

Some Provincial Variations in Irish Agriculture

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The statistics relating to Irish agriculture as a whole convey an impression of general stability during the quarter century preceding 1950, but there the stability seems to end. Since then output has increased significantly and in addition the National Farm Survey 1955-1957 has shown that the regional returns accruing from similarly-sized enterprises and similar activities differ greatly. This prompts a curiosity about the nature of the pre-1950 stability—whether it applied equally to the component areas of agriculture or concealed development in some that was balanced and cancelled by a decay in others—and similarly with regard to the progress since 1950, whether it has been general and uniform or confined to particular regions.

To estimate trends in regional output and the relative importance of different areas as agricultural producers involves an element of conjecture that imparts to the exercise a margin of error and obliges the results to be treated with reserve. Even the delineation of the regions must to some extent be arbitrary. The provinces are an immediate choice. They possess distinctive economic features but they are not distinct economic units. Neither are they self-contained. The organization of output generates between them a traffic in both crops and animals. This interprovincial dealing cannot be fully disentangled and estimates of provincial output cannot therefore be exact. However the provinces are geographical entities of long standing and sufficiently dissimilar in economic, social and demographic character to have acquired separate identities in the public mind. They are the generally accepted divisions of the economy and are accordingly taken as the basis of this regional study.

This paper is an attempt to assess the changes in the agricultural output of the provinces from 1926-27 to 1955. The methods used in the computation and the basis on which the chief items are allocated among the provinces are set out in the Appendix. There it will be noted that no allowance is made for interprovincial trading in crops such as oats and feeding barley, intermediate products in the agricultural process, although up to 1955 this interprovincial trade in feeding barley had not attained the dimensions of more recent years. Notwithstanding the limitations on their precision the results are believed to reflect the main outlines of agricultural development in the provinces and, in view of the length of the period, the basic trends in the regional prosperity of agriculture during this century.

Volume indices of agricultural output and its main constituents given in Table I indicate that development in the provinces proceeded at very different rates and that behind the slow growth in total production and concealed by it lay a great deal of counterbalancing loss and gain in provincial outputs. In 1938-9, for example, the index of total output stood at the same figure as in 1926-7; the regional indices did not. They showed instead a perceptible difference in the productive ability of the provinces that broadly indicated the future trend in their relative significance within the agricultural sector. Leinster and Munster appeared as areas of economic growth, while Connacht and Ulster (3 counties) already carried the marks of stagnation or decline. Since 1938-9 these disparities were accentuated by the more rapid development in Leinster where output was expanded by almost one-third, a rate of increase nearly three times as great as in Munster and double that recorded for the country as a whole. Contributing nearly two-thirds of the increase in total output, compared with about one-third from Munster and practically nothing from the provinces of Connacht and Ulster (3 counties) combined, Leinster emerges as by far the most progressive segment of agriculture.

The output of livestock and livestock products decreased in all provinces between 1926-7 and 1938-9 and then increased; the pre-war decrease was greatest in Connacht and Ulster (3 counties) and the subsequent increase was greatest in Leinster and Munster. The main result in this branch of agricultural activity which accounts for three-quarters of total output was a substantial improvement in the output of Leinster and a significant decline in that of Ulster (3 counties). A similar though much more pronounced change occurred in crop production. In the pre-war period output was increased, offsetting the reduction in livestock and livestock products, but although general the increase was concentrated in Leinster and Munster. Since 1938-9 crop production contracted in Connacht and Ulster (3 counties) but expanded in the other two provinces, particularly Leinster, where it is now nearly two and a half times as great as in 1926-7. Leinster and Munster succeeded in developing and intensifying their farming, expanding the output of animals and crops, while Connacht perhaps maintained the *status quo* and Ulster (3 counties) suffered a drop in output, which before 1938-9 was confined mainly to livestock and livestock products and since then to crops.

The changing importance of the provinces as agricultural producers is better seen in Table 2 which sets out their proportionate contributions to the agricultural output of the State. Between 1926-7 and 1938-9 the change in the proportionate output of the different provinces was slight but, gathering momentum since then, the result has been to reduce to a significant extent the relative importance of both Connacht and Ulster (3 counties), and to advance Leinster to a position of near equality with Munster.

In the livestock and livestock products sector the amplitude of the change was small, a moderate contraction in the proportion of output attributable to Connacht and Ulster (3 counties) was accompanied by a corresponding expansion in that attributable to Leinster, while Munster having raised its quota, later lowered it to

its original dimensions. The net result of the changes in this branch of agriculture between 1926-7 and 1955 was to shift from Connacht and Ulster (3 counties) to Leinster approximately one-fortieth of an output that had been expanded by about 7 per cent.

TABLE 1.—ESTIMATED PROVINCIAL VOLUME INDEX NUMBERS OF GROSS AGRICULTURAL OUTPUT (INCLUDING VALUE OF CHANGE IN LIVESTOCK NUMBERS).
(base 1938-39=100)

Year	Leinster	Munster	Connacht	Ulster (3 counties)	State
A. Livestock and Livestock Products.					
1926-27	104	101	105	110	103
1938-39	100	100	100	100	100
1954	108	109	103	107	108
1955	119	107	105	101	110
B. Crops and Turf.					
1926-27	77	84	99	103	91
1938-39	100	100	100	100	100
1954	148	117	78	77	114
1955	163	119	86	80	124
C. Crops (excluding Turf).					
1926-27	73	75	92	100	84
1938-39	100	100	100	100	100
1954	161	137	98	86	134
1955	176	131	95	89	140
D. Total Gross Agricultural Output (including Turf).					
1926-27	97	98	104	108	100
1938-39	100	100	100	100	100
1954	119	110	95	99	110
1955	131	109	99	95	114
E. Total Gross Agricultural Output (excluding Turf).					
1926-27	97	97	103	108	100
1938-39	100	100	100	100	100
1954	121	113	102	103	113
1955	133	111	103	99	116

The changes in crop and turf production were more significant. In all years shown the proportion of output attributable to Leinster exceeded that for any other province but whereas in 1926-7 it was but slightly greater than the Munster figure and substantially less than that of Connacht and Ulster (3 counties) combined, in 1955 it was twice as great as the combined total for Connacht and Ulster (3 counties) and one and a half times as great as that for Munster. Most of this change occurred since 1938-9. By that year the total output of crops and turf had risen by about one-tenth and the

proportions attributable to Leinster and Munster had increased at the expense of Connacht and Ulster (3 counties) whose joint output was by then almost equalled by that of Leinster. Since 1938-9 the total output of crops and turf has expanded by about one-quarter. Leinster's contribution to the total rose from about one-third to nearly one-half; the proportion attributable to Munster remained practically stable, though here there may be some understatement due to the neglect of interprovincial trading in feeding barley; the combined share of the other provinces declined by nearly one-third. The exclusion of turf has an important effect on the relative positions of Connacht and Leinster but not on the other provinces. In 1926-7 Connacht produced close on one-fifth of total crop output and in 1955 about one-tenth, while in the same years, between which crop output as a whole rose by two-thirds, Leinster raised its proportion from two-fifths to more than half.

TABLE 2.—PROPORTION OF TOTAL GROSS AGRICULTURAL OUTPUT (INCLUDING VALUE OF CHANGE IN LIVESTOCK NUMBERS) ATTRIBUTABLE TO EACH PROVINCE.
Note.—Based on values at 1938-39 prices for all years.

Year	Leinster	Munster	Connacht	Ulster (3 counties)	State
A. Livestock and Livestock Products.					
1926-27	30.8	40.6	18.9	9.7	100
1938-39	30.6	41.7	18.5	9.2	100
1954	30.9	42.2	17.8	9.1	100
1955	33.3	40.6	17.7	8.4	100
B. Crops and Turf.					
1926-27	30.5	29.4	28.0	12.1	100
1938-39	34.4	30.7	24.7	10.2	100
1954	44.8	31.4	16.8	7.0	100
1955	46.1	29.9	17.3	6.7	100
C. Crops (excluding Turf).					
1926-27	39.5	30.8	18.1	11.6	100
1938-39	42.9	32.4	15.6	9.1	100
1954	50.7	32.4	11.2	5.7	100
1955	53.6	30.1	10.5	5.8	100
D. Total (including Turf).					
1926-27	30.7	38.3	20.8	10.2	100
1938-39	31.6	39.0	20.0	9.4	100
1954	34.4	39.5	17.5	8.6	100
1955	36.6	37.8	17.6	8.0	100
E. Total (excluding Turf).					
1926-27	32.1	39.2	18.7	10.0	100
1938-39	32.9	40.0	18.0	9.1	100
1954	35.2	40.1	16.3	8.4	100
1955	37.8	38.3	16.1	7.8	100

These very considerable changes in the volume and in the provincial distribution of crop and turf production between 1926-7 and 1955 were accompanied by much smaller changes in the volume and distribution of total agricultural output, indicating the predominant importance of livestock and livestock products in the output of the agricultural economy and the extent to which relatively small changes in this branch of farming can offset substantial fluctuations in other branches. Compared with the trend in crop and turf output shown in Table 1 and the variations in distribution shown in Table 2, the changes in the allocation of total output between the provinces were modest. Though modest, they represented a very great reduction in the difference between the agricultural potential of Leinster and Munster and a significant widening of the gap between these two provinces on the one hand and Connacht and Ulster (3 counties) on the other.

TABLE 3.—INDEX NUMBERS OF VOLUME OF GROSS OUTPUT (INCLUDING TURF AND VALUE OF CHANGE IN LIVESTOCK NUMBERS) PER MALE ENGAGED IN AGRICULTURE IN EACH PROVINCE.

(base 1938-39=100)

Year	Leinster	Munster	Connacht	Ulster (3 counties)	State
1926-27	87	86	96	93	89
1938-39	100	100	100	100	100
1954	146	138	124	132	138
1955	161	138	129	130	144

Taking into account changes in output and in the number of males employed, Table 3 shows the trend in productivity per male agricultural worker in each province and in the country as a whole. Everywhere the increase since 1926-7 in output per head was considerable and everywhere the greater part of the increase took place since 1938-9. Up to that year the increases in Leinster and Munster were similar and greater than in the other provinces. Since then the increase in Leinster was bigger than elsewhere and the increase in Munster akin to that recorded in Connacht and in Ulster (3 counties). The improvement in productivity in every province was significantly affected by the reduction in the numbers employed. Between 1926-7 and 1955 when output rose by 35 per cent. in Leinster and 11 per cent. in Munster, productivity in these provinces rose by 85 per cent. and 60 per cent. while in Connacht and Ulster (3 counties) where output fell by 5 per cent. and 12 per cent. respectively, productivity rose by 34 per cent. and 40 per cent. In terms of output per head there was an all round improvement since 1926-7 in the economic condition of the male worker in agriculture. By 1955 the average improvement per head for the State as a whole was about 62 per cent. but was not distributed evenly throughout the country. In Leinster it was twice as great as in Connacht and Ulster (3 counties) and about 40 per cent. higher than in Munster.

Table 4 relates productivity per head in the provinces to the average for the State and allows direct comparisons to be made between the provincial figures. In every year shown the figures for Leinster and Munster have been above, and those for Connacht and Ulster (3 counties) below the national average. Furthermore, since 1926-7 the figures for Connacht and Ulster (3 counties) have decreased; the figure for Leinster has increased while that for Munster rose and then dropped approximately to its original level. In 1926-7 productivity per male worker in Leinster was about the same as in Munster, about 44 per cent. higher than in Connacht and about 62 per cent. higher than in Ulster (3 counties). In 1955 it was about one-seventh higher than in Munster and roughly twice as high as in Connacht and Ulster (3 counties). This represents a considerable widening of the difference between provincial productivities and, in so far as gross output per head is related to income, a pronounced increase in income disparity in favour of Leinster and against the West and North of the country. In relation to his counterparts in other provinces the male agricultural worker in Leinster substantially improved his productive capacity between 1926-7 and 1955 and attained an output nearly one-third higher than the average for the whole agricultural sector.

TABLE 4.—VOLUME OF GROSS OUTPUT (INCLUDING TURF AND VALUE OF CHANGE IN LIVESTOCK NUMBERS) IN EACH PROVINCE PER MALE ENGAGED IN AGRICULTURE EXPRESSED AS PERCENTAGE OF AVERAGE FOR STATE.

Year	Leinster	Munster	Connacht	Ulster (3 counties)	State
1926-27	115	116	80	71	100
1938-39	117	120	75	68	100
1954	124	119	67	65	100
1955	131	115	67	62	100

The relative changes in the productive capacity of the provinces, associated with their differing degrees of intensification of farming and the consequent rates of increase in animal and crop output, may find part of its cause in the provincial patterns of farm size. Information available indicates that between 1931 and 1949 the intensification of farming was more pronounced on the larger farms. The data, summarized in Table 5, shows that while the proportion of land ploughed per 1000 acres of crops and pasture increased on all holdings, the increase varied directly with farm size, ranging from 8 per cent. on holdings under 30 acres to 111 per cent. on those over 200 acres. The area under hay declined progressively as farm size decreased from 1 per cent. on the largest to 19 per cent. on the smallest farms. Cattle numbers increased least and pig and poultry numbers declined most on the smallest holdings and although the greater contraction in sheep numbers occurred on the large holdings, the variation was not great. Excluding sheep,

the proportionate reductions recorded for the under 30 acre holding exceeded and the proportionate expansions fell short of the national average; in general the smaller the holding the smaller was the rate of increase or the bigger the rate of decrease in stocking density and in area cropped. The relationship between farm size and change in farming pattern was close and direct.

TABLE 5.—PERCENTAGE CHANGE IN DENSITY ON VARIOUS SIZES OF FARM 1931-49.

Item	Size of farm					
	1-30 acres	30-50 acres	50-100 acres	100-200 acres	over 200 acres	All holdings over 1 acre
	Per 1,000 acres of crops and pasture.					
Area ploughed ..	8	24	36	56	111	34
Area under hay	-19	-16	-13	-11	-1	-12
Cattle—Total ..	1	3	4	5	3	3
Sheep	-33	-31	-37	-44	-38	-38
Pigs	-54	-49	-44	-36	-16	-45
Poultry	-16	-3	2	6	9	-4

The effect of these changes on the volume of farm output is difficult to assess but the estimates in Table 6, taken from the Report of the Commission on Emigration and Other Population Problems (para. 112), where they are "quoted with considerable reserve", will serve as an indication. They show that gross output per cultivable acre declined by one-tenth on holdings under 30 acres, remained relatively stable in the range 30-100 acres, increased by one-tenth on 100-200 acre holdings and by one-fifth on those of 200 acres and over. They also suggest that the gross volume of provincial output may be significantly affected by the size distribution of farms, major changes in output being associated with a preponderance of large or small holdings and comparative stability resulting where 30-100 acres farms predominate.

The size distribution of holdings in the provinces is given in Table 7 and by reference to Tables 5 and 6 the distribution seems to split the provinces into two different categories as regards the

TABLE 6.—PERCENTAGE CHANGE IN VOLUME OF GROSS OUTPUT, 1931-49.

Size of holding	Per 1,000 acres of crops and pasture
1-30 acres	-10
30-50 acres	- 2
50-100 acres	+ 2
100-200 acres	+10
Over 200 acres	+21
All holdings	+ 1

change in output. In Connacht and Ulster (3 counties) more than 60 per cent. of holdings are under 30 acres and less than 5 per cent. are over 100 acres, while in Leinster and Munster about two-fifths and one-third respectively of all holdings are under 30 acres and more than 15 per cent. above 100 acres. While Table 7 segregates Leinster and Munster, as likely to have shown increases in output, from Connacht and Ulster (3 counties) it does not support any sharp distinction between Leinster and Munster; farm size distribution is similar in both provinces. It is true that the highest proportion of holdings whose output changed least, those between 30 and 100 acres, is located in Munster and also that these holdings comprise half the total number in that province but offsetting these considerations is the greater significance of holdings under 30 acres in Leinster and, finally, the relative importance of holdings over 100 acres, where output increased most, is closely similar in each province.

TABLE 7.—SIZE DISTRIBUTION OF FARMS (5 ACRES AND OVER) IN THE PROVINCES, 1955.

Province	Size of farm						Total 5 acres and over
	5-15 acres	15-30 acres	30-50 acres	50-100 acres	100-200 acres	over 200 acres	
	percentage distribution						
Leinster	18.2	23.7	20.9	21.0	11.6	4.6	100.0
Munster	13.7	20.1	23.1	27.8	12.1	3.2	100.0
Connacht	24.6	40.0	22.6	9.8	2.2	0.8	100.0
Ulster (3 counties)	29.5	33.2	20.1	12.4	3.7	1.1	100.0
State	20.6	29.2	21.9	18.2	7.6	2.5	100.0

A relevant and perhaps significant item in this context is the change in the number of the various-sized holdings within each province. Changes occurred in all provinces and while, as Table 8 shows, the force of the change was not uniform, its main characteristic was common throughout the country, a trend in favour of larger, but not very large, farms. Everywhere holdings over 200 acres and under 30 acres decreased in number and those of 50-100 acres increased. The greatest increase, absolute and proportionate, occurred in Connacht, the only province to record a substantial increase in holdings of 30-50 acres. Leinster, the only other province where the number of 30-50 acre holdings did not decrease, registered the greatest increase in farms of 100-200 acres. The general decline in the relative importance of the very small farms was most pronounced in Connacht and of the 15-30 acres farms in Ulster (3 counties) which suggests that even in areas where the small holding predominates the occupants are not content with the living standard it affords.

TABLE 8.—PERCENTAGE CHANGE IN NUMBERS OF FARMS IN EACH PROVINCE, 1930-55.

Province	Size of farm						Total 5 acres and over
	5-15 acres	15-30 acres	30-50 acres	50-100 acres	100-200 acres	over 200 acres	
Leinster	-20.1	-6.6	1.5	3.5	8.5	-7.2	-4.5
Munster	-12.5	-8.4	-4.5	2.1	2.5	-8.3	-4.2
Connacht	-24.3	-3.9	8.1	11.1	-3.7	-22.8	-6.7
Ulster (3 counties)	-15.7	-17.6	-1.8	8.2	3.0	-9.9	-10.8
State	-19.6	-8.0	1.0	4.6	4.3	-9.7	-6.1

Valuable information on the output and income of agriculture in the provinces is available from the National Farm Survey which draws its data from three regions that correspond broadly with the provinces, the East and Midland region with Leinster, the South region with Munster and the North and West region with Connacht and Ulster (3 counties) combined. It is clear from the Survey that the South region is the most prosperous and the North and West region the least. This in part has already been established by other evidence, such as emigration and population density, which has shown economic depression to be more widespread among the agricultural community in Connacht and Ulster (3 counties) than elsewhere. The Survey, for the first time however, indicates the magnitude of the regional disparity in output and in income and shows that it is not altogether the result of different patterns of farm size or peculiar to particular segments of the farming population. In the North and West region where the level of agricultural income was generally lower than elsewhere the disparity applied to all sizes of holding.

Probably the most satisfactory index of the income differential is labour and family income per adjusted acre farmed.¹ The "adjusted acre farmed" reduces to a pasture equivalent the rough grazing and commonage attaching to the farms. The use of total labour income removes the distortion arising from the uneven ratios of family to hired labour on the different sizes of farm and in the different provinces and enables comparison to be made on the basis of the return available to the human factor of production. The highest returns were recorded in the South region; the lowest in the North and West and in all regions return per acre decreased as farm size increased. The rate of reduction was not uniform and there was a general tendency for the difference between the regional figures to fall as farm size rose.

The prime reason for the regional disparity in income was, as Table 9 shows, inequality of output. In the South region output per adjusted acre was substantially higher than elsewhere on all farms under 200 acres. On the smallest farms it was twice as high

¹ See *National Farm Survey 1956-57, First Interim Report, Table 9.*

as in the North and West region where output per acre was lowest in every size group. In the East and Midland region output followed the same trend as elsewhere, declining as farm size increased, but the difference between the highest and lowest figures was less pronounced than in the South where output per acre on the smallest farms was exceptionally high and the difference between it and the figures for the other farm sizes much wider than elsewhere. If this size group is excluded the margin between highest and lowest outputs on farms under 200 acres in all regions is much less marked, though still greatest in the South and least in the North and West.

TABLE 9.—TOTAL OUTPUT PER ADJUSTED ACRE FARMED.

Size Group	East and Midland Region		South Region		North and West Region		All Regions Combined	
	1955 £	1956 £	1955 £	1956 £	1955 £	1956 £	1955 £	1956 £
5-15 acres ..	23.0	20.0	37.4	37.4	18.1	15.1	23.0	20.2
15-30 acres ..	20.6	20.5	26.3	24.9	16.2	14.5	19.8	18.7
30-50 acres ..	19.5	19.4	24.1	23.2	14.7	13.4	19.5	18.7
50-100 acres ..	18.0	17.7	20.7	20.3	14.6	14.5	18.8	18.4
100-200 acres ..	15.4	16.0	18.5	19.3	11.9	10.7	16.7	17.3
Over 200 acres ..	15.4	15.5	13.8	15.4	*	*	14.7	15.3

*Less than 10 sample farms in this category.

If cash output rather than total output is made the basis of comparison much of the difference between the farm output figures inside the provinces disappears. In some respects cash output is the more appropriate yardstick because it represents the farm's direct contribution to the exchange economy. It excludes from the total changes in inventories and household consumption, and records simply the nett difference between farm purchases and sales. The substitution of cash output does not, as Table 10 shows, alter the respective importance of the regions as producers. In all cases the highest figures were recorded in the South region and the lowest in the North and West. It does however alter the relative importance of the farms. In every region the greater reduction in the output figures occurred in the smaller farms, indicating the greater extent to which their resources are committed to production for household use. The reduction per acre in saleable output which this involved did not however vary much from region to region for any particular farm size. Production for household consumption would appear to be fairly constant in amount and therefore of proportionately less importance in the farm economy as farm size and farm output expands. Its exclusion from the total reduced substantially the margin between the per acre output of small and large farms in the South region, almost eliminated it in the East and Midland and changed the order of things so much in the North

and West that on 5-100 acre holdings output tended to rise rather than fall as farm size increased. An important feature of the table is the very large volume of saleable output produced on the smaller farms in the South region.

TABLE 10.—CASH OUTPUT PER ADJUSTED ACRE FARMED.

Size Group	East and Midland Region		South Region		North and West Region		All Regions Combined	
	1955 £	1956 £	1955 £	1956 £	1955 £	1956 £	1955 £	1956 £
5-15 acres ..	16.5	14.4	31.0	31.5	11.2	9.6	16.3	14.6
15-30 acres ..	16.0	16.9	21.9	21.3	11.6	10.8	15.2	15.1
30-50 acres ..	16.2	16.6	21.2	20.6	11.3	10.6	16.4	16.0
50-100 acres ..	16.0	16.0	18.6	18.6	12.1	12.4	17.1	16.7
100-200 acres ..	14.2	15.1	17.2	18.2	10.7	9.7	15.5	16.3
over 200 acres ..	14.7	15.0	13.0	14.8	*	*	14.0	14.7

*Less than 10 sample farms in this category.

In so far as it reflects prevailing conditions the National Farm Survey establishes some clear-cut conclusions about the state of agriculture. However much its organization and structure may have been shaped by the free play of the market it has not attained a position where returns are equal or even similar in its various sectors. Conditions of marked inequality prevail. Provincial incomes diverge greatly as do provincial outputs even when allowance is made for different patterns of farm size, while inside the provinces outputs and income per acre vary from one farm size to another. In the agricultural economy as a whole income and output are stratified on a regional and farm size basis and also by pattern of farming and between the extremes the margin is very wide. This ties in with the general import of Tables 1-4, that the provincial sectors of agriculture are unequal in economic significance and pace of development.

The National Farm Survey shows the South region, which corresponds with Munster, to be the most productive while Tables 1-4 indicate that Leinster is the most progressive. Are the two sets of data contradictory? Not necessarily; the former refers to a sample of farms in two consecutive years; the latter relates to the whole agricultural economy in years that are spaced sufficiently far apart to allow an assessment of change over a longish period. The one concerns the state of agricultural affairs at a particular time; the other their development. They do not deal with the same thing. They differ in source and coverage. They need not therefore be mutually corroborative and may yield results that seem divergent. It is possible for Munster to appear the most productive in one and Leinster the more progressive in the other. The most progres-

sive may not have reached the point where it is the most productive. While all this is possible some parts of the data nevertheless imply a divergence that is uncomfortably wide. The Survey shows, for instance, that on almost all sizes of farm output and income in Munster were substantially higher than in Leinster which if true is still surprising in view of the very different rates of development in those provinces since 1938-9 (Table 1). Again Leinster has the smaller area of cultivable land but contributes (Table 2) almost the same proportion of total agricultural production as Munster where, as the Survey suggests, farm output is so much higher. Finally some of the data in Table 4 does not seem immediately reconcilable with per capita output figures available from the Survey. Admittedly the latter refers to total labour and the former only to male labour, nevertheless the output per head shown by the Survey for all sizes of farm is so much greater in Munster than in Leinster that it seems at variance with the figures in Table 4.

More important than these however are some of the implications arising from the data relating to farm size. It was suggested earlier that the explanation of the differing rates of agricultural development in the provinces might be sought in their different patterns of farm size. Supporting evidence from Tables 5 and 6 indicated important changes in output associated with size of farm while Tables 7 and 8 indicated equally important differences between the regional farm-size distributions. The Survey leaves the result less certain and clear-cut. It confirms the assertion that farm size has an important bearing on volume of output but does not suggest that size distribution is the reason for the divergence between the provincial rates of agricultural development.

In all regions output per acre declined as farm size rose but the rate of decline was far from uniform and the recorded output for the different sizes of farm varied greatly from region to region. The primary influence affecting production was not therefore farm size but the general framework of farming conditions. Within that framework the volume of regional production varies according as small, medium or large farms predominate but the variation is not sufficiently great to change the relative significance of the provinces as agricultural producers. Thus on farms under 200 acres, as already seen, the lowest per acre output in Munster exceeded the highest in Connacht and Ulster (3 counties). No reshuffling of size distributions would alter the respective importance of these two regions because on every size of farm the recorded output per acre in one was higher than in the other.

If size distribution neither indicates nor determines whether the output of one province will exceed that of another it may not likewise be a main reason for dissimilar rates of development. The data in Tables 5 and 6 refer to the whole country but may not apply with equal effect to each of the provinces. It seems improbable, for instance, that small farms in Munster and Connacht with such very different volumes of output should register the same proportionate decline in production and it is difficult to accept that farms yielding a cash output of £31 per adjusted acre farmed experienced a contraction in output of perhaps one-tenth during the preceding couple of decades. It seems more reasonable to assume different rates of

decline where outputs per acre are very dissimilar and that the lesser decline will be associated with the greater output. Such assumptions do not upset the conclusion that farm size and changes therein affect the pace of agricultural development in the provinces. They do however make it virtually impossible to explain different rates of development mainly in terms of size distribution because similar changes in size distribution may not affect the output of the different provinces to a similar extent. It would seem appropriate therefore to attach less weight to farm size and more to pattern of farming in seeking to explain why agricultural development proceeded at different rates in the provinces. While this conclusion is prompted by a consideration of Farm Survey data and Tables 1-4, it must again be emphasized that these two sets of statistics do not refer to the same thing and the results they afford may appear divergent without necessarily being contradictory.

The changes in the pattern of farming between 1927 and 1955 represented adjustments within a framework of production that remained basically unaltered. Grass continued to be the main crop, occupying as pasture at least two-thirds of the cultivable area of each province and as hay not less than one-seventh. The ploughed area expanded in Leinster and Munster but contracted in Connacht and Ulster (3 counties); the expansion was greatest in Leinster and the contraction greatest in Ulster (3 counties). The increase in tillage was related directly to farm size and confined almost entirely to wheat and barley whose production is concentrated in Leinster and Munster. If ploughed land indicates farming intensiveness, output should rise more rapidly in Leinster and Munster than elsewhere and more rapidly on the large farms than on the small; the latter disparity would seem particularly adverse to the output of Connacht and Ulster (3 counties) where nearly two-thirds of all holdings over 5 acres are in the 5-30 acre size group.

These developments did not lessen the traditional importance of grassland and the grazing animal. Cattle numbers increased in every province and sheep in every province except Leinster. Pig and poultry numbers fluctuated very much and generally became less important in the farm economy. The expansion in the cattle industry was confined to dry stock. In Leinster alone was there a significant increase in milch cows: elsewhere numbers either remained stationary or declined. In Connacht and Ulster (3 counties) the greatest increase, absolutely and proportionately, were recorded for dry cattle over 1 year, and the older the animal the greater was the increase; in Munster the pattern of change was closely similar. In Leinster the greater increases were recorded at the younger ages. The trend towards beef production, which in prevailing conditions implies an extensive use of land and a reduced output per acre, was accompanied in Leinster by an increase in the milch cow herd, and in Leinster and Munster by an increase in the area ploughed. Connacht and Ulster (3 counties) experienced no such compensating developments to mitigate or counteract the effect on output of increased dry stock production. Except for sheep rearing, the change towards extensive farming implied, if not a reduction in total output, at least a rate of increase below that of the other provinces.

The changes in the pattern of production point then to a higher rate of development in Leinster and Munster than in Connacht and Ulster (3 counties). To what extent this was accentuated by the proportionate importance of the small holding in the various provinces is difficult to say. It is unlikely that the results of Tables 5 and 6 apply with equal rigour to all provinces but it seems even more unlikely that the reduction in small farm output should be lower in the North and West than elsewhere. It would appear reasonable therefore to conclude that the greater rate of progress in Leinster and Munster was reinforced by the provincial distribution of small holdings.

As between Leinster and Munster there is an immediate difference arising from their tillage programmes but with respect to live-stock and livestock products the distinction is not so clear. The proportionate change in cattle density was approximately the same in both provinces, though very differently distributed among the constituent categories and presumably to the advantage of Leinster in so far as it recorded greater increases for the more lucrative type of animal, the milch cow and dry stock under 1 year. As an off-setting item however it recorded the greater decrease in sheep, pigs and poultry. The effect of farm size is impossible to assess even

The final result of the developments between 1927 and 1955 is broadly from the data.

that Leinster now produces about the same fraction of total output as Munster and substantially more than Connacht and Ulster (3 counties) combined. These two provinces containing some 30 per cent. of the economy's cultivable land and 40 per cent. of its farming population produce about one-quarter of total agricultural output. Output per male worker, which rose at a rate lower than in Munster and substantially lower than in Leinster, is about half the Leinster figure, 60 per cent. of the Munster figure and two-thirds of the average for the whole country. In terms of agricultural output and income the economic condition of Connacht and Ulster (3 counties) has deteriorated significantly relative to the other provinces.

Income inequality may be eliminated in many ways, for example by differential pricing policies, intensification of production, migration. It is curious that in Connacht and Ulster (3 counties) provinces with the highest density of agricultural population, the trend in output was not towards commodities carrying a known or fixed price and requiring some intensification of production. Instead it favoured commodities whose production implies extensive farming and whose price, determined by supply and demand, fluctuates with the state of the market. This threw the burden of readjustment on the human factor. Since 1926 Connacht and Ulster (3 counties) have had the greatest rates of net emigration, the greatest decline in agricultural population and the greatest reduction in the density of agricultural population in relation to cultivable land. Despite its considerable extent the adjustment was inadequate and output per male worker declined by comparison with Leinster and Munster.

The disparities associated with agricultural development since 1927 accentuate, relatively if not absolutely, the economic problems of Connacht and Ulster (3 counties). Population density is higher

than elsewhere and small farmers are more numerous. If future development follows the pattern of past years per capita incomes will become relatively more depressed and population will tend to decline at even greater rates. These results are all the more probable if disparities in income and output within agriculture are accompanied by similar disparities in industry so that the provinces where agricultural development is greater enjoy also the greater share of industrial expansion as has happened since 1926.

APPENDIX

Item	Basis of Allocation of Main Items																																																										
Cattle + Calves + Hides	The agricultural prices of beasts at different ages were used to allocate the total final value of a beast between the four stages in proportion : <table><tr><td>Under 1 year</td><td>..</td><td>..</td><td>P_1</td></tr><tr><td>1—2 years</td><td>..</td><td>..</td><td>P_2</td></tr><tr><td>2—3 years</td><td>..</td><td>..</td><td>P_3</td></tr><tr><td>3 years and over</td><td>..</td><td>..</td><td>P_4</td></tr></table> where $P_1 + P_2 + P_3 + P_4 = 1$. For the same year the distribution of the total number of animals in each category between the provinces was determined as follows : <table><tr><td></td><td>Leinster</td><td>Munster</td><td>Connacht</td><td>Ulster</td><td>State</td></tr><tr><td></td><td></td><td></td><td></td><td>(3 Cos.)</td><td></td></tr><tr><td>Milch Cows</td><td>L_1</td><td>M_1</td><td>C_1</td><td>U_1</td><td>1</td></tr><tr><td>1—2 years</td><td>L_2</td><td>M_2</td><td>C_2</td><td>U_2</td><td>1</td></tr><tr><td>2—3 years</td><td>L_3</td><td>M_3</td><td>C_3</td><td>U_3</td><td>1</td></tr><tr><td>3 years and over</td><td>..</td><td>L_4</td><td>M_4</td><td>C_4</td><td>U_4</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td>1</td></tr></table> where $L_1 + M_1 + C_1 + U_1 = 1$, etc. The proportion of the output of the cattle + calves + hides allocated to each province was then determined, e.g., for Leinster : Proportion = $P_1 L_1 + P_2 L_2 + P_3 L_3 + P_4 L_4$. The proportions were first determined for each year separately. The resultant figures were reasonably close for the different years and it was decided to use the average results.	Under 1 year	..	..	P_1	1—2 years	..	..	P_2	2—3 years	..	..	P_3	3 years and over	..	..	P_4		Leinster	Munster	Connacht	Ulster	State					(3 Cos.)		Milch Cows	L_1	M_1	C_1	U_1	1	1—2 years	L_2	M_2	C_2	U_2	1	2—3 years	L_3	M_3	C_3	U_3	1	3 years and over	..	L_4	M_4	C_4	U_4						1
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Milch Cows	L_1	M_1	C_1	U_1	1																																																						
1—2 years	L_2	M_2	C_2	U_2	1																																																						
2—3 years	L_3	M_3	C_3	U_3	1																																																						
3 years and over	..	L_4	M_4	C_4	U_4																																																						
					1																																																						
Milk :																																																											
(a) Consumed by persons	Agricultural consumption allocated in proportion to agricultural population and non-agricultural consumption allocated in proportion to non-agricultural population. For one year a test was made to see if separate consumption calculation should be made for Dublin (and Cork), but result got was not very different.																																																										
(b) Used in industry	.. Allocated on basis of creamery returns.																																																										

Farmers' Butter ..	This is a residual figure in the national estimates. Total milk production is determined and allowance made for utilization as liquid milk, for industry, for animal feed, etc. The balance is considered used for farmers' butter. In this allocation a similar calculation was performed for each province to determine the residue of milk used for farmers' butter. The allocation was then made in proportion to these residual quantities.
Sheep + Lambs + Wool	Allocated in proportion to the total number of sheep on 1st June each year.
Pigs	In proportion to total pigs on 1st June.
Poultry	For each type separately allocation in proportion to number of birds on 1st June, hatched in current year.
Eggs	In proportion to adult birds on 1st June.
Wheat	In proportion to total produce (area $\times$ yield).
Oats	In proportion to total produce (area $\times$ yield).
Barley	Allocation in proportion to total produce of malting barley.
Sugar Beet	Allocation in proportion to deliveries to factories by Province.
Potatoes	Allocation in proportion to average of proportion of total produce and proportion of total population to take account of movement of ware potatoes for consumption between provinces.
Turf	Allocation in proportion to quantities drawn from bog.
Fruit	Allocation in proportion to acreage.

DISCUSSION

T. P. Linehan: In the C.S.O. we have experimented with this "allocation method" using the same basis of allocation as that used by Mr. Byrne, with similar results. More recently, with the completion of the National Farm Survey, we have been endeavouring to gross these Survey results to national proportions using as many known controlling factors as possible to eliminate any bias that may be in the Survey sample. Thus, the output of dairy produce for the Survey farms in any size region cell was multiplied by the ratio for that cell of the total number of milch cows returned in the June 1955 Agricultural Enumeration to the number of milch cows on the Survey farms on 1st June, 1955. Similarly, for the output of pigs, sheep and wool, poultry and eggs, etc. The resultant aggregate of total output is in very close agreement with the official output figure. The grossing is carried out separately for each of the six size groups in each of the three regions distinguished in the Survey compilations. For 1955 a provisional result has just been prepared and shows the proportion of total output as follows:

Region 1	—	37.5 per cent.
2	—	43.1 per cent.
3	—	19.4 per cent.

These cannot be compared directly with those in Table 2 of the paper but with *ad hoc* adjustments for Kilkenny (to Region 1 from Region 2) and for Galway and Roscommon, (to Region 3 from Region 1) I have obtained the following approximate figures which may be compared with those in Table 2 (D) and also with the corresponding percentages of the total crops and pasture in each area :

	PERCENTAGE OF TOTAL OUTPUT		Percentage of Crops and Pasture
	Farm Survey Grossed	Table 2 (D)	
	%	%	
Leinster	32	36.6	33.5
Munster	39	37.8	35.9
Connacht and Ulster	29	25.6	30.5
State ..	100	100.0	100.0

Because of the basic differences in the two approaches, too much significance should not be attached to these differences. The figures are in broad agreement but it may be noted that the results based on the Survey, even when adjusted in line with the agricultural statistics, still show Munster as being somewhat better on a per acre figure than Leinster, while the "allocation method" shows Leinster as somewhat better. The investigation which I refer to seems to show that the Survey overstates the difference to some extent between Region 3 and other Regions, but *not* between Regions 1 and 2.

We have also experimented with a second approach to the problem of grossing the Farm Survey data. A linear multiple regression analysis was carried out for each cell relating the output per acre of crops and pasture to density on 1st June 1955 of milch cows, other cattle, pigs, poultry and sheep and percentage ploughed. The regressions were, of course, carried out on the results for the farms in the Survey, but subsequently the population densities or true densities for each cell obtained from a special analysis of the 1955 Agricultural Statistics were substituted in these equations to determine the average output per acre in each size group in each region. The aggregate output obtained by applying these per acre rates to the known acreage of crops and pasture in each cell was in reasonable agreement with the alternative estimate previously described.

As an analysis by size of holding of the 1926 Agricultural Statistics is available in published form it seemed worthwhile to assess the change between 1926 and 1955 by substituting the 1926 densities in

the regression equations. In effect this yields estimates of 1926 output by size and region at 1955 prices. It would, indeed, be foolish to place undue reliance on the results as over a period of 29 years many structural changes have taken place. However, the overall change for the State as a whole between 1926 and 1955 estimated in this regression method is an increase of 11 per cent. in the volume of output at 1955 prices. This is gratifyingly close to the figure of 14 per cent. shown in Table 1 (D) and encourages a comparison of the changes in the different Regions over the same period. These showed :

An increase of 13 per cent. in the volume of output in Region 1.

An increase of 18 per cent. in the volume of output in Region 2.

A decline of 6 per cent. in the volume of output in Region 3.

From Table 1 (D), however, the picture appears to be very different between 1926-7 and 1955 :

Leinster showed an increase of 35 per cent.

Munster showed an increase of 12 per cent.

Connacht & Ulster combined show a decline of about 6 per cent.

The differences between the two sets of figures arising out of two known factors can be allowed for to some extent :

(1) Areas covered.

(2) Prices used.

(1) Areas covered

As already mentioned, an attempt to transfer from Regions to Provinces means taking Kilkenny out of Region 2 and transferring it to Region 1; taking Roscommon and Galway out of Region 1 and transferring them to Region 3.

Alternative assumptions are that the counties being transferred should be assessed at their Regional Rates or their Provincial Rates. Both assumptions give an increase of 17 per cent. for Munster. For Leinster, however, the change may be as low as 12 per cent. if Galway and Roscommon are put in at Region 1 Rates, or as high as 18 per cent. if they are put in at Region 3 Rates. The latter assumption seems more plausible. The corresponding change in Connacht and Ulster is a decline of 4 per cent.

(2) Prices

One difference in the two sets of figures is the price system being used, 1938-9 prices in the paper and 1955 prices in the Survey. The prices of Livestock and Livestock Products have risen one-third as much as those for crops between 1938-9 and 1955 and this has a certain effect on comparisons between provinces when the relevant importance of the two groups differs substantially.

A crude adjustment for this difference in price movement may be made by adding one-third to the value of livestock and livestock products at 1938-9 prices.

The final comparison of the two methods for the changes between 1926 and 1955 in the volume of output is as follows :

	From Table 1 (D) 1938/39 Prices	Table 1 (D) adjusted to 1955 Prices	Regression method 1955 Prices
	percentage change	percentage change	percentage change
Leinster	+35	+30	+18
Munster	+12	+11	+17
Connacht and Ulster	— 6	— 6	— 4
State ..	+14	+12	+11

The most important difference in the results arrived at by the different methods would seem to be that the "allocation method" appears to give a significantly steeper rate of increase in Leinster than Munster, while the Regression approach indicates that they have moved in concord.

Both approaches show reasonable agreement on the very large difference between Leinster and Munster on the one hand and Connacht and Ulster on the other hand.

The fact that the regression method gives a valid result for the change in the volume of output for the State as a whole between 1926 and 1955 would seem to give additional weight to the provincial trends obtained by the same method. If these are taken as being more correct than those given by the "allocation method," the figures shown in tables 3 and 4 of the paper will also require substantial amendment. In particular, it would appear that the figure for 1955 for the index of volume of gross output per male engaged in agriculture (Table 3) for both Leinster and Munster would be approximately the same at some intermediate point between 161 and 138. Furthermore, the figures in Table 4 for 1955 would be altered to 118 for Leinster and 123 for Munster.

It is hoped that when the analysis of the Farm Survey data has been completed that the relative position of the provinces, or regions, can be determined with more confidence.