-

Pat O'Brien: It has, because land now is much more productive, because there's more manure and fertilizer. See, the life of that land there now, you wouldn't get wildlife. Like one time, when you'd be walking, you'd see partridges and pheasants. You wouldn't see them now.[01:26:00] But then, in order for to turn back the clock, governments have to increase the finance or funding for farmers. If they had to, to farm them that way, in order for farmers to make a living. You know, it's as broad as it is long. You can't turn back the clock, and, and, and not farm without some source of income. How are you going to live? How, how are farmers going to live?

Gabriel Coleman: Well, that's what I've found so far is, you know, that this intensification movement, it didn't happen naturally. It was, there was so much investment in it.

Pat O'Brien: Yeah, it was driven. Farmers were encouraged to, to increase, increase their stocking rate, and to put out [01:27:00] more fertilizer and carry more stock and produce more food.

Gabriel Coleman: Yeah so it makes sense that if you want a similar change you've got to-

Pat O'Brien: I saw on that hedge as well, on the way in, the driveway coming in.

Gabriel Coleman: And so this field we're in now this would just be pasture as far back as you can remember?

Pat O'Brien: Yeah, there was tillage here. When I was a farming, started off, we had barley here. See, I'm supposed to keep the walls built. See, they didn't want gaps but you know they fall. I'll have to rebuild them then. There's a neighbor there then, and I'm gonna, I have electric inside, you see my cattle cannot knock the walls, because it's an electric fence. Ah. But they put cattle out there, and see, they knock all the walls. Ah. They never build them. But I do have to try.

Brian Joyce: Pat, where did you find that grenade?

Pat O'Brien: Oh, I found it [01:28:00] here, on this wall. I found a grenade one time. Yes. That's still, if you Google it, you'll see it. The army had to come to detonate it. A bomb disposable unit.

Another thing, years ago, there was no electric fences. It was bull wire.

All right, come down around this way, because the bull lives this way. [01:29:00]

Gabriel Coleman: Okay.

And so when did you start putting in all the electric?

Pat O'Brien: I did that after, down through the years. I'll tell you where I learned that, when I used to go up to Elizabeth's place with her father. I seen the electric and, and I copied it because it is very handy for bringing in stock.

Brian Joyce: If you have barbed wire, Gabriel, the sheep will get stuck in it. They won't be able to pull themselves out. So, electric wire is better it's not barbed.

Pat O'Brien: A lot of [01:30:00] lowland in here, you see, and have it drained. There's drains on this.

Gabriel Coleman: And you're saying it was, you said it was drained?

Pat O'Brien: Yeah, I could clean those drains, the springs further on down the land.

Gabriel Coleman: Okay.

Brian Joyce: There's the bull.

Pat O'Brien: So you see the drain now, I'm going to clean that [01:31:00] again now. Yeah. I cleaned it a number of years ago.

Gabriel Coleman: And this must date back quite a ways. Does the drain itself date back a ways or?

Pat O'Brien: That runs into the lake. See that lake? You can see the water. That runs in there. Now that drain goes all the way down there. See that hedge now there? Now I have to sow a piece of hedge here. And I have to plant spot since last spring. Or before [01:32:00] last year. It was too wet to sow and you're not allowed to drain it. When you're in ACRES. I had it drained years ago. I drained it. I don't know, the shores must be broken or blocked up or something.

Gabriel Coleman: And so because of ACRES, you wouldn't be able to uh, remake it?

Pat O'Brien: No, you're not. And you see, if the land is very wet the whitethorn, it didn't thrive on it. See, that gets very wet in. But I said I'm going [01:33:00] to sow it anyway. See here now, I have to sow it all the way up to that end of that hill. We just can't throw it in November because the hedges, the hedge goes to sleep. Yeah. And you can sow it in. Then when spring comes, it'll start growing again.

Do you want to go a bit further?

Gabriel Coleman: Uh, sure. If you'd like.

Pat O'Brien: Now, you see what I mean by fencing off the drain? That's electric, it doesn't let stock down it.

Gabriel Coleman: [01:34:00] And so which fields would you be cutting silage from?

Pat O'Brien: I cut near the house. And the field. Yeah. I have to, I have to get them hedges trim. Now you can trim them from the 1st of September onwards.

Gabriel Coleman: And within the REPS scheme, are you able to fertilize at all with the silage or?

Pat O'Brien: Yeah a certain amount. Even here now, I can put a bag. A hundredweight to the acre.

Gabriel Coleman: And when you made this, uh, this baled silage, is that just a single cut you did or?

Pat O'Brien: That's all. Yeah. But I do a second, not much. Okay. Small [01:35:00] bit, second cut.

Gabriel Coleman: This is, yeah, I'm, uh, It's interesting how all of that is established. You know, the, um, the practice of taking two or three cuts and making sure you fertilize between all of them. Um, And I was also reading about, like there was a conversation about the fact that clover, when you fertilize, um, it can depress the clover? So if you have a field that's rich in clover, it's not as good to use fertilizer on it? Um, is that something that you would have, like, come across, or?

Pat O'Brien: Yeah you also sow clover. Uh huh. Clover, uh, [01:36:00] It produces nitrogen itself from the air or something. So I just sowed that hedge now for REPS and GLAS as well. Okay. There's no hedge there.

Gabriel Coleman: It's a very big field then. Would you come here a lot, Brian?

Brian Joyce: Um not too often. For family events, yes. I did have to come here nearly every two weeks this summer for soil sampling as part of an experiment that I'm running. [01:37:00] Um, it was a good farm to run experiments on because of course I'm related to the farmer. I'm able to communicate well with him and organize, uh, my sampling and know when slurry was spread. Where it was spread, where it was not spread. What different agricultural practices were done to the fields, etc.

Gabriel Coleman: What's underneath?

Pat O'Brien: Sand. But the springs, you see, the, the, the drain [01:38:00] starts there. Okay. But then the other side of here, the drain goes down the whole end. Then I have a place down here, just kind of preserved for the waders. They're a little small birdín. And the, the, the according to the department, there's waders in it. Ah. It's a bit boggy.

Brian Joyce: Waders would be like snipe. Woodcocks.

Gabriel Coleman: Plovers? Are those?

Brian Joyce: Yeah. That's another kind of wader

Gabriel Coleman: They have those in, um, in New York City. You can go see woodcocks. In Bryant Park. [01:39:00] They nest there in the, well, I don't know if they nest. They mate there, I think.

Brian Joyce: Yeah.

Pat O'Brien: That's the lower end there now. There's a big drain going at the end of that. It's cleaned by the OPW. That's another state body. That's the crowd that spend all the money on the bike shed. They don't do a whole lot.

That's not my land, now, outside it, but that would be a great place for wildlife, you know, foxes. I'll show you the border walk frame here. See one, going back years ago now, they could keep this field. And let winterage, like the orchard, grow that height. And then [01:40:00] they'd put cattle in it at around Christmas. And they'd live in it without feeding them. On winterage.

Brian Joyce: Is

that a snipe? Yeah. I see the snipe. So

Pat O'Brien: See I get paid not to over manure this.

See, there's a bog there. There's a bog outside of here.

Gabriel Coleman: Okay. And how long have you been keeping this?

Pat O'Brien: That's, that's since ACRES, now, that came in.

Gabriel Coleman: Okay. So a long time then.

Pat O'Brien: Well, ACRES only started. The ACRES are down in two years now.

Gabriel Coleman: Oh right, yeah. Now I'm getting them mixed up.

Pat O'Brien: You're mixed up with GLAS and REPS. REPS was the first one, and then GLAS.

Gabriel Coleman: Yes. [01:41:00] And have you noticed a difference in the two years in changing the manuring?

Pat O'Brien: Eh, you would, because you don't put out as much.

Gabriel Coleman: Yeah.

Pat O'Brien: Couldn't get much land like that now up in Meath. Maybe south Meath, Longwood would be good, or do you know how, um, Oldcastle, that's, the land didn't as good there. But around Navan there. North Meath, there's great land in Meath. See that's boggy there on the road.

Gabriel Coleman: Ah, yeah.

Pat O'Brien: See that's the oak, look up there. I haven't cleaned that for years, because it's the heads [01:42:00] that have the, the, the, the forest pulled away. We kept water in that full time. Uh huh. All year round. I know the fences up. Yeah, yeah.

Gabriel Coleman: I'm looking for sphagnum moss, if it's boggy, but no.

[Phone rings] Is that your man?

Pat O'Brien: Could be.

Pat O'Brien: Come up along here now, and I'll show you this drain. She sounds, they sound nice people. She's, the wife is with them. Or, I don't know whether it's his wife or his mammy. She called herself Mammy Wilde. Uh huh. Maybe that's the name. May Wilde or something.

Brian Joyce: There's sphagnum moss there, and that's fox poo, [00:55:00] so, but you can see what the fox is eating and it's all blackberries. So it just looks like blackberry.

Pat O'Brien: And there are birds there so you're not supposed to spray that with Roundup. You're allowed to strim it. Do you know the strimmer? You can spray briars alright, with um, Grazon 90 or something for the electric fence but you'd have no cutting. See all this spraying has stopped.

Even though this fence is low, the cattle will never go near it. So this area here is for these waders. I have nothing on this land in for the winter, [00:56:00] Brian, or Gabriel, I have stock in, there's nothing here. I don't see foxes here, what I do see is hares. I don't like hares. It's not that I don't like them. They'll eat my whitethorn hedge if I don't try. They eat the bark and kill it

Brian Joyce: They have to put the plastic cones at the bottom of it.

Pat O'Brien: Well, you cannot do that to a small whitethorn hedge but I can't because I have loads of them. I'd have to put a chicken net on each side to try and keep them out. [00:57:00]

That's an awful deep drain. It goes down an awful deep there till it falls. But that dries up during the summer. It's full of foxes and wildlife down there. There's nothing to interrupt them.

Gabriel Coleman: It's cool to see the moss growing alongside though.

Pat O'Brien: That's the kind of moss that you know about?

Gabriel Coleman: Yeah.

Pat O'Brien: Do you like that or what Gabriel?

Gabriel Coleman: Yeah, cause it's like, the sphagnum moss is what makes a bog a bog. Yeah. Cause it, it makes everything acidic.

Pat O'Brien: Oh yeah. So that. You know how bogs were formed? Well according to what I read, is that years ago forests all fell. And the timber all rotted. And that's how bogs formed.
[00:58:00]

Gabriel Coleman: Because it rotted and preserved.

Pat O'Brien: Yeah, the timber all, the trees fell. And they weren't, they all rotted into, and as you said, see when you walk in a bog you can feel the ground shaking under you. See, when we were under British rule, gone back years ago, Meath and Dublin was, the English called it the Pale. Cromwell at that time, was ruling Ireland for, he was English. He said, to Hell or to Connacht. And you see, they wanted the good land. And then, if you look at the houses, you pick out all the huge, big houses and walls, like Ashford Castle.

Gabriel Coleman: Where you ever in [00:59:00] Cong.

Gabriel Coleman: No.

Pat O'Brien: Oh you should go to Cong.

Brian Joyce: It's where the Quiet Man was filmed. So there's a big-

Pat O'Brien: It's a very attractive tourist little village. Yeah. In what county?

Gabriel Coleman: Yeah. In what county?

Pat O'Brien: It's in Mayo now it's only about 20 minutes from here.

Brian Joyce: There's a big statue of John Wayne holding Maureen O'Hara. It's so lifelike when my dog barks at it, he hates it.

Pat O'Brien: Even back Cashelhacket. Where are you going back, the Tuam Road?

Brian Joyce: Yeah, probably. We drove past there to get here.

Pat O'Brien: Did you? Well, if you look at Cashelhacket, there's a big house in off the road. You'll see it in, a big field in front of it. Cashelhacket House. Do you know that house?

Brian Joyce: Yeah, kind of.

Pat O'Brien: It's on the left. Do you know where you go for the walk? When you pass the walk, go easy and show Gabriel. That was owned by an English landlord. And they, going back to that time, farmers had to give the landlords [01:00:00] rent. They didn't own the land.

Right. The Irish, they had nothing. And then we had a famine because the potato blight killed, and, and the Irish starved. A lot of them went to America. Did you ever hear the song, is it, uh, um, oh dear, I can't think of the song. Isle of Hope. Isle of Hope. So, like the migrants now, they got on boats to go to the States. So, Joe Biden, he came from Mayo .

Gabriel Coleman: Yes, yeah. In where?

Brian Joyce: Ballina.

Pat O'Brien: Ballina, yeah. President Kennedy, they came from Wexford.

That drain now runs all the way up to the road. [01:01:00] Now see them rushes. You, you, you can, you can spot spray them, but you can't spray them with a, a tractor sprayer. You can cut them from the first to July onwards. Top them.

Brian Joyce: With the tractor sprayer there's a higher risk of it going not on the uh, rushes.

Pat O'Brien: Around here. That's where's they're eating blackberries. You can track for them here.

Brian Joyce: That's why you have to spray it by hand, so it's, you know, it's you pointing directly at the plant.

Pat O'Brien: There's a, there's a pipe running along there. [01:02:00] You wouldn't see, ivy is another thing that grows rapidly too.

Brian Joyce: So you have to have your water troughs raised to try and stop badgers from drinking from them and then giving your cattle TB.

Pat O'Brien: Now you see there was a wet spot there now, and see how the hedge didn't do as well. So I have to sow it now again in that other wet [01:03:00] spot.

See that spot there, I don't know what happened, but it got so wet, probably the water isn't able to soak down. But I see a lot of duck.

Brian Joyce: Oh, there's another snipe.

Pat O'Brien: That go in there. In the ACRES now, you're not supposed to touch that either. [01:04:00] And years ago, If Teagasc came out, they'd tell you to drain that. Yes. Do you understand what we're saying?

Brian Joyce: So snipe are where the word sniping came from?

Pat O'Brien: Why don't you try and get on Ear to the Ground?

Gabriel Coleman: Say again?

Pat O'Brien: You should be on Ear to the Ground and do it.

Gabriel Coleman: Yeah, we'll see.

Pat O'Brien: How do you get on that program?

Gabriel Coleman: I gotta know somebody in RTÉ, I think.

Brian Joyce: I'm saying it's so difficult to shoot, there's another one, snipe because of the way that they fly. That's where the word sniper came from.

Pat O'Brien: See the water, it's like a claise, it's called.

Gabriel Coleman: Yeah, Okay. [01:05:00] Oh, there you go. That's a duck there. Yeah, it's very nice to have.

Brian Joyce: Yeah, I love seeing all the birds, personally.

Pat O'Brien: My land runs along here and up along. That's not my land, no, out there. Yeah.

Brian Joyce: Why is there that bare patch over there?

Pat O'Brien: That's where the bull, yeah.

That's the main line now, them, the heavy power that's going to Castlebar. So they're going, [01:06:00] doing something with that now. They're going, putting up new wires, taking down the other old wires. Okay. And replacing the poles. They're replacing poles after over 20 years.

Brian Joyce: So if you want to cut off the electricity to Mayo, this is where you do it. This is how you do it.

Pat O'Brien: You hear people saying that it's not good to be living near them. Give off radiation. So don't breathe Brian, walking under them. The turloughs one time, now I tell you about, they were full of bushes like [01:07:00] that.

Gabriel Coleman: Mm hmm. Yeah, I can see what you're saying about the stock taking shelter.

Pat O'Brien: They're all whitethorn. They're, they're, they're, well according to the courses, when we're doing the course for the ACRES, see how the tramp has been on to them there now? See that? That's foxes and wildlife. See look, the grass is broken down. They run like a railway track up along them. And there's nothing to disrupt them or hurt them. If you look there you'll see.

Gabriel Coleman: It's nice to see the impact, I suppose.

Pat O'Brien: In Meath there's no walls, they're all hedges. But Meath has the lovely mountains.

Gabriel Coleman: Yeah I was saying you know you're out West when they've got all the stone walls all around.

Pat O'Brien: Why there's so many stone walls in the west is that. There was a lot of limestone. So they had limestone quarries. And the people one time, it was horses and carts. They build all them walls. Drawing stones.[01:09:00]

Gabriel Coleman: So what would you say is the biggest change to the land since you were young? Is it all this, all the REPS things you've been doing?

Pat O'Brien: Yeah, well um, there's a big change with land because people removed. Um, a lot of scrub and, you know, turloughs that sent out years ago, that line, that have all that removed, and see that tree out. They'd have it all levelled and carrying a load of stock. Well there'd be only, uh, a small, um, stocking rate, that have tripled the stocking rate or quadrupled it.

It had been, you know all made, made in a [01:10:00] way for intensive farming. This group here and I, got a great grant to get it done. I had money left over after the grant. It was all whitethorn and big trees around there, well, like them there. And I got in a dozer and diggers and I got the grant, the Teagasc men, they encouragement to do it.

Brian Joyce: Remove the whitethorn.

Pat O'Brien: Yeah, remove the trees.

Brian Joyce: And now it's all plant more and more.

Pat O'Brien: Well, they're making me put back hedges now. They're not, one time when the REPS came out, we were getting 10,000 an acre. Yeah, 10,000. Then they cut it to five for, for GLAS and now they increased it, [01:11:00] but they didn't increase it a whole lot. See, the single payment or the basic payment, that's all cut. I was cut about 3,000 Euros in payments.

Gabriel Coleman: Um, would you say that these, um, like REPS schemes, are they the kind of change and like payment you'd like to see more of, or is there other

Pat O'Brien: Well that's the way a farming is going to go. Yeah. It's going to be all environmentally, attached to the environment. It has to be because. [01:12:00] But then again, what about Russia and China and Germany and all these countries, are they? You see Russia there. All the pollution that's gone up in there, bombing Ukraine. Israel bombing, Gaza to the ground, you could say.

Gabriel Coleman: Well, I can tell you the States. I mean, you'll have to ask the guy in Cornell as well, but where I'm from, it's not. It's just corn and soy for miles. Plenty of fertilizer every year, all this. Yeah. So, no such. Well, there are some schemes, but they're mostly, um, what do they call them? Buffer strips.

Pat O'Brien: I'm sure Trump doesn't believe in climate change.

Gabriel Coleman: No, yeah. Well, and that's [01:13:00] the thing. This is in Minnesota. They have the DNR, the Department of Natural Resources, is very good about these kind of schemes for farmers, at least for pollution. But in other states, you cross the border to Wisconsin or Iowa, and it's completely different. No such Buffer strips along the rivers, or, So, It's nice to be in a place where there is something.

Pat O'Brien: Now there was an old house there one time, and it was attached, it was fallen in, my aunt, and the person that got this place from, I demolished it, and I had cattle pen and things, and I kept the old shed on it too.

Brian Joyce: Yeah, there's the bull.[01:15:00]

Pat O'Brien: I'll probably have to come down again to show this man the sucklers.

Brian Joyce: You're going to have to start charging for tourists. There's a farm tipper I know that organises buses full of American tourists to come and walk around the Irish farm and see what it's like. He's making more money from that than actually farming.

Pat O'Brien: There's a fella back on the way to Clifton, Daniel O'Hara, [01:16:00] and he'll bring you on a horse and cart, and up a road up to the mountain, show you where they were making the poitín years ago.[01:17:00]

You can see going back when I was talking about cocks of hay and everything years ago. There was no such thing of producing all this plastic for round bale.

Gabriel Coleman: Because the plastic is for the effluent, right? To keep it and to keep it airtight, I guess.

Pat O'Brien: To keep it, to preserve it into silage. Brian would know about that. How silage is grass is fermented into silage. It's all got to do with producing. It, it, it gives off so much carbon emissions when you're producing plastic. Plastic is made from oil, isn't it?

Gabriel Coleman: But even from the stuff I'm looking at back in the [01:18:00] late 50s, early 60s, it's always silage, you need plastic sheeting. Like, it's an essential part of it. There's no, no alternative.

Brian Joyce: Another big thing about silage is it's easier to produce in poorer weather. You don't have to leave it on the ground to dry as long. So with climate change, the land's gotten actually wetter. For example, this year on my own farm, we hoped to make hay, we couldn't because the weather was so poor, there was no sufficient dry period to make hay and we had to make silage. Yep. That's another reason for why most people have gone over to make this silage.

Gabriel Coleman: Well, that was in the 80s. It was, there was, in 1980 and 1983? They were very, very, very wet years. And there were farmers up in Mayo and in Tyrone and like the northwest kind of of the country. Um, who were just panicking. Because they couldn't make [01:19:00] anything. And so, that was like what pushed a lot of farmers to start. But then, yeah.

Pat O'Brien: I saw that bit of hedge there, saw it, but somehow didn't grow. That wall left up. That stone wall.

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