

# **Environmental offsets in Colombia: Policy, practice and conflict**

A thesis submitted for the degree of Doctor of Philosophy

Department of Geography  
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## Declaration

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Date: 5<sup>th</sup> June 2021

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## Abstract

### Environmental offsets in Colombia: Policy, practice and conflict

Jane K. Feeney

Environmental offsets aim to find a balance between economic growth and biodiversity conservation by compensating for the adverse environmental impacts of development. In Colombia, environmental offsets are being put forward as the engine for a new sustainable development model. Colombia is considered a pioneer in environmental policy in Latin America, has various environmental compensation instruments and is currently taking a lead in the region in biodiversity offsetting. This research examines environmental offsetting in policy and practice in Colombia, tracing the evolution of offsetting policy since the 1970s and the drivers behind the latest biodiversity offset regulations. Crossing the landscapes of Colombia, from rural *fincas* in the Andes and the valley of the Magdalena Medio, to the offices of industry, government and NGOs, this thesis examines the subject of offsetting and the meanings of biodiversity from different angles, revealing the importance of biodiversity as a national asset, a symbol of identity and inseparable from cultural diversity. Through the use of semi-structured interviews, policy analysis and a case study of the hydroelectric dam Hidrosogamoso and forest offsets implemented in Parque Nacional Natural Serranía de los Yariguíes, this research offers empirical evidence of the successes, multidimensional challenges, contradictory policies and contested practices associated with offsets. Drawing on political ecology and peace and conflict studies, centred on the themes of 'biodiversity' and 'conflict', the research explores the conflicts that arise as a result of direct, systemic, and cultural violence towards people and nature, revealing parallels between a socio-ecological conflict at the impact site and the offset site. It draws attention to the threats facing human rights and environmental defenders amid historical patterns of colonisation and extractivism, land use conflicts and current post-conflict peacebuilding challenges. This study examines the discursive constructions of biodiversity and highlights the social impacts of offset projects implemented in a protected area, as well as the practical and ethical challenges of attempting to offset environmental harm, challenging win-win and no net loss narratives promoted under green growth agendas. It argues that by creating a reliance on extractive development and transnational capital to carry out conservation, offsets are a double-edged sword that risk becoming a new tool of (neo)extractivism that is ultimately environmentally and socially unsustainable.

**Keywords:** environmental offsets, biodiversity offsets, environmental compensation, conservation, political ecology, conflict, Colombia, socio-ecological conflict.

## **Resumen**

### **Las compensaciones ambientales en Colombia:**

#### **La política, la práctica y el conflicto**

**Jane K. Feeney**

Las compensaciones ambientales tienen como objetivo encontrar un equilibrio entre el crecimiento económico y la conservación de la biodiversidad, a través de compensar los impactos ambientales adversos del desarrollo. En Colombia, las compensaciones ambientales se están planteando como el motor de un nuevo modelo de desarrollo sostenible. Colombia es considerada pionera en política ambiental en América Latina, con diferentes instrumentos de compensación ambiental dentro de la legislación y actualmente lidera la región en compensación de biodiversidad. Esta investigación examina la compensación ambiental en la política y en la práctica en Colombia, rastreando la evolución de las políticas de compensación ambiental a través del tiempo desde los años setenta y los factores que han impulsado las últimas regulaciones de compensación por pérdida de biodiversidad. Atravesando los paisajes de Colombia, desde las fincas rurales de los Andes y el valle del Magdalena Medio, hasta las oficinas de la industria, el gobierno y las ONG, esta tesis examina el tema de la compensación y los significados de biodiversidad desde diferentes ángulos, revelando la importancia de la biodiversidad como activo de la nación, símbolo de identidad e inseparable de la diversidad cultural. Esta investigación ofrece evidencia empírica de los éxitos, desafíos multidimensionales, las políticas contradictorias y las cuestionadas prácticas asociadas con las compensaciones, mediante el uso de entrevistas semiestructuradas, el análisis de la evolución de las políticas públicas y un caso de estudio que examina la implementación de compensaciones forestales en el Parque Nacional Natural Serranía de los Yariguíes para compensar los impactos de la represa hidroeléctrica Hidrosogamoso. Basándose en estudios de ecología política, estudios de paz y conflicto, centrada en los temas de 'biodiversidad' y 'conflicto', la investigación explora los conflictos que surgen como resultado de la violencia directa, sistémica y cultural hacia las personas y la naturaleza, revelando paralelismos entre un conflicto socio ecológico en el área de impacto y el área de compensación; llama la atención sobre las amenazas que enfrentan los defensores del medio ambiente y los derechos humanos, en medio de patrones históricos de colonización y extractivismo, conflictos de uso de la tierra y los actuales desafíos para la construcción de paz en el postconflicto. Este estudio examina las construcciones discursivas sobre la biodiversidad y destaca los impactos sociales de los proyectos de compensación ambiental implementados en un área protegida, y los desafíos prácticos y éticos de proponerse compensar por el daño ambiental, desafiando las narrativas de ganar-ganar (una situación donde todas las partes ganan) y no pérdida neta promovidas bajo las agendas del crecimiento verde. Sostiene que, al crear una dependencia en el desarrollo extractivista y el capital transnacional para llevar a cabo la conservación, las compensaciones son un arma de doble filo que corren el riesgo de convertirse en una nueva herramienta de (neo)extractivismo que, en última instancia, es insostenible en términos sociales y ambientales.

**Palabras clave:** compensaciones ambientales, compensaciones por pérdida de biodiversidad, compensación ambiental, conservación, ecología política, conflicto, Colombia, conflicto socio ecológico.



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## Glossary of terms, abbreviations and acronyms

Additionality	Conservation outcomes which are achieved over and above results that would have occurred without the particular intervention
ANDI	<i>Asociación Nacional de Empresarios de Colombia</i> (National Business Owners Association of Colombia)
ANLA	<i>Autoridad Nacional de Licencias Ambientales</i> (National Authority of Environmental Licenses)
BBOP	Business and Biodiversity Offsets Programme
Biodiversity offset	Measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure and ecosystem function and people's use and cultural values associated with biodiversity
<i>Campesino</i>	An intercultural subject, who identifies themselves as such, vitally involved in direct work with the land and nature; immersed in forms of social organisation based on unpaid family and community work and/or on the sale of their labour. Can be translated into English as 'peasant' or 'person of the land'
CAR	<i>Corporación Autónoma Regional</i> (Regional Autonomous Corporation)
CAS	<i>Corporación Autónoma Regional de Santander</i> (Regional Autonomous Corporation of Santander)
CBD	Convention on Biological Diversity
CDM	Clean Development Mechanism
CDMB	<i>Corporación Autónoma Regional para la Defensa de la Meseta de Bucaramanga</i> (Regional Autonomous Corporation for the Defense of the Bucaramanga Plateau)
CENSAT	Asociación Centro Nacional Salud, Ambiente y Trabajo 'CENSAT Agua Viva' (Friends of the Earth Colombia)
CIF	<i>Certificado de Incentivo Forestal</i> (Forest Incentive Certificate)
CONIF	<i>Corporación Nacional de Investigación y Fomento Forestal</i> (National Corporation for Forestry Research and Development)
COP	Colombian peso
COVID-19	Coronavirus Disease 2019
DANE	<i>Departamento Administrativo Nacional de Estadísticas</i> (National Administrative Department of Statistics)
DNP	<i>Departamento Nacional de Planeación</i> (National Planning Department)



Ecosystem services	The benefits people obtain from ecosystems and biodiversity. They include provisioning services (e.g. food, water, timber, and fiber); regulating services that affect climate, floods, disease, wastes, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis, and nutrient cycling
EIA	Environmental impact assessment
EJ Atlas	Environmental Justice Atlas
ELN	<i>Ejército de Liberación Nacional</i> (National Liberation Army)
EPL	<i>Ejército Popular de Liberación</i> (Popular Liberation Army)
EPM	<i>Empresas Públicas de Medellín</i> (Public Companies of Medellín)
ESSA	<i>Electrificadora de Santander S.A.</i> (Santander Electrification Plant)
FAO	Food and Agriculture Organization of the United Nations
FARC	Refers either to rebel group <i>Fuerzas Armadas Revolucionarias de Colombia</i> (Revolutionary Armed Forces of Colombia) or political party <i>Fuerza Alternativa Revolucionaria del Común</i> (Common Alternative Revolutionary Force)
FEN	<i>Fondo Energético Nacional</i> (National Energy Fund)
Forest offset	Compensation for loss of forest through reforestation or ecological restoration
Fundación Guaya canal	<i>Fundación Estación Biológica Guaya canal</i> (Guaya canal Biological Station Foundation)
FUNDASET	<i>Fundación para el Desarrollo Agrícola Social y Tecnológico</i> (Foundation for Social and Technological Agricultural Development)
GDP	Gross Domestic Product
GIZ	<i>Deutsche Gesellschaft für Internationale Zusammenarbeit</i>
Ha	Hectare
ICCB	International Congress for Conservation Biology
IDEAM	<i>Instituto de Hidrología, Meteorología y Estudios Ambientales</i> (Institute of Hydrology, Meteorology, and Environmental Studies)
IFC	International Finance Corporation
IGAC Codazzi)	<i>Instituto Geográfico Agustín Codazzi</i> (Geographic Institute Agustín Codazzi)
IHA	International Hydropower Association
INCORA	<i>Instituto Colombiano de la Reforma Agraria</i> (Colombian Institute for Agrarian Reform)
INDERENA	<i>Instituto Nacional de los Recursos Naturales Renovables y del Ambiente</i> (National Institute of Renewable Natural Resources and Environment)
INGO	International non-governmental organisation

Instituto Humboldt	<i>Instituto de Investigación de Recursos Biológicos Alexander von Humboldt</i> (The Alexander von Humboldt Biological Resources Research Institute)
IDB	Inter-American Development Bank
IPCC	Intergovernmental Panel on Climate Change
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
ISA	<i>Interconexión Eléctrica S.A. E.S.P.</i> (Interconnection Electric S.A. E.S.P.)
IUCN	International Union for Conservation of Nature
MADS	<i>Ministerio de Ambiente y Desarrollo Sostenible</i> (Ministry of Environment and Sustainable Development)
MAVDT	<i>Ministerio de Ambiente, Vivienda y Desarrollo Territorial</i> (Ministry of Environment, Housing and Territorial Development)
MinMinas	<i>Ministerio de Minas y Energía</i> (Ministry of Mining and Energy)
Mitigation hierarchy	The sequential use of impact avoidance/prevention, then minimisation, restoration of damage, and offsets or compensation, to ensure no adverse effects
Net gain (NG)	A situation where the biodiversity gains from mitigation measures exceed the negative impacts on biodiversity caused by the project
NGO	Non-governmental organisation
No net loss (NNL)	NNL of biodiversity refers to a situation where negative impacts on biodiversity caused by a project are counter-balanced by mitigation measures so that ultimately there is no loss of biodiversity
OECD	Organisation for Economic Cooperation and Development
PA	Protected area
Parques Nacionales	Refers to <i>Unidad Administrativa Especial del Sistema de Parques Nacionales Naturales de Colombia</i> (Special Administrative Unit of the Network of National Natural Parks of Colombia)
Patrimonio Natural	<i>Patrimonio Natural Fondo para la Biodiversidad y Áreas Protegidas</i> (Natural Patrimony Fund for Biodiversity and Protected Areas)
PES	Payment for ecosystem services
PNGIBSE	<i>Política Nacional para la Gestión Integral de la Biodiversidad y sus Servicios Ecosistémicos</i> (National Policy for the Integral Management of Biodiversity and its Ecosystem Services)
PNN	<i>Parque Nacional Natural</i> (National Natural Park)
PNUD	Programa de las Naciones Unidas para el Desarrollo (United Nations Development Programme)
POMCA	<i>Plan de Ordenación y Manejo de Cuencas Hidrográficas</i> (Plan for the Zoning and Management of the Hydrographic Basin)
REAA	<i>Registro único de Ecosistemas y Áreas Ambientales</i> (Single Registry of Ecosystems and Environmental Areas)

REDCRE	<i>Red Colombiana de Restauración Ecológica</i> (The Colombian Restoration Ecology Network)
REDD+	Reduced Emissions from Deforestation and forest Degradation
SEMCA	<i>Sistema de Evaluación y Monitoreo a la Efectividad de las Compensaciones Ambientales en Colombia</i> (Monitoring and Evaluation System of the Effectiveness of Environmental Compensation in Colombia)
SiB Colombia	<i>Sistema de Información Sobre Biodiversidad de Colombia</i> (Biodiversity Information System of Colombia)
SILA	<i>Sistema de Información de Licencias Ambientales</i> (Environmental Licenses Information System)
SINA	<i>Sistema Nacional Ambiental</i> (National Environment System)
SINAP	<i>Sistema Nacional de Áreas Naturales Protegidas</i> (National System of Natural Protected Areas)
UK	United Kingdom
UN	United Nations
UNHRC	United Nations Human Rights Council
UNAL	<i>Universidad Nacional de Colombia</i> (National University of Colombia)
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention On Climate Change
Universidad Javeriana	<i>Pontificia Universidad Javeriana</i> (Pontifical Xavierian University)
UPA	<i>Unidad de producción agropecuaria</i> (Unit of agricultural production, or agricultural landholding)
US	United States of America
WCS	Wildlife Conservation Society
WWF	World Wildlife Fund



# 1. Introduction

Those megaprojects, what they do is silent displacement, without having to put a gun to your head.

(Monica, Fisher / Activist)

Offsets are a sophism of distraction but, deep down, there are many, many lies.

(Antonio, Community leader)

I think that the perfect is the enemy of the good, sometimes we want perfect models in biodiversity, ideal models ... but we have to advance and get on with things.

(Marian, Coordinator, Trade association)

Unfortunately, there is never any budget for the environmental sector ... An offset can advance you five years because it is bringing resources ... We defend biodiversity and we do our best, but there are points at which it is necessary to be pragmatic.

(Gonzalo, Researcher, INGO)

We have to try to mitigate the environmental impact, but without hindering socioeconomic development ... So, that is our task and challenge, the environmental authorities, to be there in the middle and see how these burdens can be balanced.

(Adrian, Public servant, Regional environmental authority)

How can biodiversity loss be offset? This thesis explores the policies and practices surrounding the compensation of environmental harm, taking Colombia as a point of departure. The quotes above represent some of the perspectives on the issue: government workers juggling trade-offs between economic interests and environmental protection; conservation professionals designing solutions to meet environmental targets amidst a lack of resources and funding; and the people whose territories and lives are treated as collateral damage in the pursuit of sustainable development. This research explores the multidimensional challenges, contradictory policies and contested practices associated with offsets, and the conflicts that arise as a result of direct, systemic, and cultural violence towards people and nature. It argues that by creating a reliance on extractive development and transnational capital to carry out conservation, offsets are a double-edged sword that

risk becoming a new tool of (neo)extractivism that is ultimately environmentally and socially unsustainable. Crossing the landscapes of Colombia, from rural *fincas* in the Andes and the valley of the Magdalena Medio, to the offices of industry, government and NGOs, this thesis examines the subject of offsetting and the meanings of biodiversity from different angles, revealing the importance of biodiversity as a national asset, a symbol of identity and inseparable from cultural diversity.

## **1.1. An overview of biodiversity knowledge and trends**

Biodiversity, or biological diversity, refers to the diversity of life on Earth (Wilson, 1992, p. 7), encompassing the variety of plants, animals, and microorganisms that live on the planet. Ecosystems are made up of abundant and complex biodiversity and estimates of the total number of species on Earth range between 5 million and 100 million, the vast majority of which are unknown to humans (Mora et al., 2011, Wilson, 1996, p. 153). Although our knowledge and understanding of biodiversity are limited, what is clear from available data is that it is in steep decline (IPBES, 2019). Important work is being done to conceptualise, measure and track the status of biodiversity, including the UN Convention on Biological Diversity's Global Biodiversity Outlook, assessment reports by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and the Aichi Biodiversity Targets, among others. Unfortunately, however, they paint a bleak picture; forests are being lost at a rate of between 10 million and 21 million hectares per year and nearly one quarter of species are threatened with extinction (Secretariat of the Convention on Biological Diversity, 2020). The biggest direct driver of biodiversity loss is land and sea-use change, followed by the direct exploitation of organisms, climate change, pollution and invasive species (IPBES, 2019). Research shows that human activity has pushed the world beyond its planetary boundaries and towards a 'sixth mass extinction' (Ceballos et al., 2015, Rockstrom et al., 2009, Williams et al., 2015, Wilson, 1992). It is a particular form of human activity that is driving biodiversity loss: an expansionist model of production based on the exploitation of natural resources and human communities; today being lived out in the form of global capitalism. This has been facilitating higher-income countries to consume more at the expense of extraction and production in lower-income countries, with an unequal distribution of social and ecological costs and benefits (Díaz et al., 2019). As a result, biodiversity is declining at different rates in regions globally, with Latin America and the Caribbean experiencing the greatest decline since 1970 (WWF, 2020). Strategies are being developed and

implemented that claim to find a better balance between economic development and environmental protection, such as environmental offsetting, the topic of this research.

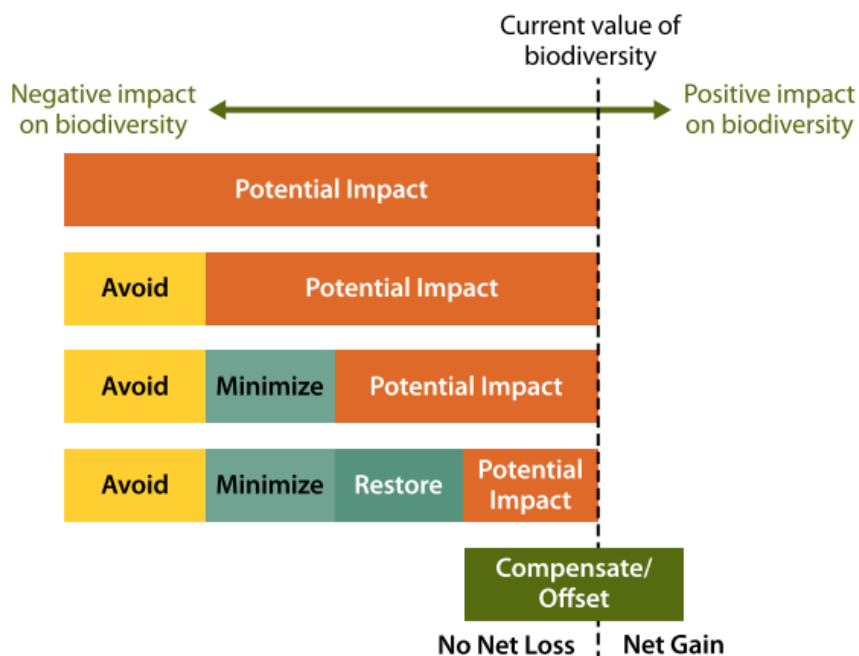
## **1.2. Environmental compensation and the rise of biodiversity offsets**

In general terms, compensation refers to ‘a recompense for some loss or service, and is something which constitutes an equivalent to make good the lack or variation of something else’ (BBOP, 2012a, p. 10). *Environmental* compensation involves carrying out positive environmental measures to correct, balance or otherwise atone for the loss of environmental resources (Cowell, 2000, p. 690). Environmental compensation is widely incorporated into policy across the world and its roots can be traced back to the late 1960s and early 1970s with the introduction of environmental impact assessment (EIA). The EIA process aims to identify, predict, evaluate and mitigate the biophysical, social, and other relevant impacts of development proposals before a decision is made, such as whether or not to proceed with a project and grant an environmental license (International Association for Impact Assessment, 1999, p. 2). The mitigation hierarchy (see Figure 1) is a central tool in EIA, based on the precautionary principle to ‘do no harm’. According to Stevenson and Weber (2020), mitigation hierarchies have been used for over a century in natural resource management, inspired by Muir’s preservation theory (avoid/protect) and Pinchot’s conservation theory (reduce/compensate) which formed the basis of environmentalism in the United States (US), and consequently influenced environmental management in the rest of the world. The steps to be followed in the mitigation hierarchy are: first avoid impacts, then minimise them, take measures to rehabilitate or restore, before finally offsetting residual, unavoidable impacts (avoid–minimise-restore-offset) (BBOP, 2012b).

Early forms of environmental compensation are reforestation and afforestation schemes, whether through ‘in-kind’ compensation or monetary forest compensation funds. There have been efforts to transition away from forest compensation schemes based on forest area towards conservation or restoration actions that more accurately account for impacts at the habitat and ecosystem level. Forest compensation schemes represent a regulatory foundation upon which new compensation mechanisms, such as biodiversity offsets and

habitat banking<sup>1</sup>, are being developed (Bovarnick et al., 2010). Biodiversity offsets are defined as ‘measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken.’ (BBOP, 2012b, p. 13). The goal is to achieve ‘no net loss’ (NNL) or ideally a ‘net gain’ of biodiversity, with respect to species composition, habitat structure, ecosystem function and people’s use and cultural values associated with biodiversity (ibid.). Biodiversity offsets, and environmental compensation in general, should be a last resort, after a developer follows the previous steps of the mitigation hierarchy to first avoid, minimise and restore any damage to biodiversity. A company might offset because it is legally required to, because of environmental standards imposed by a bank or financial institution, or as part of its corporate social responsibility strategy.

Figure 1: The mitigation hierarchy



Source: Ledec and Johnson (2016)

<sup>1</sup> A habitat bank is ‘a system where an organisation or private company restores, creates, enhances or conserves a habitat to sell tangible units of this habitat or facilitates land purchase and creation of habitat, termed credits, to a developer or permittee. These credits are used by the developer or permittee as compensation for equivalent units of habitat that they would impact upon through project development or natural resource extraction’. BOVARNICK, A., KNIGHT, C. & STEPHENSON, J. 2010. Habitat Banking in Latin America and Caribbean: A Feasibility Assessment. United Nations Development Programme.



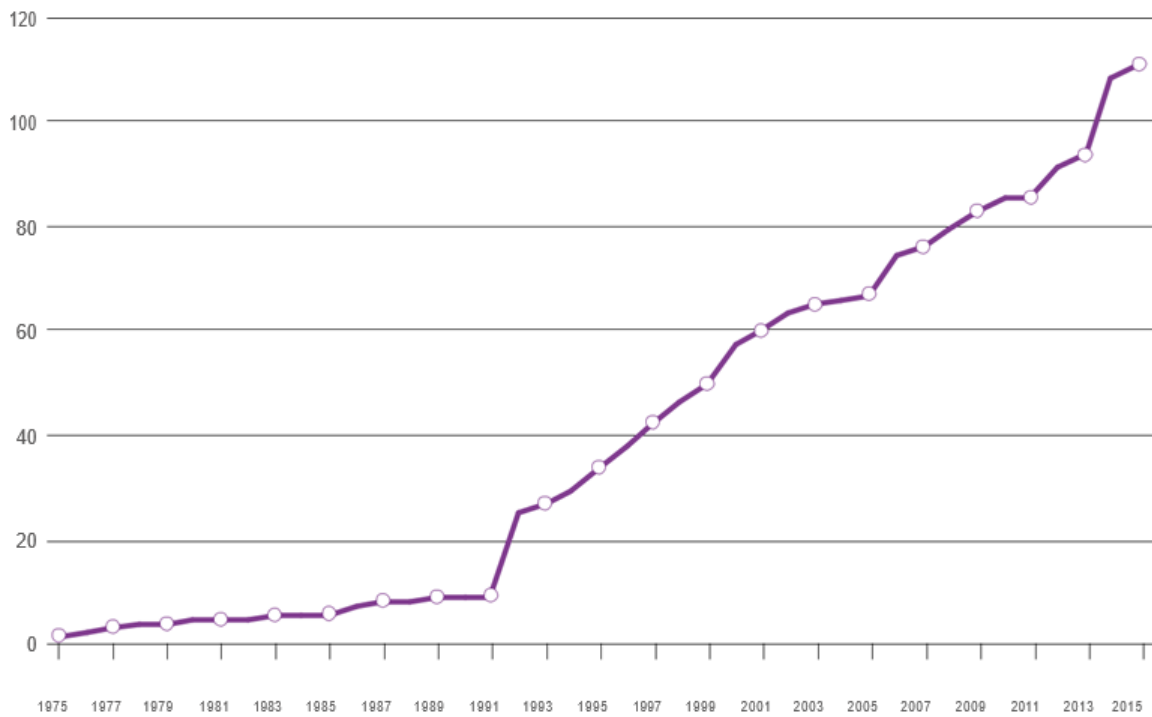
The term 'biodiversity offsets' has gained popularity in science and policy circles over recent decades, generating both hype and controversy. The number of countries that have or are considering biodiversity offsetting policies has increased rapidly over the past 20 years (see Figure 2 and Figure 3), with a particular uptake in countries that are biodiversity-rich and mining-dependent (IUCN, 2017). According to the Global Inventory on Biodiversity Offset Policies (2019), there are currently an estimated 42 countries with a regulatory requirement for offsets and 66 others with provisions in place to enable and facilitate offsetting. It is difficult to arrive at an exact number due to a lack of publicly available data in many countries, the heterogeneity of different legal systems and different interpretations on what is considered an 'offset', 'compensation' or 'no net loss' policy<sup>2</sup>. The mitigation hierarchy and offsets are also widely incorporated into the standards and guidelines of financial institutions, such as the International Finance Corporation (IFC)'s Performance Standards on Environmental and Social Sustainability, specifically PS6 (IFC, 2012b), the Equator Principles, a risk management framework adopted by 97 financial institutions in 37 countries (Equator Principles, 2013) and multilateral banks, for example the Inter-American Development Bank and the European Investment Bank (European Investment Bank, 2018, Hardner et al., 2015). By requiring projects they finance to adhere to the mitigation hierarchy, these institutions act as a catalyst for offset projects (OECD, 2016). In practice, it is regulation that emerges as the main driver of biodiversity offsetting activities; in 99.7% of cases according to a study of 37 countries by Bull and Strange (2018). However, according to the same study, offset projects implemented by developers due to lender requirements or corporate commitments, while much less in number, tend to be much larger in size, covering close to the same area of land as those offsets implemented due to public policy (ibid.).

The popularity surrounding biodiversity offsets in the past two decades follows the rise of 'biodiversity' as a concept and the growth of the biodiversity conservation movement. Under national and international agendas of sustainable development and green growth, offsets are promoted as a tool to neutralise the conflict between economic growth and environmental protection (Moreno-Mateos et al., 2015). However, enabling a trade-off of biodiversity through offsets requires clear indicators and metrics, raising questions about how biodiversity is defined, measured, and valued, and who decides.

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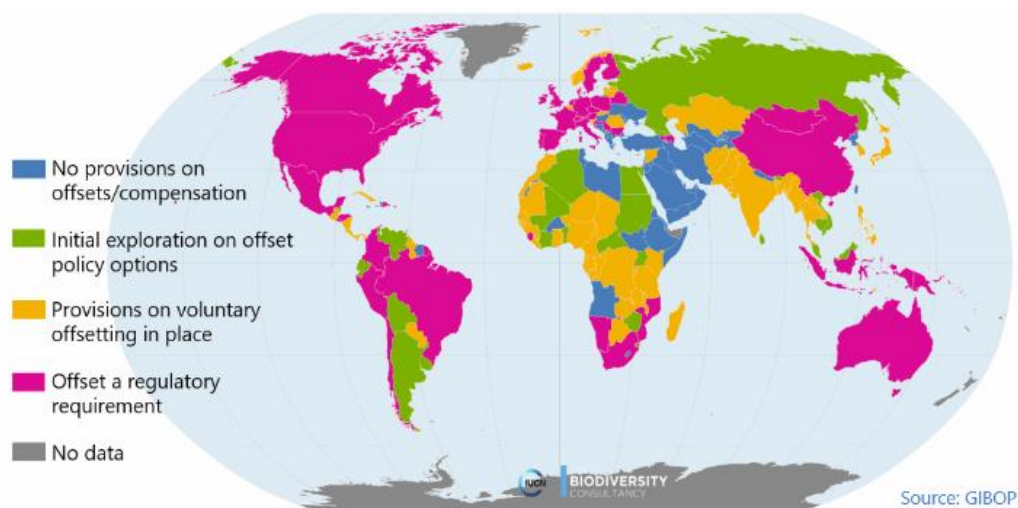
<sup>2</sup> GIBOP takes a broad definition of 'offsets' to include other forms of compensatory measures which may not necessarily be in full alignment with the technical criteria of offsets.

Figure 2: Number of countries with, developing, or considering national policies that require or enable biodiversity offsets, 1975-2015



Source: OECD (2016)

Figure 3: Countries at different stages of development of national biodiversity offsetting policy



Source: Global Inventory on Biodiversity Offset Policies (2019)

### 1.3. Research rationale

An array of policies, standards, guidelines and good practice principles for biodiversity offsets has been published by international institutions and organisations, the extractive industries and consultants (Bull et al., 2018, BBOP, 2012b, Doswald et al., 2012, ICMM & IUCN, 2013, IUCN, 2016, Kate and Crowe, 2014, Ledec and Johnson, 2016, OECD, 2016, Rio Tinto, 2008, The Biodiversity Consultancy, 2015, Tucker et al., 2013). Meanwhile, there are NGOs and activist groups that are fiercely critical of offsetting, which many see as the financialisation of nature, for example, at the international level the World Rainforest Movement, Counter Balance, REDD-Monitor, Friends of the Earth, as well as local NGOs and social movements.

There is an extensive body of academic literature on offsetting, the majority coming from environmental sciences and conservation biology, examining the many conceptual and technical challenges associated with biodiversity offsetting (e.g. Bull et al., 2013a, Gibbons et al., 2016, Gibbons and Lindenmayer, 2007, Kiesecker, 2009). The smaller but growing proportion of literature coming from social sciences has highlighted the ethical challenges associated with offsetting and the commodification of nature (e.g. Hannis and Sullivan, 2012, Ives and Bekessy, 2015, Spash, 2015, Sullivan, 2013). Comparatively few empirical analyses of biodiversity offsetting exist and those that do primarily examine high income countries, especially the US wetland banking system and Australia's federal and state offset regulations, and they widely report failure to achieve no net loss (Bull et al., 2013a, Curran, 2014, Harper, 2005, Lindenmayer et al., 2017, May et al., 2017, Zu Ermgassen et al., 2019). Considering the majority of offset policies occur in middle- and low-income countries, there is, according to Gelcich et al. (2017, p. 187) a 'glaring geographical gap' for research opportunities focused on these countries. Recent work in Malaysia, Madagascar and Brazil has uncovered the social costs associated with offsets, such as local communities losing access to land and natural resources and ideological conflicts over the offsetting approach (Anaya and Espirito-Santo, 2018, Bidaud et al., 2017, Brock, 2015).

Studies of EIA procedures across Latin America have found that many countries fail to comply with best practice (Sanchez-Triana and Enriquez, 2007). In some cases, the EIA has become a de facto substitute for biodiversity conservation regulations, pollution control regulations, and effective land-use planning, with inadequate public participation (Acerbi et al., 2014, Toro et al., 2010). In Latin America, experiences with other compensatory mechanisms such as payment for ecosystem services (PES) have revealed equity and

distribution issues, and conflicts of interest such as trade-offs between environmental and social objectives (Corbera et al., 2007, Kosoy et al., 2007, Muradian et al., 2010). Therefore, given the need for more offsetting studies focused on middle- and low-income countries including those in Latin America, and taking into consideration the social issues arising from other compensatory conservation mechanisms in the region, this highlights an important research opportunity to examine the potential implications of biodiversity offsetting in the region.

Colombia, considered a pioneer in environmental policy in Latin America, was chosen as the focus of this investigation of the political ecology of environmental offsetting. Colombia has had different forms of environmental compensation legislation dating back to the 1970s and is currently taking a lead in the region in biodiversity offsetting (Sarmiento, 2013). Colombia introduced regulation requiring developers to offset their residual biodiversity impacts in 2012 under the 'Manual for the allocation of compensation for biodiversity loss' (MADS, 2012b), which was updated in 2018 under the 'Compensation manual for the biotic component' (MADS, 2018a). With regulatory offsets and the first pilot habitat bank in Latin America (FOMIN, 2017), Colombia represents an important case study to examine the developments and implications of environmental offsetting in the region. Other countries in Latin America have advanced biodiversity offsetting legislation, notably Brazil, Mexico, Peru and Chile. According to Villarroja et al. (2014), the Colombian and Peruvian offset frameworks are considered as some of the most progressive in Latin America, highlighted as examples to be followed by future offset policies, not only in the region, but globally. Although Colombia has some of the most advanced biodiversity offsetting policy in the region, implementation of this policy has been slow to date, facing various bottle necks. However, there are many experiences in the country with environmental compensation in general, through EIA processes and under legislation relating to impacts on forests, forest reserves, endangered species, and natural water sources. The lack of monitoring and lack of information on the effectiveness of previous environmental compensation programmes has been highlighted, but empirical research on these programmes is lacking (Madsen et al., 2010, Reid et al., 2015). These programmes provide a basis from which to explore how environmental offsets have been implemented to date, and the considerations in light of increased political promotion of offsets as 'the engine for a new sustainable development model for Colombia' and a strategy for peace (MADS, 2017b).

#### 1.4. Status of biodiversity in Colombia and socio-ecological challenges

Colombia is considered the second most biodiverse country in the world after Brazil, containing approximately 10% of the planet's biodiversity and ranking first in bird and orchid species diversity (CBD, 2017, SiB Colombia, 2019). However, the transformation and fragmentation of territories is driving biodiversity loss, as a result of the expansion of agriculture, illicit crops, displacement of communities, infrastructure (including for energy development), mining, logging, and forest fires (MADS & PNUD, 2014). Pérez-Rincón (2014) shows a direct link between the extractivist model<sup>3</sup> promoted by the last two decades of the Colombian government and an increase in socio-environmental conflicts, particularly over mining, fossil fuels and biomass, with a disproportionate impact on local populations and indigenous peoples. While Colombia has progressive rights frameworks for indigenous peoples and even for nature, with the granting of 'biocultural' rights to the Atrato river for instance (Ebus, 2017), there is a gap between rights on paper and rights in practice.

Colombia is currently considered the most dangerous country in the world for land and environmental defenders, according to the latest data from Global Witness (2020). A peace agreement was signed in 2016 between the Colombian government and guerrilla group the Revolutionary Armed Forces of Colombia (FARC) after 50 years of internal conflict. The implementation of the peace accord has been limited by opposition from some political sectors, failure of the government to fulfil its commitments and low capacity or will of the state to ensure a public presence across the national territory (Somos Defensores Program, 2019). As a result, when the FARC (today transformed and constituted as political party Common Alternative Revolutionary Force) disarmed, dissidents and other armed groups stepped into the power vacuum, and threats, violence, killings and disappearances of human rights and environmental defenders have increased. In June 2020, national newspaper El Espectador published on its cover pages the names of the 442 community leaders who were killed since the peace agreement was signed, under the headline 'Let's not forget them. Deaths from the other pandemic.' (Figure 4).

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<sup>3</sup> The extractive industries (mining, oil, agriculture, energy, gas and water) went from representing 14% of the total share of Colombian foreign direct investment in 1994 to 55% in 2012. (PÉREZ-RINCÓN, M. A. 2014. Conflictos ambientales en Colombia: inventario, caracterización y análisis. In: GARAY, L. J. (ed.) *Minería en Colombia: Control público, memoria y justicia socio-ecológica, movimientos sociales y posconflicto*. Bogotá: Contraloría General de la República.)

Figure 4: 'Deaths from the other pandemic', *El Espectador*, 14 June 2020



The fragile situation in many areas represents a threat to biodiversity, as actors take advantage of the lack of state control to carry out land grabs and exploit the land, increasing deforestation (Brodzinsky, 2017). In other areas, however, the peace agreement has offered opportunities for new scientific expeditions, such as Colombia BIO, and an initiative involving scientists, FARC ex-combatants, UN peacekeepers and communities, resulting in the discovery of new species (Semana, 2017, Volckhausen, 2018).

While the government and many international NGOs argue that economic development and conservation can be compatible, through concepts such as 'responsible mining' and biodiversity offsetting, there is strong opposition from community groups that argue that livelihoods, life and health are incompatible with extractive development. These social movements construct a political strategy for the defence of territory, culture, and identity linked to particular places (Escobar, 1998). This highlights one of the key criticisms of biodiversity offsetting: the failure to account for place-based values, especially when offsets are located far away from the impacted sites (Ives and Bekessy, 2015, Monbiot, 2012). With calls for greater analyses of the ethical, social and political dimensions of offsetting (Gelcich et al., 2017, Ives and Bekessy, 2015) and given the need for research on offsetting in Latin America, this research aims to contribute to this knowledge gap.

## 1.5. Notes on terminology

### 1.5.1. To offset or compensate?

Environmental compensation comes in different forms and goes by different names – compensatory conservation, compensatory mitigation, environmental offsets, forest compensation, biodiversity offsets, ecological compensation. While the idea of compensating for damage to biodiversity appeared as far back as the 1972 Ramsar Convention, biodiversity offsets rose dramatically in popularity since 2004, following the establishment of the Business and Biodiversity Offsets Programme (BBOP) (Hrabanski, 2015). In some of the literature, the term ‘compensation’ is used interchangeably with ‘offsets’, and in some languages such as Spanish, only compensation is used (*compensación*) as there is no corresponding term for offset.

BBOP makes a clear distinction, defining offsets as ‘a specific kind of compensation designed to achieve no net loss or a net gain of biodiversity, while compensation may not achieve no net loss, for a variety of reasons’ (BBOP, 2013, p. 2). Likewise, Bull et al. (2016, p. 5) refer to something being a ‘true biodiversity offset’ when there is ‘demonstrably quantifiable equivalence between what is lost and gained... An offset can therefore be seen as a specific and rigorously quantified type of compensation measure’. From this perspective, the interchangeable use of terms is problematic as it ‘creates confusion about what constitutes an offset, and where the bar lies for achieving true NNL’ (ibid.). This raises the question whether there is such a thing as ‘true no net loss’. As mentioned earlier, no net loss has to date proven extremely difficult, if not impossible, to attain in practice and no net loss policies vary in their specification of the reference scenario, if they even have one, i.e., ‘no net loss compared to what?’ (Maron et al., 2018). It can be argued that there could never be true no net loss of biodiversity as it is so complex that it is impossible to exactly recreate or preserve the same structure of biodiversity elsewhere. Some elements will be lost, including the particular ecosystem that is impacted, its ecosystem services and local values such as sense of place (Apostolopoulou and Adams, 2015).

In Colombia, compensation under the 2012 and 2018 manuals can be referred to as ‘biodiversity offsets’ (or at least intended offsets) as they apply to residual biodiversity impacts after following the mitigation hierarchy, they involve a numerical calculation of multipliers, and the goals of ecological equivalence, additionality and no net loss are explicitly stated in the legislation. However, the no net loss target is aspirational – the success of a project is not determined by its success in proving no net loss, but rather on

the completion of a list of actions as an approximation towards it. The 2018 offset manual uses the term 'biotic' rather than biodiversity to combine under one umbrella environmental compensation requirements that were previously treated separately (compensation as part of the environmental licensing process, for forest use, or extraction from forest reserves). Projects coming under previous compensation mechanisms may or may not constitute biodiversity offsets, as they are determined on a case by case basis and their EIA and compensation plans may aim for no net loss, whether or not this specific terminology is used.

Given the inconsistencies in the definition and application of no net loss, as well as the failure to demonstrate it on the ground, this seems to undermine to a large extent the practical relevance of the distinction between offsets and compensation. In this thesis, 'biodiversity offsets' is used when referring to international literature that uses this terminology, and when referring to the 2012 and 2018 biodiversity/biotic compensation regulation in Colombia. 'Forest offsets'<sup>4</sup> is used when referring to compensation for impacts on forests, under Colombia's 'forest use system' and the Hidrosogamoso project. 'Environmental offsets', 'environmental compensation' or 'offsets' is used generally to refer to different activities that aim to compensate for environmental impacts, encompassing biodiversity offsets and forest offsets.

### 1.5.2. Defining 'campesino'

The words '*campesino*' and '*campesinado*' can be translated in English as 'peasant' and 'peasantry', terms which have their own long and contested histories (Edelman, 2013). Increasingly, the original Spanish term is kept in English publications (e.g. Amnesty International, 2020, Loker, 1996), and likewise, the original term '*campesino*' is used in this thesis. This thesis adopts the definition provided by Acosta Navarro et al. (2018, p. 7), which defines a campesino as an 'intercultural subject who identifies themselves as such, vitally involved in direct work with the land and nature; immersed in forms of social organisation based on unpaid family and community work and/or on the sale of their labour', where the subject may be of any age or gender. This Colombian-specific definition is similar to the United Nations Human Rights Council (UNHRC)'s definition of 'peasant' but while the UNHRC's definition has been criticised for being overly production-focused (Quimbayo Ruiz et al., 2020), Acosta Navarro et al. (2018) propose different territorial, cultural, productive and organisational dimensions to be considered when identifying and

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<sup>4</sup> Not to be confused with forest carbon offsets, such as those associated with REDD+.



characterising campesinos, starting with an individual's self-identification as *campesino*. Among these are aspects such as links with the territory, the use and tenancy of land (generally small or medium sized properties with formal or informal land title, or landless), the relationship with the environment and natural resources, and the effects of the internal conflict and forced displacement particular to the Colombian context.

## **1.6. Research aims and questions**

The aim of this research is to examine the significance and implications of environmental offsetting in policy and practice in Colombia. It aims to uncover local level experiences with forest offsetting, the implications for recent developments around national level biodiversity offsetting policy, and to examine the discourse and meanings associated with the concept of 'biodiversity'. In doing so, the objective is to contribute to international efforts to better understand the ethics and politics surrounding the emergence of biodiversity offsetting as a key tool for biodiversity protection.

The research questions are:

1. How is 'biodiversity' understood by different stakeholders involved in biodiversity conservation in Colombia?
2. How and why has environmental offsetting policy developed in Colombia?
3. How has environmental offsetting policy been implemented in practice in Colombia?

To investigate the answers to these questions, the research adopts a political ecology frame centred on the discursive constructions of biodiversity and dimensions of socio-ecological conflict. Political ecology studies the relationships between society and nature in contexts of power (Escobar, 1996) and the conflicts arising from, or linked to ecological problems (List and Rittberger, cited in Forsyth, 2003). By focusing on the social and political dimensions of environmental offsets in Colombia, this research fills an important research gap, linking political ecology, conservation social science and peace and conflict studies. Starting from an understanding that systems of meanings of nature and systems of use of resources are inextricably bound (Escobar, 1996), the research explores the meanings and measures of biodiversity, and the practical and conceptual challenges of attempting to offset environmental harm. Drawing on Latin American political ecology to examine historical processes of colonisation and extractivism, it examines the socio-ecological conflicts arising from a megaproject, the Hidrosogamoso dam, and its forest

offsets, revealing how uneven power relations influence the conceptions, use, and control of land and biodiversity.

## **1.7. Thesis structure**

The rest of this thesis is structured as follows. Chapter two presents a discussion of the key literature from political ecology, specifically Latin American political ecology, and theories of conflict and violence from peace and conflict studies, as well as key literature on the social and ethical challenges of biodiversity offsetting. Chapter three outlines the methodological framework, data collection and analysis, research ethics, positionality and the methodological challenges and limitations. Chapter four presents an overview of Colombia's geographic, socio-economic and political context, history of land use conflicts, as well as the evolution of environmental policy and environmental compensation mechanisms in the country. Chapter five provides a background to the case study of the Hidrosogamoso dam in Santander. The results of the research are presented over four chapters. Chapter six explores the diverse meanings of biodiversity held by research participants and how biodiversity is measured in offsetting policy. The drivers and evolution of environmental offsetting policy in Colombia is discussed in chapter seven, as well as the current status and future challenges. Chapters eight and nine focus on offsetting in practice through the Hidrosogamoso dam and forest offsets in Parque Nacional Natural La Serranía de los Yariguíes – examining the challenges, perceptions of success and dimensions of socio-ecological conflict. Finally, the conclusions and future research directions are discussed in chapter ten.

## 2. Political ecology, socio-ecological conflict and offsets

### 2.1. Introduction

This chapter discusses the key areas of literature within which this research is situated: political ecology, socio-ecological conflict and environmental offsetting, with a focus on Latin America and Colombia. The chapter is arranged into two main sections. The first introduces the field of political ecology in general, followed by key contributions and themes from Latin American political ecology. Next, the theme of conflict is explored, drawing on political ecology and theory from peace and conflict studies, before giving an overview of work addressing socio-ecological conflict in Latin America. The second part of the chapter reviews key literature on biodiversity offsetting, with a focus on work that addresses the social and ethical challenges of offsetting. Related work on conservation conflicts over protected areas, payment for ecosystems services and REDD+ is also discussed. The chapter highlights the gaps in the literature that this thesis aims to address: the need for research that looks beyond high-income countries to examine the processes of offsetting policy development and implementation in Latin America; and the need to understand the social and ethical implications of these projects, as well as their biodiversity impacts.

### 2.2. Political ecology and socio-ecological conflict

#### 2.2.1. *An introduction to political ecology and Latin American political ecology*

Political ecology is concerned with the relationships between society and nature in contexts of power (Escobar, 1996). It is a vast field of study and a community of practice, encompassing ideas and debates about the politics surrounding environmental change, its management and conservation, who has access to and control over natural resources, as well as how nature itself is understood, valued and narrated (Adams and Hutton, 2007, Robbins, 2020, Stott and Sullivan, 2000). Robbins describes political ecology not as a method, theory or single perspective, but as *something people do*, or an argument or text that examines winners and losers, is narrated using dialects (i.e. examining relations and processes, rather than discrete objects), begins and/or ends in a contradiction, and examines claims about the status of nature (Robbins, 2020). An important recurring theme in political ecology is *conflict*, which arises out of contradictory interests or ideologies and

the uneven distribution of the benefits and costs associated with environmental change and management.

Ecology, derived from the Greek word *oikos* ('home'), studies the interactions between organisms and their environment (their 'home life') (Begon et al., 2006, xi). If ecology studies how living organisms relate to their environments, in what way is ecology 'political'? According to some, it is in the process of examining the conflicts arising from, or linked to, ecological problems that ecology becomes political (e.g. List and Rittberger 1992, cited in Forsyth, 2003). From Enrique Leff's perspective, ecology becomes political as a result of the power strategies that drive processes of appropriation of nature by different, and often conflicting, interests and values (Leff, 2017). Or further still, it is in examining the role of politics in the creation of science itself, recognising the uncertainties and contestation in the production of ecological knowledge (Forsyth, 2003). There are debates in the field of political ecology over whether an overemphasis on the political aspects of the environment overlooks the 'ecology' in political ecology, and on the flipside whether there is an under-emphasis on policy and politics (Vayda and Walters, 1999, Walker, 2007). The lack of a common definition of political ecology or standardised methods have led to criticisms of the field as 'incoherent' (Walker, 2003) and there are debates over what constitutes 'environment', 'ecology' and 'nature', terms which are very often used interchangeably (Walker, 2005). Nevertheless, it is precisely this broad scope of political ecology that leaves space for scholars and activists to incorporate diverse approaches and traditions from inside and outside academia in a common mission to 'address and fight political, economic, social and ecological inequities' (Batterbury, 2015, p.41). This is often achieved via case studies that 'stress idiosyncrasies, contextual outcomes, and local surprises that precisely fly in the face of general theory-building' (Robbins, 2020, p. 84).

The term 'political ecology' appears in a 1935 Science newsletter article by Frank Thone, *We Fight For Grass*, commenting on the conflicts between indigenous peoples and colonisers over the tilling of the land, finding parallels between Japan's planned invasion of Mongolia and American troops' confrontations with native Americans over land use (Thone, 1935). This appears to be the first use of 'political ecology' in academic literature (Leff, 2015b) and later Eric Wolf brought new attention to the term in 1972 in the article *Ownership and Political Ecology* (Wolf, 1972). During the 1970s and 1980s, political ecology evolved into an academic field, amid increased awareness and concern for environmental issues such as soil erosion, land degradation and pollution, and out of a

frustration with apolitical or simplified explanations of the causes of these issues, such as population growth or lack of technology (Blaikie and Brookfield, 1987, Peet and Watts, 2002, Robbins, 2020). Political ecologists come from a wide range of disciplines - geography, anthropology, ecological economics, cultural ecology, agrarian studies, development studies and others. However, political ecology is not only an academic field but importantly encompasses the ideas, writings and advocacy of activists, NGOs and social and environmental movements, actors who may not consider themselves political ecologists or who may have never even heard of the term, but whose work represents de facto political ecology (Batterbury, 2015). In Latin America, the strong presence of social movements combined with influential critical thinkers has led to a vibrant field of political ecology in the region. According to Leff, Latin America 'has a fair claim to being the most important region in the history and development of political ecology' and is a source of thinking on 'how power relations infuse politics, economics, ecologies and cultures through processes of territorialization and re-territorialization that shape landscapes and people's livelihoods.' (Leff, 2015b, p. 45). Some of the defining traits of Latin American political ecology are explored below, namely the examination of society-nature relations through a decolonial lens and the assertion of difference through resistance movements.

Latin American scholars trace the persistence of colonisation in the region following independence from European colonisers, under neo-colonial structures of 'modernity' and global capitalism, expressed in the coloniality of power, knowledge and being (Escobar, 2006b, Parra-Romero, 2016, Quijano, 2000). Under global capitalist and neoliberal agendas, it is argued that a Eurocentric way of being and knowing and a techno-scientific understanding of the world is prioritised over alternative ontologies and epistemologies. This subversion of indigenous modes of thinking and ways of life as an antithesis to 'progress' has led to the oppression of people and the appropriation of nature. The ongoing colonisation of nature, in which nature is seen as something to be 'exploited, destroyed, reconfigured, according to the needs of the current regime of accumulation' (Alimonda, 2011, p. 22), is seen throughout the region in the form of large-scale mining, monocultures of soya and biofuel crops, and hydroelectric and infrastructure projects.

Therefore, Latin American political ecology, by studying historically configured power relations as mediators of society-nature relations (Martín and Larsimont, 2017), seeks to understand history (environmental, economic, social and political) in order to inform an analysis of present-day environmental conflicts (Alimonda, 2011). What Latin American

critical thinking and political ecology have in common is a search for identity following generations of subversion under colonialism (Alimonda, 2017). A recurring feature is the conflict that arises out of contradictory visions of society-nature relations; a dominant culture with ideals such as civilisation, progress and development versus subordinated cultures with alternative visions, such as *el buen vivir* (Castro Herrera, 2017). While the dominant culture may be represented by foreign states, institutions or corporations, it may also be imposed by internal actors - state institutions, elites, organisations etc. - as a form of 'internal colonialism' (Parra-Romero, 2016). For example, Escobar (2006b) argues that a national Euro-Andean modernity has suppressed black and indigenous knowledges and cultures in the Colombian Pacific region.

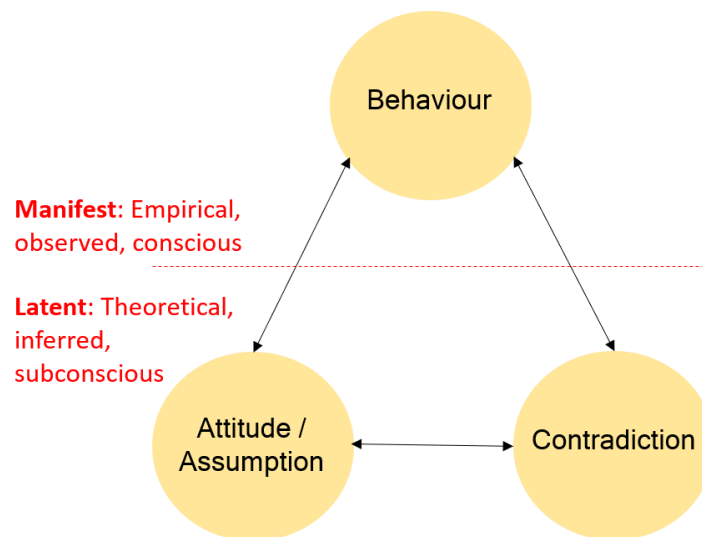
Peruvian sociologist Aníbal Quijano (cited in Escobar, 2010a, p. 2) stated that Latin America was 'the original space in the emergence of modern / colonial capitalism' but also 'the very center of world resistance against this pattern of power and of the production of alternatives to it'. Latin American political ecology extends beyond academia, combining critical thought with the daily experiences and knowledge produced by activists and social movements. This is reflected in regional and international networks, such as *Movimiento de Afectados por las Represas en Latino America* (Movement of Dam Victims in Latin America), international peasant movement *La Via Campesina*, and Friends of the Earth groups, to name a few. Analysing human-nature relations through a decolonial lens means examining and questioning the complex relations involved in the exploitation and appropriation of territories, bodies and forms of life; and making space for different ways of living, different forms of knowledge and possible worlds (Parra-Romero, 2016, p. 16). For example, Ulloa (2020) illustrates how the demands for relational water justice by women from the Wayúu ethnic group implies rethinking and decolonising the concept of 'water' and allows a reimagining of the human-territory-water relationship from a plural perspective.

Conflict is an important aspect of political ecology, one of the five major themes in the literature according to Robbins (2020). Conflicts feature centre stage in Martinez-Alier's conception of political ecology as 'the study of ecological distribution conflicts' (Martinez-Alier, 2002, p. 54), by which he is referring to social conflicts over the unequal distribution of environmental benefits (e.g. access to natural resources and ecosystem services) and burdens (e.g. pollution and waste). The next section explores conceptions of conflict from peace and conflict studies and political ecology.

### 2.2.2. Socio-ecological conflict and violence: definitions and concepts

Conflict arises from the pursuit of incompatible (or perceived to be incompatible) goals by two or more people, groups or institutions (Gilmartin, 2009). In human society conflict is inevitable and can manifest in a range of violent or nonviolent practices – protest, intimidation, physical force, dialogue, negotiation, legal action (Andrews et al., 2017). Although violent conflict is often more visible, conflict can also be peaceful and transformative, leading to constructive dialogues and outcomes. According to Johan Galtung, expert in peace and conflict studies, three elements make up a conflict: a contradiction ('something standing in the way of something else'); observable behaviours; and underlying attitudes or assumptions (Galtung, 1996, p. 70). A conflict can originate at any point in the conflict triangle (Figure 5); a contradiction might lead to certain behaviours and attitudes, or accumulated behaviours or attitudes might lead to a contradiction. Galtung discusses how the deep culture or cosmology of a civilisation conditions how people perceive time and the life cycle of a conflict, as well as how they behave in a conflict situation (Galtung, 1996).

Figure 5: The Conflict Triangle or ABC Triangle



Source: Adapted from Galtung (1996, p. 72)

Pérez-Rincón (2014, p. 264) refers to socio-environmental conflict as the manifestation of social contradictions in human-nature relations, such as people's demands for the conservation of nature, and for the ethical and aesthetic values they hold for it, as well as struggles associated with the appropriation of natural resources by different actors. Such

conflicts are being lived out across the world in struggles over the protection of territories, forests, rivers, and biodiversity against the threats posed by extractive industries, infrastructure, tourism and even biodiversity conservation projects. They are expressed in different languages of valuation – where values of human rights, livelihoods, territorial rights and intrinsic values of nature are not satisfied by economic valuations (Martinez-Alier, 2002). Examples of these conflicts are made visible in the Global Atlas of Environmental Justice (EJAtlas), conceptualised as struggles for social justice and environmental sustainability which usually arise from structural inequalities of income and power (Temper et al., 2015). While the concept of ‘ecological distribution conflicts’ may suggest an overemphasis on distributive aspects only, other dimensions of environmental justice, such as recognition of cultural identity and political participation (procedural justice) are equally important (Schlosberg, 2004). Escobar extends the concept of ecological distribution conflicts to talk about three interrelated dimensions of conflict: economic, ecological, and cultural. He defines cultural distribution conflicts as conflicts that ‘arise from the relative power, or powerlessness, accorded to various cultures and cultural practices in a historical context’ (Escobar, 2006a, p. 8). For example, such conflicts arise out of tensions between place-based local cultures and subsistence economies versus modern cultures that prioritise individualism and markets, with the resulting impacts on local environments, such as when complex ecosystems are transformed for the purposes of agriculture or energy production.

Parra-Romero (2016), building on Escobar, argues that an analysis of socio-ecological conflicts in Latin America should go beyond examining economic transactions and unequal distribution of resources (coloniality of power) to examine the cultural dynamics (coloniality of being) and academic practices (coloniality of knowledge) that contribute to the emergence (or not) of other regimes of nature, other forms of production and validation of knowledge, and other possible worlds. According to Leff, an ‘economic rationality and a colonial desire for control have deterritorialized cultures and are altering the ecological distribution of the planet’ (Leff, 2017, p. 241). As he notes, the assertion of political difference (the right to be different, the right to differ) is a hallmark of Latin American political ecology and is especially significant amid warnings of the de-politicising tendencies of the current neoliberal times (Leff, 2015a, p. 52). The inevitable dilemma, then, is how to achieve equality while respecting difference (Escobar, 2006a) and how to embrace a plurality of cultures, practices, visions, and values without arriving at a deadlock or reverting to violent conflict.



The terms 'environmental conflict', 'socio-environmental conflict' and 'socio-ecological conflict' are generally used interchangeably in the associated literature, although often with diverse approaches to analysing such conflicts, their causes and consequences. In attempts to identify the causes and triggers of violent conflicts, some have pointed to resource scarcity (Homer-Dixon, 1999, Maxwell and Reuveny, 2000) while in contrast, others point to resource abundance, i.e. 'the resource curse' (Collier and Hoeffler, 2004, Humphreys, 2005). Political ecologists have rejected overly simplistic accounts that draw direct causal links between conflict and environmental scarcity, abundance or degradation, instead highlighting the specific and situated nature of socio-ecological conflicts and illustrating examples of conflicts that defy deterministic theories (Fairhead, 2001, Peluso and Watts, 2001). Rather than searching for the 'environmental triggers' of violent conflicts, Peluso and Watts explore how specific environments, environmental processes and webs of social relations shape how violence is expressed; they see violence as a 'site-specific phenomenon rooted in local histories and social relations yet connected to larger processes of material transformation and power relations' (Peluso and Watts, 2001, p. 5). While Peluso and Watts (2001, p. 26) broadly define violence as 'practices (brutal acts) that cause direct harm to humans' (whether physical, symbolic, cultural or emotional), violence can also be conceived beyond harm to humans as harm to the environment itself.

Following on from his articulation of conflict, Galtung (1990) describes three forms of violence: direct, structural and cultural. Direct violence refers to an intentional act of violence which is visible, manifest (e.g. physical or verbal violence). Structural violence is indirect, invisible, not necessarily intended and comes from the social structure, which can manifest in the form of repression or exploitation. Behind the other two types of violence lies cultural violence, a symbolic form of violence that legitimises direct and structural violence, whether through religion, ideology, language, art, science, law, media, or education. Cultural violence can work by 'changing the moral color of an act' in order to make direct or structural violence 'look, even feel, right – or at least not wrong' or alternatively, by making reality opaque, so that the violent act is obscured or hidden (Galtung, 1990, p. 291-292). The driving force behind these forms of violence is *power* and Galtung identifies four types of power and violence: cultural, economic, military and political. For example, cultural power influences actors through persuasion, while economic power either entices or threatens through positive offers or sanctions (stick-carrot method) (Galtung, 1996).

Galtung addresses forms of violence against nature, describing direct violence as slashing and burning, structural violence as pollution and depletion of resources as an (unintended) consequence of modern industry, and cultural violence as the legitimisation of economic growth and globalisation that can obscure the environmental consequences of people's actions. Writing in 1990, as the concept of sustainable development was beginning to gain popularity in the international policy arena, Galtung ponders whether 'the buzzword "sustainable economic growth" may prove to be yet another form of cultural violence.' (Galtung, 1990, p. 294). He argues that environmental degradation needs to be counteracted through de-industrialising and de-commercialising processes, rather than converting one type of pollution to another through patchwork approaches. Similarly, Escobar (2006a) argues that neoliberal globalisation is a 'declaration of war on nature and humanity' (p. 6), to which the only response seems to be conflict and struggle.

There has been little intersection between political ecology and peace and conflict studies, partly because of political ecologists' criticisms of the more reductionist positivist approaches within peace and conflict studies, and conversely, criticisms coming from conflict scholars of the use of ad hoc case studies and lack of systematic analysis within political ecology (Le Billon and Duffy, 2018). However, there are calls for greater engagement between political ecology and peace and conflict studies in order to enrich both fields (Ide, 2016, Le Billon and Duffy, 2018). Ide (2016) shows how a constructivist approach can reveal the role of discourse in constructing identities and environmental problems, dimensions often overlooked by mainstream research on socio-environmental conflicts. Political ecology analyses of conflict recognise that conflicts emerge not only over material distribution and access to resources, but also over ideological conceptions of how to organise society; they show how pre-existing social struggles can become 'ecologised' and reframed as environmental issues and likewise how new divisions emerge from ecological conflicts (Le Billon and Duffy, 2018, Robbins, 2020). Meanwhile, theories, frameworks and debates from peace and conflict studies can offer political ecology insights into conflict dynamics and a basis from which to critically analyse socio-ecological conflicts. Therefore, using Galtung's conflict triangle and typologies of violence as a point of departure and enriched by a critical nuanced perspective offered by political ecology, this provides an interesting framework through which to examine dimensions of socio-ecological conflict in this research. The next section discusses trends and analyses of socio-ecological conflict in Latin America.

### 2.2.3. Socio-ecological conflict and extractivism in Latin America and Colombia

#### **Socio-ecological conflict and extractivism**

Latin America has experienced centuries of socio-ecological conflict across the region, but these conflicts are becoming increasingly frequent and visible, with almost a third of the conflicts recorded on the EJ Atlas located in Latin America<sup>5</sup>. The violent nature of many of these conflicts makes Latin America a particularly dangerous region for human rights activists and environmental defenders. It has consistently been the region worst affected by killings and enforced disappearances of land and environmental defenders since 2012 (Global Witness, 2020). Colombia is particularly problematic, with over 100 human rights defenders killed in 2019 (the actual number likely to be higher), the most targeted group being leaders of community-based and ethnic groups such as indigenous peoples and Afro-Colombians, and increasingly women (Front Line Defenders, 2020, United Nations, 2020).

Socio-ecological conflict in Latin America is not new and many see such conflict as a symptom of discontent and resistance under successive generations of extractivism (Front Line Defenders, 2020, Svampa, 2019). Extractivism refers to activities that literally extract natural resources from the Earth for the purpose of exporting them as commodities. This includes the extraction of oil, gas and minerals, but the term is increasingly used to refer to a range of activities and megaprojects that intensively exploit natural resources at a large scale, including farming, forestry, fishing and hydroelectric dams (Acosta, 2013, Raftopoulos, 2017). Roa Avendaño and Navas (2014) conceptualise extractivism as a process of extracting components of nature that are essential for its equilibrium (e.g. water, soil nutrients, energy) for the purposes of accumulating capital. The global capitalist economy, built on an extractivist mode of accumulation, has facilitated the extraction and export of natural resources from Latin America, as well as Asia and Africa, over the past 500 years (Acosta, 2013). Every country in Latin America, regardless of its political regime, has promoted extractivist policies and has felt the impacts to varying degrees (Gudynas, 2018). The local impacts of these policies include pollution, deforestation, biodiversity loss, land grabs, human displacement and altering of cultures and traditional livelihoods, as well as spill-over effects at a wider scale such as flexibility in environmental or labour laws,

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<sup>5</sup> 893 of a total of 3,059 cases (29%) are located in South America / Meso America / Caribbean, search performed 19<sup>th</sup> February 2020 at <https://ejatlas.org/>

detritorialisation, erosion of democracy, and economic dependency (Göbel and Ulloa, 2014, Gudynas, 2009, Gudynas, 2018). According to Ulloa and Coronado (2016, p. 26), the socio-environmental inequalities linked to extractivist processes have produced 'new geographies of appropriation', with hoarding and dispossession of land and nature.

The most recent phase of extractivism has seen an 'explosion' of conflicts since the beginning of the 21<sup>st</sup> century, as a response to the pressures on natural resources, land and territories brought about by new dynamics of capital accumulation (Svampa, 2019). In recent decades, as poverty has persisted despite (or because of) the export of commodities, progressive Latin American governments created new development policies purportedly to tackle poverty and inequality, but which maintain extractive industries at their core. Eduardo Gudynas argues that this is simply a new expression of extractivism – neoextractivism – where the state attempts to play a more active role, taking back greater control of resources and the revenues derived from them, but retaining the status quo of accumulation and the subordination of exporting countries to the global market. Through greater regulation and intervention by governments and the redirection of surplus revenue towards social programmes, natural resource extraction has intensified, but is socially legitimised under 'the myth of progress' (Gudynas, 2009, p. 221). Gudynas observes neoextractivism as a tendency among 'progressive' Latin American governments formed during 'the pink tide' that tried to distance themselves from the neoliberal model (principally, Bolivia, Venezuela, Ecuador, Argentina, Brazil and Uruguay). However, others argue that neoextractivism and its associated illusion of development extended across the entire region, including under neoliberal governments such as Colombia, Mexico and Peru (Composto and Navarro, 2014, Svampa, 2019). Svampa views neoextractivism as a 21<sup>st</sup> century version of extractivism with new dimensions at multiple scales, including socio-ecological crisis at planetary scale and the intensive occupation of the territory, land grabbing, and an 'ecoterritorial' turn<sup>6</sup>, all of which have led to escalating conflicts and an increase in state and parastatal violence (Svampa, 2019). Extractivism in Latin America has brought contrasts of extreme profitability for some, and poverty in those areas that are sacrificed (Svampa, 2019). Composto and Navarro (2014), citing Bebbington, argue that while historic extractivism and the newer version of neoextractivism have their nuances in different countries in the region, they share a common 'economic, political and ideological

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<sup>6</sup> Svampa describes the ecoterritorial turn as a new language of valuation used by social movements, such as indigenous and feminist movements, that incorporates environmental aims with the defence of land and territories.

project'. This is the pursuit of an economic model based on the intensive use of capital to achieve the extraction of resources, as well as instilling a cultural logic and a form of occupation and control that prioritises centralised power and private investment over rural, indigenous and campesino populations. Therefore, since the year 2000, the discourse coming from political elites in the region (progressive and conservative) is that there is no alternative to the extractivist rationale (Svampa, 2019). It follows that, under the neoextractivist model, those who are opposed to extractivism are opposed to social development and the national interest. This argument has been used by states to criminalise and delegitimise protestors and has led to the toleration of repression and killings of local leaders (Gudynas, 2018). In Colombia, social mobilisation is often stigmatised and delegitimised as 'guerrilla activity' (Lederach, 2017). Acosta (2013) meanwhile highlights violence as a feature in territories under processes of deterritorialisation, where the state takes a back seat and responsibility for social needs are left to the companies managing megaprojects in the territory. This has led to repression, violence and the violation of rights across Latin America.

### **Cases of socio-ecological conflict in Latin America and Colombia**

Conflicts over mining and fossil fuel industries represent perhaps the most emblematic form of socio-ecological conflict in Latin America, widely covered in case studies and made visible through the work of resistance movements and via the Observatory of Mining Conflicts in Latin America. There are currently<sup>7</sup> 277 mining conflicts published on the Observatory's map, and 950 environmental conflicts on the EJ Atlas in Latin America, the latter covering conflicts over mineral and fossil fuel extraction, water and waste management, biomass and land use, infrastructure, tourism, biodiversity conservation, industry and utilities and nuclear energy. Latin America's abundance of natural resources has attracted interest through the ages – from the gold and silver that drew early conquistadors, to coffee, sugar, oil, copper, water resources and more recently, explorations of new forms of extractivism via fracking and the extraction of rare earth and 'technology' minerals used in computers, phones and solar panels (Zaitchik, 2019). In response, communities and social groups are resisting the continued exploitation of their territories and people. These socio-environmental movements are viewed variously as

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<sup>7</sup> As of 26<sup>th</sup> October 2020 EJ ATLAS. 2020. *Environmental Justice Atlas* [Online]. Available: <https://ejatlas.org> [Accessed 26 October 2020], OBSERVATORIO DE CONFLICTOS MINEROS DE AMÉRICA LATINA (OCMAL). 2020. *Conflictos Mineros en América Latina* [Online]. Observatorio de Conflictos Mineros de América Latina, OCMAL. Available: [https://mapa.conflictosmineros.net/ocmal\\_db-v2/](https://mapa.conflictosmineros.net/ocmal_db-v2/) [Accessed 26 October 2020].

environmental justice movements (Temper et al., 2015) or movements of *r-existence*, not only resisting dispossession but also redefining their forms of existence and reinventing their cultural identities (Porto-Gonçalves and Leff, 2015).

There has been a rise in environmental conflicts in Colombia over the past two decades, primarily over mining, fossil fuel extraction, biomass and hydropower. This has been linked to pro-extractivist policies that formed the basis of Colombia's National Development Plans and Territorial Rural Development Plans and the increase of foreign direct investment, showing that as the amount of foreign capital entering the country has increased, so too has the number of socio-ecological conflicts (Forero and Urrea, 2018, Pérez-Rincón et al., 2017, Pérez-Rincón, 2014). These conflicts impact on water, soils, rivers and forests; they result in land grabs, impact protected areas and rights to water and the groups most affected are campesinos, indigenous peoples, small-scale fishers, artisanal miners and Afro-descendent communities (Pérez-Rincón, 2014). With the multiplication of megaprojects has followed a multiplication of resistance movements. A publication by CENSAT Agua Viva (Friends of the Earth Colombia) examines socio-ecological conflicts related to four different expressions of extractivism in the country: the construction of hydroelectric dams, the agro-industry, large-scale mining and hydrocarbons (Roa Avendaño and Navas, 2014). These conflicts represent resistance movements against the neoliberal model and its 'predatory extractivism', against the financialisation of nature and against a new phase of colonisation manifested in the dependency of Colombia on other countries, where the interests of foreign companies take precedence in aspects like forestry and policy development (ibid).

In Colombia, the evolution of different phases of extractivism and neoliberalism has been intertwined with war, where 'the state and paramilitary forces act at the service of national and transnational capital' (Oslender, 2007, p. 758). Violence, forced displacement and killings of activists are used to silence counter narratives, repress social movements and displace people in order to obtain their land for capital investment (Dyer, 2019). The diverse extractivist projects throughout the country have triggered conflicts over deterritorialisation processes, ruptures in human-nature relations, and various forms of violence that have fractured communities and affected their ways of life (Ulloa and Coronado, 2016). In Colombia, about 70% of the forced displacements that took place between 1995 and 2002 occurred in mining areas (Acosta, 2013, p. 85). Resource extraction was central to the guerrilla group Revolutionary Armed Forces of Colombia (FARC)'s activities and also

features as a central strategy in the peace process, to grow the economy in the post-conflict period (Bebbington, 2015, McNeish, 2016). Therefore, as extractivism has been justified in the name of development across Latin America, in Colombia it is also being justified as a route to peace. In this context, Ulloa and Coronado reflect on the different aspects to be considered when analysing these extractivist contexts in post-conflict scenarios. These include analysing society-state interactions and the cultural, social and ethnic differences that run through them; the space in which socio-environmental processes are disputed and the territorialities that they involve; as well as the historical and situated social contexts at various scales (Ulloa and Coronado, 2016, p. 38).

To understand the role of offsets in compensating for the impacts of extractive development and their role in the associated socio-ecological conflicts, the next section introduces the central debates on environmental offsets and the ideological as well as territorial conflicts that they can generate.

## **2.3. Offsets and socio-ecological conflict**

### ***2.3.1. Offsetting literature, key themes and debates***

The scientific literature on the topic of environmental offsets and no net loss goes back to the 1970s, following the Ramsar Convention and the emergence of wetland banking in the United States. Over the succeeding decades, it has gradually grown into an expansive body of literature with an increasingly international focus, with a notable surge in publications on the topic since the 2000s, along with the popularisation of the term 'biodiversity offsetting' (Coralie et al., 2015, Hrabanski, 2015). A review<sup>8</sup> of scientific literature on biodiversity offsets conducted as part of this research found that papers examining offsetting in the US dominate the field, followed by Australia, the UK, France, and Canada. However, in recent years there have been more papers with an international/general focus, discussing overall concepts and processes of biodiversity offsetting with no specific geographical focus. The high number of papers published in the *Wetlands* journal since 1985 is illustrative of the dominant US focus, but the journals *Biodiversity Conservation* and *Ecosystem Services* overtake in 2014-2016 as the journals with the most published articles on biodiversity offsetting. This suggests a shift from a concentration on wetlands to the application of the biodiversity offsetting approach to other

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<sup>8</sup> Further details of this review can be found in the methodology chapter, section 3.3.1.

ecosystems, as well as an increasing focus on ecosystem services. These findings are consistent with other analyses that show the dominance of high-income countries in producing offsetting literature, especially the US, Australia and Canada, with contributions from certain European countries, particularly the UK, France, the Netherlands, Germany, and smaller contributions coming from Asia, South America and Africa (Coralie et al., 2015, Goncalves et al., 2015, Hrabanski, 2015). While much of the work comes from research institutes, a considerable contribution comes from non-academic institutions including public agencies, private companies and NGOs, notably the Business and Biodiversity Offsets Programme (BBOP) and The Nature Conservancy (Coralie et al., 2015).

The vast majority of research on biodiversity offsetting comes from the fields of environmental sciences and ecology, while social sciences represent a smaller portion. Only 16% of offsetting literature published between 1984 and 2015 appeared in social science journals in a review conducted by Coralie et al. (2015). Gelcich et al. (2017) found that offsetting papers on social and policy issues made up only 5% and 8% respectively of peer-reviewed offsetting research, in a similar time period, 1990–2014. The majority of the scientific literature on offsets deals with the conceptual and technical aspects of the approach. These include how to measure biodiversity loss and gains (the metrics or currency), how to calculate no net loss using multipliers, defining baselines and scales against which biodiversity gains are measured, ensuring the mitigation hierarchy is followed, and establishing thresholds beyond which impacts are regarded as non-offsettable (e.g. Bull et al., 2013a, Gibbons et al., 2016, Gibbons and Lindenmayer, 2007, Kiesecker, 2009). Bonneuil (2015) tracks a link between the emergence of biodiversity offsetting and the ‘environmental backlash’ in the United States between 1973-1990; a neoliberal counter-revolution driven by political and economic elites in response to falling industry profits and strict environmental legislations brought about by the environmental movement of the 1960s. This period saw the rollback of environmental regulations and the emergence of market-based instruments, with the terms ‘no net loss’ and ‘offset’ first used in relation to air pollutants and carbon offsets before being adopted into the biodiversity realm. This, along with an increasingly economic rhetoric driven by certain actors, rather than supported by science, suggests that offsetting was born from a political ideology before it started to be treated as a technical issue (Calvet, 2015, Coralie et al., 2015, Devictor, 2015).

The concept of biodiversity offsetting has spurred a controversial debate. Those in favour argue that offsets have the potential to provide more efficient, targeted and transparent



conservation efforts and can offer benefits for business, conservation groups, governments and communities (ten Kate et al., 2004, The Environment Bank, 2013). While there is general agreement on the technical and governance challenges of offsets between those in favour of offsets and those opposed to them, there is disagreement over their acceptability, due to the ethical and social challenges involved and the conflicting value frames of those on both sides (Maron et al., 2016b, Sullivan, 2017). Critics argue that offsetting is ethically misguided, a commodification and 'trading in' of nature which is about the conservation and accumulation of capital, rather than nature (Hannis and Sullivan, 2012, Ives and Bekessy, 2015, Spash, 2015). Some argue that biodiversity has cultural, spiritual, place-based and intrinsic values that can never be offset and that accepting the loss of biodiversity in one place in exchange for gain elsewhere represents the sacrificing nature in one place, carrying with it place-based ecological and social casualties (Sullivan, 2013). One of the main critiques is that offsetting gives businesses a 'license to trash', rationalising development and the environmental harm it causes as unavoidable (Howarth, 2013, Sullivan, 2013). In response, others will argue that offsetting is an improvement on past or current policy and practice, where compensation requirements are loose and do not properly account for project impacts (Quétier et al., 2015, ten Kate et al., 2004). In between the opposing views, there are others who raise concerns about biodiversity offsetting but concede that such an approach may be necessary given the realities of a current capitalist-driven society. From this perspective, offsets may be better than a business-as-usual scenario and this group takes a pragmatic approach, open to a reworking of offsetting processes rather than rejecting the approach entirely (e.g. Maron et al., 2016a, Martin et al., 2016, Moilanen and Laitila, 2016). Despite the issues and criticisms, biodiversity offset schemes are nevertheless gaining ground and becoming increasingly common across the world, being put forward as a 'last resort' corresponding to the mitigation hierarchy and no net loss or net gain principles.

The topic of biodiversity offsetting is situated within a wider discourse on the neoliberalisation of nature. Neoliberal conservation represents a '*political ideology* that aims to subject political, social, and ecological affairs to capitalist market dynamics' (Büscher et al., 2012, p. 5, emphasis in original). This is based on the premise that the only way to conserve nature is through valuing it in monetary terms - 'selling nature to save it' (McAfee, 2012). Neoliberal conservation has an inherent contradiction in that 'it privileges as a solution the very structures and processes of neoliberal capitalism that produce the socio-ecological damages it seeks to redress' (Büscher et al., 2012, p. 14). Büscher et al. (2012) argue that discourses promoting neoliberal conservation that are

seemingly free of contradictions (e.g. 'win-win' solutions) discursively mask contradictory realities, for instance, the complexities, uncertainties, politics and power relations inherent in implementing conservation projects. The depoliticising effects of biodiversity offsets have been explored, where it is argued that the focus on quantitative calculations of ecological losses and gains frames offsets as a technical management matter, limiting participation in decision making to a select group of stakeholders (Apostolopoulou, 2019, Maestre-Andrés et al., 2020).

Although offsetting is often described as a 'market-based' approach, the majority of offset schemes are driven by regulation and are varied in structure, with few operating in a market as such (Bull and Strange, 2018, Koh et al., 2019, Lapeyre, 2015). Lockhart and Rea (2019) describe offsets as a 'command-and-commodify' form of regulation, involving a mix of market liberalisation and authoritative state control. In the Latin American context, where neoliberal, post-neoliberal and other forms of resource governance co-exist simultaneously, these have been characterised as 'not-quite-neoliberal natures' (de Freitas et al., 2015). In contrast to the universal concepts and guidelines in the design of offsets, the experiences in implementation are highly dependent on the local context. This is evident from the stalled attempts to implement biodiversity markets in the UK and in Spain, but their expansion in the US (Lockhart, 2015, Lockhart and Rea, 2019, Maestre-Andrés et al., 2020). The experiences in the UK and Spain highlight the difficulties when trying to decide on appropriate metrics, the lack of knowledge, capabilities, and political will, as well as challenges from civil society groups due to the controversial nature of the approach. These challenges are likely to be substantially amplified in countries with weak institutions, and the risks of depoliticisation greater in contexts with less organised civil society movements. Given the expansion of offsetting regulation around the world, the next section discusses the work to date examining the development of offsetting in Latin America and in Colombia.

### 2.3.2. *Offsetting in Latin America and Colombia*

Although there are increasing policies, standards and guidelines for biodiversity offsets, comparatively few empirical analyses exist and those that do primarily examine high income countries and they widely report failure to achieve no net loss (Bull et al., 2013b, Curran, 2014, Harper, 2005, Lindenmayer et al., 2017, May et al., 2017, Zu Ermgassen et al., 2019). Considering the majority of offset policies occur in middle- and low-income countries, there is, according to Gelcich et al. (2017) a 'glaring geographical gap' for

research opportunities focused on these countries, including in Central and South America, the region that contains the greatest proportion of offsets by area (Bull and Strange, 2018).

Existing studies on Latin America assess offsetting policy development and the feasibility of habitat banking in the region (Bovarnick et al., 2010, Villarroya et al., 2014), with studies on offset schemes in Brazil (Brancalion et al., 2016, Darbi et al., 2009, Kennedy et al., 2016, Sonter et al., 2014) and Peru (Mandle, 2015). The publications addressing the Colombian context, written by environmental consultants, The Nature Conservancy and the Instituto Humboldt, offer recommendations for offsetting including incorporating an integral assessment of the ecological and social values of biodiversity and its ecosystem services, developing portfolios of priority areas for restoration and conservation, taking into account the uncertainties involved in restoration, and ensuring additionality and participatory processes (López Arbeláez and Quintero Sagre, 2015, Rojas, 2015, Saenz, 2013, Soto and Sarmiento, 2014). A number of national and international institutions and NGOs have released guidance documents since the passing of Colombian biodiversity offset legislation in 2012 (Ariza Pardo and Moreno Hincapié, 2017, Buitrago Garzón, 2017, Deutsche Gesellschaft für Internationale Zusammenarbeit [GIZ], 2017, Instituto Humboldt, 2018, Instituto Humboldt and The Nature Conservancy, 2019, Sarmiento et al., 2015a, Sarmiento et al., 2015b). A critical analysis of offsetting plans that have been submitted to the Colombian environmental authorities is carried out by Murcia et al. (2017), focusing on those that incorporate ecological restoration approaches. The authors highlight the weaknesses of the offset plans and provide a number of recommendations, including the need for participatory processes to avoid social conflicts and the need for better territorial planning instruments. In terms of the Colombian forest offset scheme (*compensación por aprovechamiento forestal*), commentators have highlighted the lack of monitoring and lack of information on the programme's effectiveness (Madsen et al., 2010, Reid et al., 2015). Previous work has shown how logging permits issued in collective territories of black communities and indigenous forest reserves in the Chocó region undermines environmental protection in these territories (Córdoba Moreno et al., 2017, Palomeque Serna and Hincapié, 2016). However, there is a lack of empirical work that examines the forest offsets carried out as part of these permit processes. Experiences with other compensatory mechanisms such as payment for ecosystem services (PES) and REDD+ in Colombia are discussed at the end of the following section.

### 2.3.3. Social and cultural challenges of offsetting

International policy, standards and guidance on biodiversity offsetting discuss the importance of considering social and cultural dimensions in decisions around offsets, to achieve no net loss and preferably a net gain in biodiversity without making local people worse off and preferably ensuring they are better off, as highlighted in the below excerpts from policy documents:

At a minimum, offsets must not be used: [...] Where the exchanges involved in the project's residual losses and the predicted offset gains are considered *socially or culturally unacceptable* to relevant stakeholders; Where the *values that will be lost are specific to a particular place*, and therefore cannot be found elsewhere and adequately protected or re-created

– International Union for Conservation of Nature's Policy on Biodiversity Offsets (IUCN, 2016, p. 9, emphasis added).

A biodiversity offset should be designed and implemented in a landscape context to achieve the expected measurable conservation outcomes taking into account available information on the full range of biological, *social and cultural values of biodiversity* and supporting an ecosystem approach.

– Business and Biodiversity Offsets Programme's Standard on Biodiversity Offsets (BBOP, 2012b, Principle 3, emphasis added).

Where *socioeconomic and cultural uses of biodiversity* (that is, ecosystem services) are at issue, biodiversity offsets may include the provision of compensation packages for Affected Communities impacted by the project and offset.

– International Finance Corporation Guidance Note 6 (IFC, 2012a, GN32, emphasis added).

These excerpts recognise the importance of accounting for social and cultural values and uses of biodiversity as good practice in offsetting to ensure 'no net loss for people as well as biodiversity' (Bull et al., 2018), and proposed methods are being developed to better account for social issues such as measuring well-being associated with biodiversity losses and gains (Griffiths et al., 2019). Despite this, there are multiple social and ethical losses that are often dismissed when evaluating offsets (Moreno-Mateos et al., 2015). Biodiversity offset projects, whether through conservation or ecological restoration, can result in the displacement of people and have negative impacts on livelihoods; this was the case in a third of the 70 projects analysed by Sonter et al. (2018). They found that while many offset plans include goals to compensate for ecosystem services beyond strictly ecological targets, there is a lack of subsequent tailoring of projects to ensure that impacts to ecosystem services are actually offset. This may suggest that developers that include ecosystem services in project goals are more interested in enhancing their image

and social license to operate rather than mitigating their impacts (Sonter et al., 2018), or that there is insufficient follow up by the relevant authorities.

In the US context, studies have investigated the social equity implications of wetland mitigation, finding patterns of wetland loss in urban areas and gain in rural areas, with the consequent impacts on communities in both places, noting that the value of wetlands varies depending on the geographical location, where they may be viewed as an amenity in urban areas and as an underdeveloped site in rural areas (BenDor et al., 2008, BenDor and Stewart, 2011, Ruhl and Salzman, 2006). When offsets involve the creation, extension or increased management of protected areas, this has resulted in the exclusion of communities from these areas, as seen in Brazil (Anaya and Espirito-Santo, 2018), Madagascar (Bidaud et al., 2018, Bidaud et al., 2017) and Malaysia (Brock, 2015). These experiences mirror other examples from around the world, in a body of literature examining the social impacts of protected areas and national parks. While protected areas represent an important strategy for the conservation of biodiversity (Gray et al., 2016), in the rush to meet national targets for protected area coverage, the imposition and delimitation of these areas often creates a conflict between, on the one hand, the state and other actors such as local and transnational NGOs, and on the other hand, local actors such as peasants and indigenous communities. When protected areas are promoted as wild or human-free zones, as a form of 'fortress conservation' or 'projects of territorialisation' (Holmes, 2014), the resulting impacts on local people living within or surrounding the protected area boundaries are displacement from their land or severely limited livelihood options (Adams and Hutton, 2007, Brockington et al., 2006, Redpath et al., 2013). Despite debates over the validity of using biodiversity offsets to fund protected area creation or management, in some places they are being promoted as a tool to address the financing gap in the management of protected areas, especially in lower-income countries (Githiru et al., 2015, Maron et al., 2016a, Pilgrim and Bennun, 2014). However, the expulsion of local people from protected areas as a form of offset, along with other initiatives that justify the expropriation of land and resources for environmental ends have been characterised as a 'green grab' (Fairhead et al., 2012).

Various authors highlight conflicts in protected areas in Colombia; conflicts over land ownership, the violation of rights and legal inconsistencies and contradictions, a result of a 'pristine' model of nature conservation, a neoliberal model of tourism and a colonial discourse that excludes, prejudices and criminalises local people (Díaz Cano, 2008, Duran, 2009, Ojeda, 2012). Escobar (1998) has highlighted a socio-ecological conflict in

the Colombian Pacific between local communities and state, timber, mining, and agroindustrial interests, exploring how social movements defend their territories through a slow re-construction of Afro-Colombian identities and alternative constructions of development, territory and biodiversity conservation. There are similar concerns over climate mitigation projects, such as biofuel production and REDD+ projects, due to their potential to facilitate land grabs and reinforce existing social inequalities in rural communities (Hunsberger et al., 2017, Ulloa, 2013). In other parts of Latin America, payment for ecosystem services projects have revealed equity and distribution issues and conflicts of interest such as trade-offs between environmental and social objectives (Corbera et al., 2007, Kosoy et al., 2007, Muradian et al., 2010).

## **2.4. Conclusion**

Latin America has experienced centuries of socio-ecological conflict as a result of the intensive and unsustainable use of natural resources. Over recent years, the level and intensity of these conflicts have been increasing, and this is exemplified in Colombia with the unprecedented rates of killings of environmental and human rights defenders. As highlighted in this chapter, whatever the political regime, socio-ecological conflict has persisted and intensified across the region, attributed to successive generations of extractivism from the colonial period to the present day. Biodiversity offsets are put forward as a pragmatic compromise between development and environmental aims. However, as more and more offsetting projects are being implemented around the world, the impacts of these initiatives on people are beginning to become apparent, as are the challenges and controversies.

This literature review has highlighted two main gaps in the literature that this thesis aims to address. First, the research on offsetting to date has an overwhelming focus on high-income countries. However, with the rise in offsets spurred by policy and lender requirements, Latin America emerges as an important region to examine the implications of an offsetting approach. Colombia is a particularly interesting case, a country at the vanguard of biodiversity conservation, and offsetting, in the region. Second, the large body of scientific literature on environmental compensation and biodiversity offsetting mainly addresses the technical aspects and ecological factors, revealing a gap for research examining the social and political dimensions. This chapter has introduced some key themes emerging from Latin American political ecology pertinent to an analysis of

offsetting in this context, such as the historic power relations through processes of colonisation and extractivism and the intertwined economic, ecological and cultural dimensions of socio-ecological conflict. The methodology used in this research to address the gaps highlighted here is presented in the next chapter.

## **3. Methodology**

### **3.1. Introduction**

This chapter discusses the methodology adopted in this research project: the methodological framework, involving a case study design and qualitative approach within a constructivist paradigm; data collection through literature review, desk research, semi-structured interviews and qualitative observation during twelve months of fieldwork in Colombia; data coding and thematic analysis; research ethics and positionality; and finally, the methodological challenges and limitations.

### **3.2. Methodological framework**

Since biodiversity conservation interventions result from human decision-making and their success relies on changes in human behaviour, some of the primary determinants of the success or failure of environmental policy are social factors (Mascia et al., 2003). Therefore, this research uses qualitative social science methods to examine the social and political dimensions of environmental offsetting, such as who is involved in decision making, who is impacted by these decisions and in what way, as well as people's subjective meanings associated with biodiversity. Qualitative research examines the meaning of people's lives under real-world conditions, presenting their views and perspectives, as well as the contexts in which they live, using multiple sources of evidence and contributing insights in order to explain human social behaviour (Yin, 2011). As highlighted in the previous chapter, there is a gap in the literature examining biodiversity offsetting in Latin America and a need for more research examining the social dimensions of offsetting. A qualitative approach is appropriate for this purpose, since it is suited to exploring a phenomenon that has received limited research attention (Creswell, 2014) and where the parameters of the issues involved have not been determined. The research is carried out within a constructivist paradigm, using a case study design and thematic analysis.

#### **3.2.1. A constructivist worldview**

The basic set of beliefs that represent the worldview of the researcher, also referred to as a 'paradigm', encompasses three elements: epistemology, ontology, and methodology (Guba and Lincoln, 1998). The constructivist paradigm assumes a relativist ontology (i.e.



that there are multiple realities), a subjectivist and transactional epistemology (i.e. that knowledge is created through the interactions between researcher and subject), and a hermeneutic, dialectical methodology (i.e. that examines meaning and discourse) (Guba and Lincoln, 1998). Constructivists believe that knowledge and truth are created, rather than being out there waiting to be discovered. As opposed to the existence of an objective, essential reality, constructivists believe that reality is expressed through a variety of symbols and languages and that humans shape reality, whether consciously or subconsciously, to fit their purposes (Schwandt, 1998). Following Guba and Lincoln's constructivist paradigm, what is 'real' is a construction in the minds of individuals and there are multiple, and often conflicting, constructions of social realities, all of which are (at least potentially) meaningful (Schwandt, 1998).

The term 'social constructionism' is often used interchangeably with 'social constructivism', although some people argue there are clear distinctions between the two<sup>9</sup>. Additionally, 'constructivism' and 'social constructivism' are often used interchangeably, although Latour et al. (1986) argue that if we accept that all interactions are social, then the adjective 'social' becomes devoid of any meaning. Considering this, Hacking argues that the epithet 'social' should be used sparingly, for emphasis or contrast, and can be useful when referring to the construction of inanimate objects or phenomena usually thought of as existing independently of human society (Hacking, 1999). Such is the case in discussions about the 'social construction of nature'. A key theme in political ecology, these discussions include how we (humans) come to know about the environment, how it is defined and categorised, and how environmental trends and problems are represented, acknowledged, and defined (Peet et al., 2011). Aside from the social construction of nature, constructivist analyses in political ecology focus on discourse analysis and the historical and cultural dimensions of environmental change and are associated with post-structural or post-modern perspectives (Tetreault, 2017). This 'second generation' of political ecology (Escobar, 2010b) encompasses a wide range of constructivist and anti-essentialist perspectives. This work includes the deconstruction of concepts such as sustainable development and biodiversity conservation, examining wilderness as a social construct and the consequences on protected areas designed to be wild and people-free, and the

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<sup>9</sup> According to Gergen and Gergen, constructivism views people's constructions of the world as originating from processes inherent in the individual mind, whereas social constructionism views them as originating from human relationships. GERGEN, K. J. & GERGEN, M. M. 2007. Social Construction and Research Methodology. In: OUTHWAITE, W. & TURNER, S. P. (eds.) *The SAGE Handbook of Social Science Methodology*. London, UNITED KINGDOM: SAGE Publications.

study of social movements that contest 'truths', imaginations and discourses (Adams and Hutton, 2007, Escobar, 1998, Peet and Watts, 2002). In contesting scientific 'truths', critics argue that constructivist arguments can undermine science and provide an avenue for anti-science advocates, such as climate change deniers. Latour, whose work has been criticised for facilitating this trend, recognises the danger in this, and says that it is important to admit the uncertainties in science, but that this should not block policy or erode confidence in science (de Vrieze, 2017).

If we assert that everything is socially constructed, does it mean that there is no material existence beyond human perception? Most constructivists would not agree. I follow others such as Redclift (2010) who argues that a constructivist approach does not deny the materiality of non-human entities, but it recognises that we cannot separate their material existence from our knowledge of them. Referring to our conception of nature, from a constructivist perspective we can never attain 'value-free objective knowledge of the existence of nature, and we never cease to view nature through a social lens' (Redclift, 2010, p. 124). Another criticism levelled at the social construction of nature by Watts and Peet is that it overestimates human powers to transform nature and underestimates the significance of 'non-manipulable nature'. They argue there is a need to acknowledge the way in which nature also shapes society; how nature, the environment, and place are sources of thinking, reasoning, and imagining, in other words, 'the natural construction of the social' (Watts and Peet, 2002a, p. 263).

As a researcher, I adopt a conception of constructivism as a paradigm that perceives of a biophysical world that exists beyond and irrespective of human existence, but that knowledge, understanding and experiences of that world are always socially constructed, subjective and dynamic, resulting in multiple realities. Without delving too deeply into the nuances of different variations of constructivism (see, e.g., Demeritt, 1998), the perspective taken in this research diverges slightly from critical realism in the sense that critical realists tend to have more confidence in the possibility of knowing reality and establishing truth, even if it always a partial truth (Proctor, 1998). On the other hand, from a constructivist perspective, all reality is subjective, and is therefore more accepting of plural truths and realities. From the perspective pursued in this research, we can consider how human actions shape the biophysical world in material ways, as well as how the stories humans tell about a particular environment influence how it is perceived, experienced and managed. Likewise, an environment shapes individuals' perceptions,

values and beliefs. In this way, humans and their environment play a role in constructing each other. More concretely, in the case of biodiversity conservation in Colombia, this research examines the various and sometimes conflicting representations, meanings and narratives associated with 'biodiversity' and its compensation, including the different perceived challenges, successes and failures. This involves looking for a complexity of views, multiple meanings of experiences and relying on the participants' views of the situation being studied (Creswell, 2014). One of the challenges with a constructivist approach is navigating what is spoken and unspoken; it requires eliciting responses from a range of participants and seeking methods that incorporate both 'official' and 'local' forms of knowledge (Robbins, 2020).

### 3.2.2. Case study research design

This research uses a case study design. A case study is 'an empirical inquiry that investigates a contemporary phenomenon ("the case") in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident.' (Yin, 2014, p. 16). In order to define the case, it is necessary to define spatial, temporal and other concrete boundaries. A case study is suited to answering *how* and *why* questions, such as those posed in the research questions of this project. This research examines a single embedded case using multiple units of analysis and multiple sources of evidence (Yin, 2014). Within the overall case (environmental offsetting in Colombia) are two sub-units of analysis (offsetting in policy and offsetting in practice via the Hidrosogamoso hydroelectric dam) (Figure 6). The context within which the case is set includes offsetting policy and practice globally and the geographical, socio-economic and political context in Colombia and Latin America, as discussed in chapters four and five. The sources of evidence are interview data, documents and direct observation, as explained in more detail in the data collection section of this chapter.

Figure 6: Embedded single-case design (based on Yin, 2014)



The case study has both temporal and spatial boundaries. The timescale of the first unit of analysis covers two periods: from the 1990s to 2012 (when forest offsetting legislation was in place and prior to biodiversity offsetting legislation) and from 2012 to 2018 (since biodiversity offsetting legislation was passed). The timescale of the second unit of analysis covers the same two periods: from the 1990s to 2012 (the two decades leading up to the construction of Hidrosogamoso and the commencement of the offset projects) and 2012 to 2018 as the main focus of analysis (the implementation period of the forest offsets). In terms of spatial boundaries, the first unit of analysis looks at Colombia’s offset policy at the national level, while the second unit of analysis focuses on particular locations within the area of impact of the Hidrosogamoso dam and the surrounding areas of the forest offset project in Parque Nacional Natural (PNN) Serranía de los Yariguíes, all located in the department of Santander. The majority of data focuses within these spatial boundaries but is complemented with data from the regional (Latin America) and international levels.

**Process and rationale for case study and sub-unit selection:**

Case study: Colombia

The idea for this PhD research project arose out of preliminary research undertaken for my master’s dissertation that analysed the broad trends of the biodiversity offsetting model

in Latin America and the Caribbean (Feeney, 2013). It was the aim, through a PhD, to do an in-depth analysis of the expansion of biodiversity offsetting, focusing on one country within Latin America. As explained in the introduction, Colombia was chosen as the focus of the research due to having national biodiversity offset legislation since 2012 and representing the second most biodiverse country in the world after Brazil. Since I speak Spanish but not Portuguese, Colombia was chosen as the most suitable case study to explore the development of biodiversity offsetting in one of the most biodiverse countries in the world.

#### Sub-unit: Hidrosogamoso

To provide grounded empirical evidence and examine the local implications of biodiversity offsets, the original aim was to examine a biodiversity offset project being implemented under Colombia's 2012 biodiversity offsetting legislation. However, it became clear during the first year of research and following the pilot field trip to Colombia that a stalled implementation of the legislation on the ground meant there was a lack of active offset projects operating under this legislation to be studied. Despite this, there were other projects implementing offsets under previously existing environmental compensation legislation - forest offsets or environmental impact assessment processes. During the first year, a database was developed of potential case study projects gathered from the literature review and suggestions from experts based in Colombia. A total of 15 projects were considered from different sectors: mining (Cerrejón Mine, AngloGold/B2Gold Gramalote, AngloGold La Colosa, AngloGold/B2Gold Quebradona), hydrocarbons (Ecopetrol Rubiales, Ecopetrol Ariari, Casanare, Mansarovar Los Llanos, Mansarovar Magdalena Medio, Oleoducto Los Llanos), infrastructure (Variante San Francisco-Mocoa), and hydroelectric dams (el Quimbo, Ituango, Sogamoso), as well as the Meta pilot habitat bank. Online research into these projects was carried out, as well as email and Skype conversations with researchers, activists and project staff involved in some of the projects. Each project was evaluated based on a variety of criteria: the sector; the stage of implementation of the offsets; potential access to data and field sites; past or ongoing research on the projects, including the likely level of research fatigue among target groups; geographic location; level of risk and safety considerations.

Finally, the Sogamoso hydroelectric dam, 'Hidrosogamoso', was selected as the most suitable according to these criteria and the aims of the research. The case of Hidrosogamoso is an empirical example of a 'forest offset' project in practice, part of the

conditions of legislation related to environmental licenses and forest use. Since the project had been granted its license in the year 2000, it was not subject to the more recent 2012 biodiversity offset legislation. However, since Hidrosogamoso's offset project was being designed in the midst of wider policy changes and moves towards biodiversity offsetting, these were taken into consideration in the design of the project, to some extent. Construction of the Hidrosogamoso dam started in 2009 and it has been in operation since 2015. The forest offset project – reforestation and ecological restoration projects in the buffer zone surrounding the dam's reservoir and in PNN Serranía de los Yariguíes – were implemented between 2012 and 2018. This represented a suitable stage to examine the project, at the end of the implementation phase of the offsets. Additionally, it provided the opportunity to examine the ongoing impacts on the local community of the hydroelectric dam which, at the time of fieldwork in 2018, had been operating for three years. Researching and visiting the megaproject at that stage avoided more polemic and potentially risky situations when investigating such a project during construction, when conflict is at its height.

A single case study was used for the overall case of Colombia as well as the local case study. Focusing on one country allowed for an in-depth exploration of the political, socio-cultural and environmental context in Colombia. The drawback of a single case study approach is that it does not allow for comparisons across projects. The option of selecting multiple local case studies within Colombia was considered, for instance comparing the offsets of two different hydroelectric projects. There is a high diversity of offset plans and projects that are currently active in Colombia, which have been developed on a case by case basis, as well as a high diversity of ecosystems and socio-cultural contexts within different regions. Therefore, drawing meaningful conclusions from comparisons across multiple projects presents a challenge and would have required a longer period of fieldwork beyond the scope of this project. However, given the Colombian government's publication of a revised biodiversity offsetting manual in 2018 which aims to promote a more standardised approach, future research comparing multiple offset cases could provide interesting insights.

### 3.2.3. Qualitative research methods

This research uses multiple qualitative research methods: document analysis, semi-structured interviews, as well as qualitative observation. Using complimentary methods,

different data sources and collection procedures allows deeper insight into the research problem, through triangulation (Hoggart et al., 2002).

### **Document analysis**

Documents can provide background and context to the research subject, reveal questions that need to be asked and situations that need to be observed in the research, as well as providing supplementary research data, a way to track change and development, and can be used to verify findings (Bowen, 2009). Collection and analysis of documents during the first 18 months of research provided background information on the socio-political and ecological context in Colombia and on offsetting policy and practice. This assisted in compiling a timeline of events and formulating a fieldwork plan and interview guide, which were refined during fieldwork as new information and documentation were gathered. In the later stages of research, documents were analysed and cross-referenced with other sources of data to search for specific information and emergent themes. When analysing documents it is important to keep front of mind who produced them, what their interests might be, remembering that seemingly 'objective' statistics are socially constructed; they 'embody the value dispositions and mind-sets of those who produce them' (Hoggart et al., 2002, p. 71).

### **Semi-structured interviews**

Interviews are an essential source of case study evidence to provide important insights into a situation and identify other relevant sources of evidence (Yin, 2014). Semi-structured interviews were chosen as a suitable method for this research to gather a diverse range of views and to explore in detail the local implications of offsetting. Semi-structured interviews allow for leeway to explore angles deemed important by the interviewee, while also focusing the conversation on issues the interviewer considers important for the research project (Brinkmann, 2014). The semi-structured, qualitative research interview is 'an interview with the purpose of obtaining descriptions of the life world of the interviewee in order to interpret the meaning of the described phenomena' (Kvale & Brinkmann, 2008, p. 3, cited in Brinkmann, 2014). As Brinkmann (2014) highlights, it is important to not only look for 'the voice' of the interviewee or coherent narratives, but also to recognise internal conflicts and multiple, sometimes contradictory meanings in their accounts.

### **Qualitative observation**

Field visits to case study site(s) allow the opportunity for direct observations which serve as a source of evidence and provide additional information on the topic being studied (Yin,

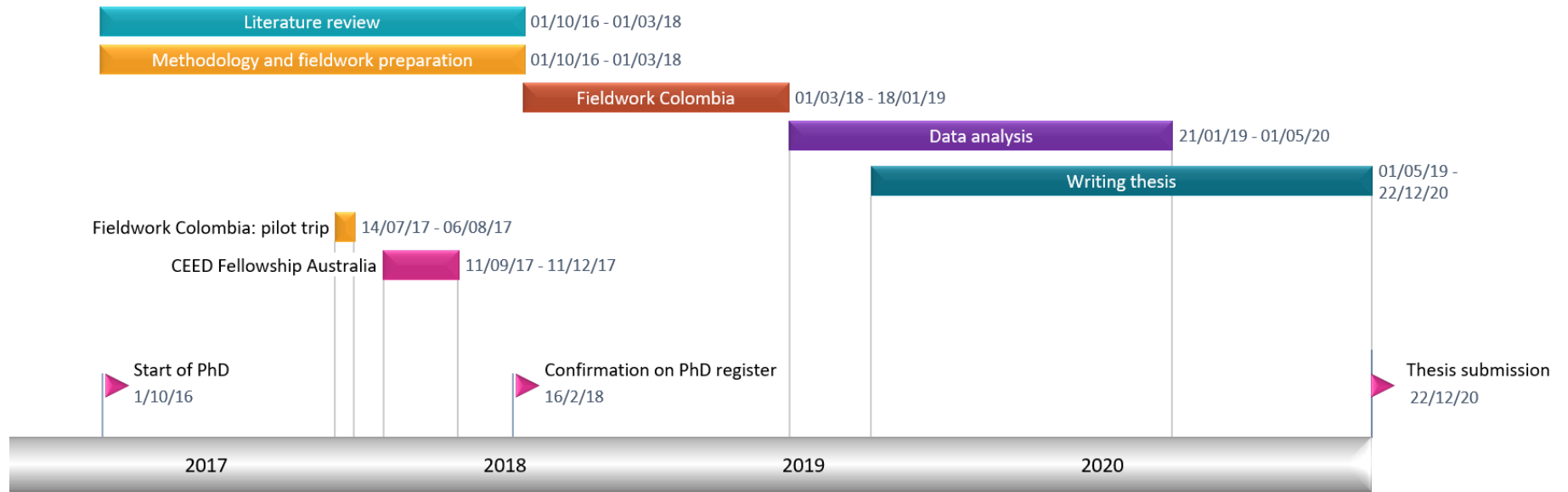
2014). A total of twelve months of fieldwork in Colombia and visits to multiple sites provided the opportunity for recording field notes and making observations of the physical environment, institutional procedures and cultural idiosyncrasies, as discussed later in this chapter.

#### *3.2.4. Project timeline*

This research project was carried out over four years between October 2016 and December 2020. The phases of the research are illustrated in the timeline in Figure 7 and the next two sections of this chapter will elaborate on the phases of data collection (literature review, fieldwork, interviews and documents) and data analysis (data organisation, coding and thematic analysis).



Figure 7: PhD Project Timeline



### **3.3. Data collection**

#### **3.3.1. Literature review**

During the first year of research, an extensive literature review was carried out covering international literature on biodiversity offsetting and related forms of conservation, as well as relevant literature from the fields of political ecology, environmental justice, ecological economics and environmental values and ethics. Key policy documents, reports and grey literature were collected on offsetting and biodiversity conservation in Colombia, Latin America and internationally.

An analysis of scientific literature on biodiversity offsetting was carried out, drawing on existing published literature reviews as well as a search of the Web of Science database resulting in, after filtering for irrelevant results, 419 articles on biodiversity offsetting published between the years 1985-2016. The papers were organised into a database according to: author, year, title, journal, journal category, social science/science, author country, case study country, biodiversity type, author institution and keywords. Additionally, a search was carried out in Web of Science for the years 2014-2016 to update the review carried out by Coralie et al. (2015), using the same lexical query<sup>10</sup>, with a resulting 154 articles after filtering out any irrelevant results. As Web of Science is dominated by English-language literature, a search was carried out for Spanish-language peer-reviewed journal articles in Google Scholar using relevant Spanish search terms related to biodiversity offsetting and cross checked in the following Spanish/Latin American databases: Scielo, Redalyc, Dialnet, Pubindex. Twelve articles were found, published between 2008 and 2015: four from Colombia, three from Spain, one from Mexico and four with an international focus. This review of scientific literature provided an overview of the key themes and trends in research on offsetting globally, highlighting an overwhelming focus on the ecological dimensions and on offsetting in high income countries, but a growing interest in accounting for broader ecosystem services and socio-cultural values, confirming a gap for research into offsets from a social science perspective and focused on Latin America. The scientific literature review was complemented by a review of policy documents and extensive grey literature – news, reports, website and social media content

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<sup>10</sup> The Web of Science search query was obtained from Coralie et al. (2015)'s supplementary materials. It was edited slightly due to originally producing a search error when copied into Web of Science.

- gathered through online searches and Google Alerts notifications using relevant key words in English and Spanish related to biodiversity, compensation/offsetting, natural capital, and Colombia. This initial phase of document analysis provided background contextual information about Colombia and offsetting trends and status, highlighted key questions to be investigated, and informed the design of the research methodology and fieldwork plan.

### 3.3.2. Fieldwork

#### **Phase 1: Pilot field trip, July - August 2017**

A preliminary three-week field trip to Colombia was undertaken in July/August 2017. I spent two weeks in Bogotá and carried out 16 meetings with key stakeholders involved in biodiversity offsetting and conservation in Colombia (national and international environmental NGOs, researchers, policy makers and environmental consultants). These were initial meetings to gather information rather than formal interviews, although some of these stakeholders were identified as potential interviewees for the next stage of research. Notes were taken by hand rather than audio recorded. These meetings provided valuable information on the status of offsetting, as well as ideas for potential case studies and avenues to be researched. I spent a week in Cartagena at the International Congress for Conservation Biology, 'ICCB 2017', attending relevant sessions on conservation in the Colombian context and networking with the international conservation community. During the conference, I conducted a short survey to gather information on the awareness of and opinions towards biodiversity offsetting among attendees. Two formats were used, printed surveys and an online version via SurveyMonkey, and 78 responses were gathered (see Appendix A). During the pilot trip, I met with academics at the National University of Colombia and the Javeriana University in Bogotá. In the subsequent months, arrangements were made with the Geography Department in the National University of Colombia (UNAL), to join the department as a visiting researcher the following year.

#### **Phase 2: Fieldwork, March 2018 – January 2019**

The second, and primary, phase of fieldwork took place over 11 months in Colombia (March 2018 – January 2019). I was based in the capital city Bogotá where I carried out national level research on environmental offsetting and was a visiting researcher at UNAL. During the year, three field visits were undertaken to the department of Santander to research the Hidrosogamoso hydroelectric dam and forest offsets (three weeks in May, three weeks in September and one week in October 2018). In order to gain an

understanding of the social and environmental impacts of the hydroelectric project as well as the offsets, visits were made to the development site, the offset site and local communities in surrounding areas. The field sites visited are detailed below and visualised in the map in Figure 8:

- Parque Nacional Natural (PNN) Serranía de los Yariguíes: visits to two of the forest offset sites within the national park (centre-west and north), visits to the homes of community members living inside and near the national park.
- El Carmen de Chucurí and San Vicente de Chucurí: interviews and visits to local organisations in both rural villages.
- Hidrosogamoso: visit to ISAGEN offices at El Cedral, the dam, boat tour of reservoir with company representative and visit to reforestation sites in the buffer zone around the reservoir.
- La Playa, Betulia: visit to fishing communities and activists living close to the dam.
- Barrancabermeja and Bucaramanga: interviews and meetings with environmental consultants, academics, NGOs and a regional environmental authority.

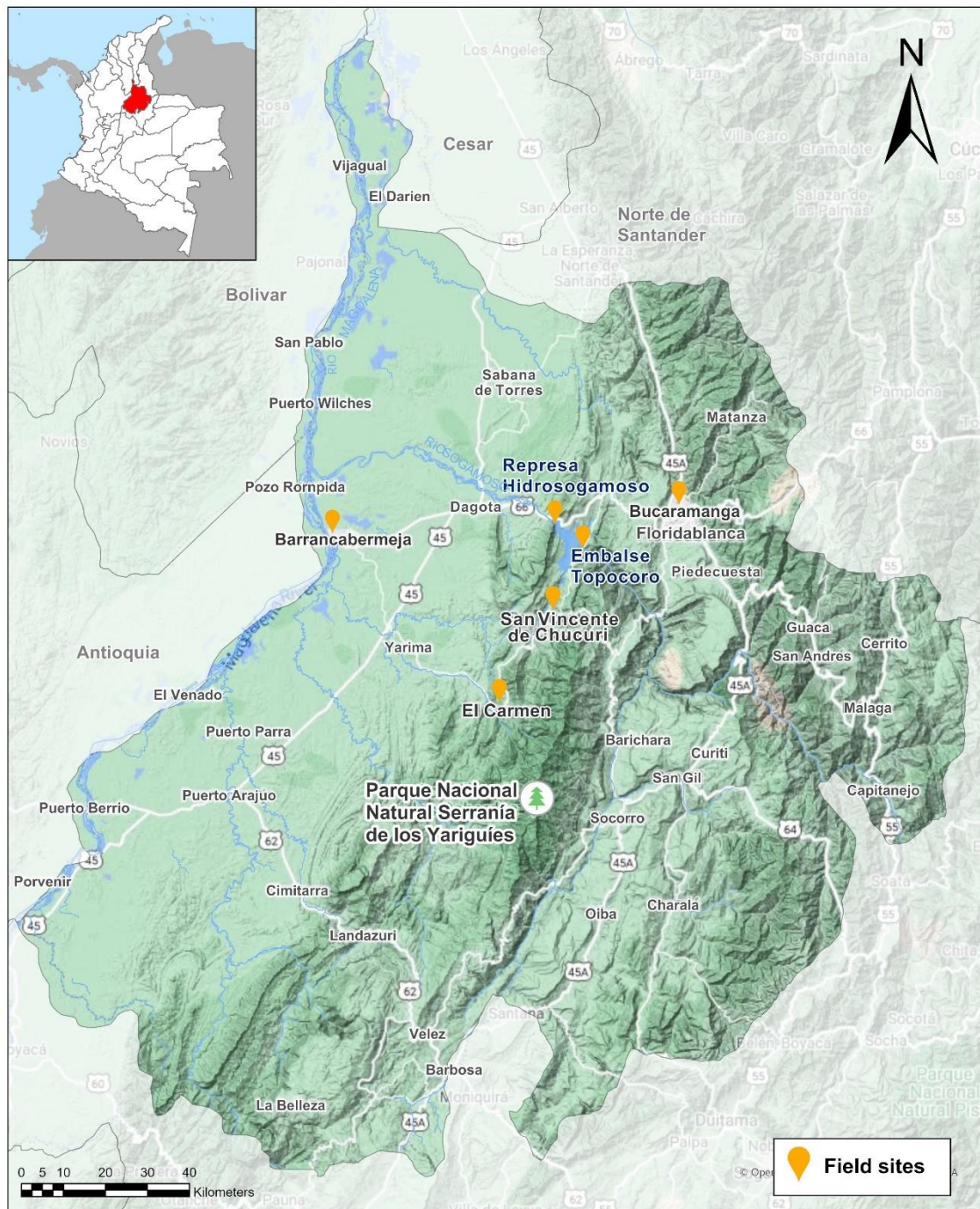
### **Observation and field notes**

Qualitative observation was undertaken throughout fieldwork, both in daily life in Bogotá as well as during the more intensive field trips in Santander. In Bogotá, whether attending seminars and events in the city, visiting government departments and NGO headquarters for meetings or making regular visits to the university, government offices and libraries to collect documentation, or simply people watching in cafés, it was possible to observe the procedures, cultural idiosyncrasies and behaviours unique to the context. While visiting the various field sites in Santander, there was the opportunity to observe, take photos and notes of my impressions and observations. In Santander daily field notes were either handwritten or typed into a Word document, compiled with notes provided by the research assistant. In Bogotá, notes were typed up following meetings, interviews and events, and personal reflections were recorded in a research journal on an ad hoc basis. Email updates were sent to the primary PhD supervisor in Dublin on a regular basis, on average twice a month, and these serve as a record of the progress, challenges and reflections throughout the process.

In Santander, the fieldwork required travel to dispersed locations, involving long bus rides, motorcycles and hiking to more remote areas. Therefore, these trips were planned to be as time and cost efficient as possible, since they required not only my time but also that of

the research assistant and local guides, and the associated daily costs. As a result, the field trips followed a structured itinerary of visits to the offset sites and surrounding communities, as well as meetings in the cities. However, the itinerary was necessarily flexible and adapted to cancellations or changes according to the availability of interviewees and weather or travel disruptions. For example, I found myself in the small town of El Carmen de Chucurí waiting for a week for the first trip to the offset site to go ahead, due to weather conditions. These unplanned delays allowed for more time to get acquainted with the local context, through informal chats with shopkeepers and locals and to experience cultural events such as *Día de la Santanderianidad*, an annual festival celebrating the identity, culture, and food of Santander.

Figure 8: Map of Santander showing research field sites



Map: Created by Wahaj Habib

### 3.3.3. Interviews

A total of 44 semi-structured interviews were carried out with 52 key stakeholders. Most were individual interviews with one participant; four interviews were with two participants

(married couples or work colleagues) and one was with four participants (ISAGEN executives). Figure 9 visualises the interviewees under each sub-unit and organised by sector. Appendix B lists further details of the interviewees (pseudonym, gender, organisation type, position, level, stakeholder group, sector, and sub-unit). Under the sub-unit of offsetting in policy, all the interviewees are professionals from different sectors with advisory roles who are involved in the development and/or implementation of offsetting policy. They work across different sectors: Colombian and international non-governmental organisations (NGOs), business/industry, government, and academia. Under the sub-unit of offsetting in practice, the Hidrosogamoso case, the interviewees belong to the following stakeholder groups: the developer ISAGEN, including coordinators based in Santander as well as senior executives at the company headquarters in Medellín; regional and national environmental authorities, including the national parks authority; offset project staff, which included local community members, project coordinators and senior staff from the implementing organisations (NGOs or private contractors); community members impacted by the dam; community members impacted by the park; and community leaders. Additionally, informal meetings were held throughout the year with various stakeholders, including Colombian and international researchers and PhD students researching similar topics.

When classifying participants according to scale (local, national, international level), this was not always clear cut. Scale is socially constructed, contested, fluid and should not be taken for granted (Brown and Purcell, 2005, Swyngedouw, 2000). In an age of transnational environmentalism, 'often it is no longer clear what is local and what is not' (Brosius, 1999, p. 281). This was the case in this research, where participants do not fit neatly to a particular scale. For example, a professional who works on the ground in Santander but is from the capital city and was trained abroad, could simultaneously hold a local, national and international perspective. A Colombian professional working in an international NGO represents both national and international views. In such cases, I have assigned the participant multiple categories, but it must be noted that none of the participants can be said to reflect only one category. A participant who has lived their whole life in a small town seems obviously local at first, until a conversation reveals their breadth of knowledge about global issues, or their connections with international networks. Therefore, these categories are used for convenience but are not unproblematic.

### **Sampling and access to participants**

A combination of purposive sampling and snowball sampling was used, first deliberately selecting participants that represented a range of perspectives on the issue, and then gaining further contacts through other participants. The sample is not expected to be representative of the population or target groups. Rather, these are personal accounts that highlight a range of positions and views on the Hidrosogamoso/forest offset case, and on offsetting at the policy level. While at the national level, the interviewees identified early in the research did not change substantially (e.g. key organisations involved in offsetting in the country), at the local level there was adaptation as different sets of actors emerged and as access to others proved challenging. For instance, while visiting the offset projects located in the national park, information about a conflict with people living inside the park emerged. Therefore, certain members of this group were later approached separately and interviewed in order to hear their side of the story. Since the majority of interviewees were male, a limitation which is discussed at the end of this chapter, when snowball sampling I specifically expressed an interest in speaking to women. I returned to two of the field sites during the final week of field work in Santander in order to specifically interview two women involved in the projects that had not been identified as interviewees on earlier visits. In the case of the institutional interviewees, they were generally contacted first by email, with follow-up calls when necessary. The participant information document and consent forms were sent by email in advance of the interview, with an explanation of the purposes of the research, the estimated length of the interview and informing them that the conversation would be audio recorded, if they agree, but that identities of all participants will be kept anonymous. In the case of the community interviews in Santander, an intermediary such as a community leader or project staff member arranged contact with community members – either introducing us directly or providing their phone numbers.

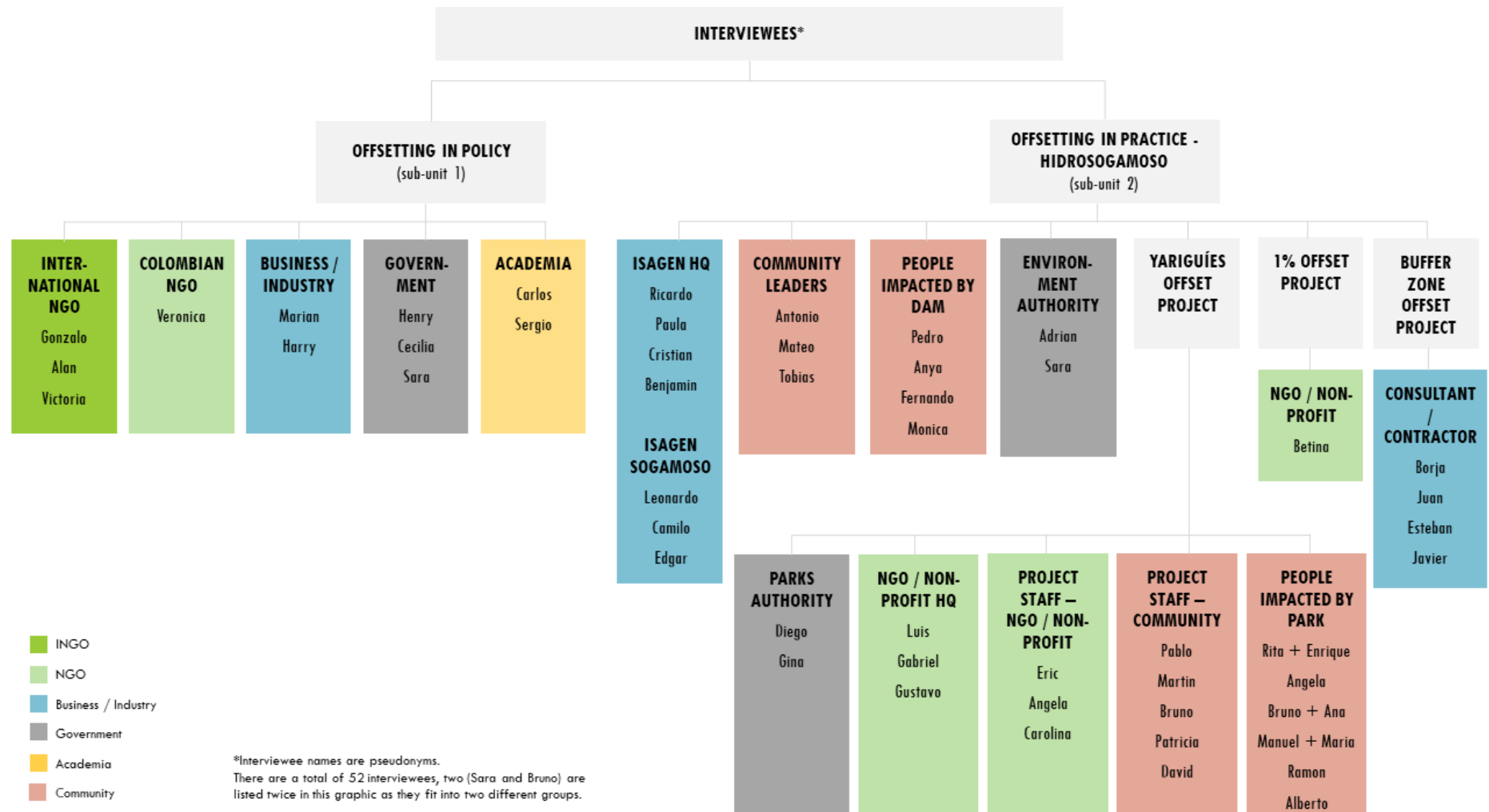
At the local level, the majority of interviews and data collected relate to the offset project located in the national park 'PNN Serranía de los Yariguíes'. This was the original focus of the research and one of the reasons for choosing Hidrosogamoso as a case study. While on fieldwork, attempts were made to gather a similar amount of information on the offset project in the buffer zone surrounding the Topocoro reservoir, to compare the two different approaches (offsetting inside and outside a protected area). However, in the end it was not possible to gain the same level of access to this project. There are a number of reasons for this. The PNN Serranía de los Yariguíes project was a collaborative project between a private company (ISAGEN), a public authority (Parques Nacionales Naturales de Colombia) and a prominent environmental organisation (Patrimonio Natural Fondo para la



Biodiversidad y Áreas Protegidas), with contractors formed of NGOs and environmental foundations. These stakeholders were visible in the territory, relatively easy to access and were open to the research and arranging visits and interviews. Also, since the project was coming to a close in 2018, stakeholders were still involved or at least in the area, and the experience was fresh in their mind. The buffer zone project was managed solely by ISAGEN with private contractors. I visited the reservoir and two offset sites in the buffer zone with ISAGEN, who provided contacts for an interview with two project staff. In addition, I attempted to make contact with all other companies involved in the forest offsets project, listed in a list of contractors obtained online (ISAGEN, 2011). This was challenging, since these private consultancies generally operate through tendering processes and many do not have websites or up to date contact information, and my contacts did not know anyone working in the companies. Since the buffer zone project ended in 2015, many people who had been involved had already moved on. During the final trip to Santander, having had no luck via phone or email, I took taxis around to different physical addresses found online, some of which were dead ends, and was able to locate two additional contractors, who kindly received me for an impromptu meeting and/or interview.

If time had allowed, it would have been interesting to spend more time in the region and follow up with more people, especially previous landowners that sold to ISAGEN in the buffer zone and local people that work as forest rangers. However, since the Yariguíes project was a pilot project in the country, it was a particularly interesting one to focus on and having two key sites (centre-west and north) provided many stakeholders with different perspectives. So, while not offering a direct comparison, the perspectives of those who worked directly in the buffer zone and those who oversaw both the Yariguíes and buffer zone projects offer an insight into two different approaches towards offsetting. Additionally, a participatory ecological restoration project was carried out to improve ecosystem connectivity between the buffer zone and the national park, as part of ISAGEN's 1% investment obligations, implemented by Fundación Guaya canal. One of the regional environmental authorities, CDMB, is also implementing a reforestation project with funds from ISAGEN. I met with the coordinators of both these projects and was due to visit the participatory restoration project, but the field trip was cancelled and therefore these projects are not included in the analysis.

Figure 9: Interviewees by case study sub-unit and stakeholder group (NB: all individuals' names are pseudonyms)



### **Interview structure and format**

The interviews were semi-structured, following a list of prepared questions but allowing for flexibility and exploring topics as they arose. The questions were tailored according to the stakeholder group (see Appendix C: Interview guide & questions), organised around five main topics:

1. Participant's role, the actors and institutions involved in offsetting.
2. Meanings, definitions, values, indicators/metrics associated with biodiversity.
3. Offsetting in practice – activities, aims, challenges, successes.
4. Stakeholder consultation, pros and cons of offset/development projects and who wins/loses.
5. Future considerations – hopes and fears for the future in relation to offsetting, ecological restoration and the environment, locality in general.

These questions served as a guide for the interview and a reference to check during and towards the end of the interview to ensure all the main issues were covered. During the interview the questions did not necessarily follow the order of the guide but rather followed the natural flow of conversation, probing into topics of interest raised by the interviewee. The interviews were on average one hour in length, ranging from 30-110 minutes, a total of 43 hours of audio. All interviews were in Spanish and face-to-face except for two international interviews that were in English over telephone/video chat. The institutional interviews took place in the offices of the participants, while the community level interviews took place either at the homes of the participants or in a neutral public area. It was difficult to find quiet public spaces in the villages, but a semi-private reception area of a hotel provided enough privacy and minimal noise from music and traffic.

A research assistant was hired to assist with the community level interviews with farmers and fishing communities, a sociologist from Santander with experience working with communities. This was very beneficial in generating a level of trust and ensuring more fluid conversations, since the local accents and vernacular were sometimes difficult to understand. Being from the capital city of Santander, the assistant was local to the region but not to any of the local areas we visited, therefore with no direct ties to any of the participants. The research assistant explained at the start of the interview the purposes of the interview and read aloud the participant information and consent form, providing any clarification to the participants before they signed. During the interview, it was an active conversation between the interviewees and both interviewers, with either me or the

assistant posing questions and the research assistant providing clarification when necessary. The assistant took part in most interviews with community members, except for on a couple of occasions when the opportunity arose spontaneously for an interview, in which case I carried out those interviews alone. All other interviews, which were more 'official' in nature, such as with staff of NGOs and companies, I carried out alone. Since these participants are used to having meetings and engaging with students and foreign professionals, it was therefore not necessary for an intermediary to help generate trust, and there was less of a language barrier. However, despite being competent in the language, there are limitations of being a non-native speaker, such as missing some finer details of the conversation during the interview and as a result, missing opportunities to probe for further details.

#### **3.3.4. Documents**

Documents were gathered from the Internet, the physical and online libraries of Trinity College Dublin and the National University of Colombia, bookshops, through official requests to government institutions and provided directly by research participants. They include legal documents, industry reports, NGO reports, online articles, electronic and archival newspaper articles, blogs and social media posts, photos, videos, peer-reviewed journal articles, books, maps and copies of official letters and event transcripts (a list of documents collected is included in Appendix D). The majority of documents related to the case study are in Spanish, while documents related to the international context are in English.

### **3.4. Data analysis**

The data analysis followed an inductive process, i.e. letting the data lead to the emergence of concepts (Yin, 2011). As Creswell (2014) highlights, researchers with a constructivist perspective build theories or patterns of meaning from the data, rather than starting with a theory, with the intent of making sense of the meanings others have about the world. This aligns with doing political ecology, often using case studies that 'stress idiosyncrasies, contextual outcomes, and local surprises that precisely fly in the face of general theory-building' (Robbins, 2020, p. 84). Although a particular theoretical framework was not adopted before starting the data analysis, as a researcher I arrived at the data with a mindset inspired and influenced by literature, themes and critical analyses coming from

the fields of political ecology and human geography. The next two subsections discuss the two main phases of analysis: data organisation and data coding and thematic analysis.

### 3.4.1. *Data transcription and organisation*

#### **Transcription**

The first stage of data analysis involved listening to and transcribing the interviews. Mid-way into the transcription process, a Colombian transcriber was hired to assist, to save time and ensure accuracy. The transcripts done by the transcriber were checked by the researcher and any earlier transcripts that were done by the researcher were sent to the transcriber, so that all transcripts were checked both by a native Spanish speaker and the researcher. For the English language interviews, the transcriptions were done by the researcher. Transcription processes can be considered along a continuum between naturalised and denaturalised styles. Naturalised transcription incorporates as much detail as possible, including idiosyncratic elements (e.g. stutters, pauses, coughs, body language, etc.), while denaturalised transcription removes these idiosyncratic elements, placing more emphasis on the substance of the interview (Oliver et al., 2005). In naturalised transcription, 'language represents the real world', while denaturalised transcription suggests that 'within speech are meanings and perceptions that construct our reality' (Oliver et al., 2005, p. 1). The style of transcription used in this research is closer to the denaturalised end of the continuum; the speech was transcribed verbatim, including grammatical errors, but leaving out most other idiosyncratic elements, except for laughter and pronounced pauses, which were included. The quotes that are included in the thesis were translated into English and edited to remove frequently repeated token words (e.g. 'yes?', 'let's say', 'I mean'), when they were not deemed to add to the meaning of the message, in order to aid with flow and comprehension. The speech of the interviewers was also included in the transcripts in order to recognise and analyse the role of the interviewers as co-constructors of accounts in the interview process (Rapley, 2001). This comprised the first stage of analysis, listening to the interviews multiple times, transcribing and checking transcriptions, and keeping notes and reflections.

#### **Data organisation**

A database was created of the 1,566 documents related to the Hidrosogamoso project received from the National Authority of Environmental Licenses (ANLA), with the assistance of an undergraduate student from Bogotá. This database served as a reference

in order to help locate relevant documents for purposes of triangulating information and to have an overview of the date, sender, receiver, subject and topic of the communications. The qualitative analysis software NVivo was used for data analysis, primarily for the interview transcripts. The Hidrosogamoso documents were also added to NVivo to facilitate keyword searches among all the pdfs. EndNote was used to host all peer-reviewed and grey literature, organised into subfolder by data type and theme.

### 3.4.2. Data coding and thematic analysis

Thematic analysis is the process of identifying patterns or themes within qualitative data (Braun and Clarke, 2006). Braun and Clarke (2006) identify six steps in the process of thematic analysis: become familiar with the data; generate initial codes; search for themes; review themes; define and name themes; and produce the report. Following a similar process, analysis started with transcription and listening multiple times to the interview recordings. Next, the interview transcripts were analysed using NVivo, assigning codes ('nodes'). This initial approach represented 'holistic' coding, reading through each transcript and assigning codes to blocks of text. This resulted in a large number of codes which were then organised into overall categories:

1. Colombia offsetting
  - a. Who is involved
  - b. Drivers
  - c. Biodiversity offsetting policy and manual
  - d. Challenges
  - e. Measuring and monitoring
  - f. Future considerations
2. Colombia restoration
  - a. Trends, status
  - b. Challenges
  - c. Future considerations
3. Offset case study
  - a. Hidrosogamoso
    - i. Timeline
    - ii. Benefits
    - iii. Negative impacts
    - iv. Who is involved
    - v. Who wins / who loses

- b. Forest offsets
  - i. Who is involved
  - ii. Activities
  - iii. Benefits
  - iv. Negative impacts
  - v. Who wins / who loses
  - vi. Challenges
  - vii. Success / Failure
  - viii. Measuring and monitoring
  - ix. Stakeholder consultation
  - x. Conflict parks vs people
  - xi. Future considerations
- 4. Biodiversity definitions
  - a. Associated concepts
  - b. Components in a system
  - c. Diversity at different scales
  - d. International policy
  - e. Relations
  - f. Natural capital concepts
  - g. Qualities
  - h. Unsure of meaning
- 5. Context
  - a. Environment and conservation
  - b. Campesino lifestyle
  - c. Armed conflict / peace agreement
  - d. Community leaders / violence
  - e. Community hopes and fears
  - f. Corruption / transparency / justice
  - g. Gender
  - h. Privatisation

Two overarching themes were identified from these nodes: 'biodiversity' and 'conflict'. The theme 'biodiversity' emerges as a direct result of the aims of the research and the questions asked in the interviews. Under this theme are participants' definitions and meanings associated with biodiversity, contrasted with international and institutional definitions, the indicators used to measure and monitor success in forest offsets (case study) and biodiversity offsets (current policy) in Colombia, with reference to international approaches. Meanwhile, the theme 'conflict' emerged out of recurring references to and

manifestations of conflict in the data: parks vs. people, development vs. environment, company vs. community/activists, the history of armed conflict and the peace process, and conflicting visions of work, development and lifestyles. While it was not an explicit aim of the research design to explore dimensions of conflict, the selection of this theme was also influenced by framing this research within political ecology, in which conflict is a central theme. In the final stage of analysis (producing the report), the four results chapters were organised based on the sequence of the research questions (RQ), with the themes embedded within them:

1. Definitions, meanings and measures of biodiversity (RQ1)
2. Offsets in policy: Why and how environmental offsetting policy has developed in Colombia (RQ2)
3. Offsets in practice: The challenges and successes of the forest offsets of the Hidrosogamoso dam (RQ3)
4. Offsets in practice: Forest offsets and socio-ecological conflict in PNN Serranía de los Yariquíes (RQ3)

### **Data interpretation**

Following on from data coding and analysis was a process of interpreting the findings. If an interviewee mentioned a certain incident or referred to a piece of legislation, the information was triangulated where possible by searching for evidence from other sources, such as government documentation or news articles. The various sources of information are used in order to present a fuller picture of the situation and in cases where no further information is found, the account, if included, is presented as being reported by the interviewee. Interpreting the data also involves attending to meta-data, or participants' 'spoken and unspoken thoughts and feelings which they do not always articulate in their stories or interview responses, but which emerge in other ways' (Fujii, 2010, p. 231). Drawing on her work with genocide survivors in Rwanda, Fujii shows how 'narratives of violence, even those filled with inaccuracies, fictions, and lies, can embody all sorts of truths – emotional, psychological, and moral. These truths are as crucial to researchers' analyses of past violence and prospects for future peace as any "fact-based" reports.' (Fujii, 2010, p. 235). Therefore, in analysing a socio-ecological conflict in a region hard hit by decades of civil war, it is important to consider these forms of meta-data and how the context influences what people say and how they say it. The data interpretation and analysis process therefore does not aim to validate accounts as true or false. Rather,



adopting a constructivist approach, it aims to put people's various accounts into context and visualise trends and contradictions among different interviewee accounts, as well as looking beyond the words to understand where people are coming from - the story behind the story, as Fujii puts it.

### **3.5. Ethics and positionality**

#### **3.5.1. Research ethics**

The research project received ethics approval from Trinity College Dublin (TCD) School of Natural Sciences Research Ethics Committee (Appendix E). The research was carried out in accordance with the School of Natural Science Research Ethics Policy, developed in 2014, and follows Trinity College Policy on Good Research Practice to ensure the project is carried out to the highest standard and to maintain the three principles of ethical research at TCD (respect for the individual subject or population, beneficence and absence of maleficence, and justice).

Considering the tensions and conflicts surrounding large-scale development projects in Colombia, including threats and violence against community leaders that oppose such projects, disclosing information on the topic of this research represented a potential risk to participants. To reduce the potential social, cultural, political and economic risks, it was crucial to ensure the safety of all participants, the researcher and research assistant. Precautions were taken in preparation and during fieldwork not to put interviewees or the researcher or assistant at risk. When requesting participation, a written document was provided to participants, in Spanish or English as appropriate (Appendix F and Appendix G), outlining the purposes of the research, benefits and implications of participating in the project and allowing participants to make an independent and informed decision on whether or not to participate. All participants were literate but to ensure comprehension among community members at the local level, the research assistant read aloud the participant information and consent forms, providing any clarification to the participants before they signed. Data is stored in password-protected files, or protected zip folders in the case of audio files and pdfs, in three locations: a password-protected laptop, Microsoft OneDrive, and a hard drive. A confidentiality agreement was signed by the hired transcription assistant.

### 3.5.2. Researcher reflexivity and positionality

The qualitative researcher is not an objective, neutral observer but is historically positioned and locally situated as an 'all-too-human' observer of the human condition (Bruner, 1993, p. 1, cited in Denzin and Ryan, 2007, p. 590). Analyses of conflicts and uneven power relations often call upon political ecologists 'to "give a voice" and frequently "take sides" in favour of the "victims"; an ethically engaged positionality which raises challenges and responsibilities' (Le Billon and Duffy, 2018, p. 242-243). To minimise bias, I seek to include diverse arguments and perspectives and look beyond simplistic assumptions, stereotypes and binaries to reveal the complexities and contradictions within individual accounts and stakeholder groups. Nevertheless, the findings of this research are unavoidably influenced by my personal views, values, experiences, and knowledge. I seek to reflect critically on my position and perspective by gaining insight from Latin American authors and activists.

Different aspects of my identity/ies mark my position in relation to the context of the research and participants – my nationality (whether recognised as Irish, European, or a generic *gringa*), being female, white, and from a higher-income country. This research is conducted from the perspective of an outsider, and visible aspects such as my physical appearance and accent meant I was always inescapably an outsider in the field. My position and perceived distance in relation to participants varied as I interviewed people across different ranks and social backgrounds – from senior professionals to middle age activists to young and old farmers. To some I may have come across as an equal, to others a threat, to others as a harmless or naïve foreigner. On some occasions my nationality helped to form an unexpected connection when people asked about the troubles in Northern Ireland. While being very different in many ways, both countries have a shared history of civil war, colonialism and Catholicism. At the same time, in all situations I must acknowledge the unequal power dynamics even when I may not have necessarily felt in a position of power. My role as a researcher gives me the privileged position of being able to decide what questions to ask, to interpret the data and decide how to present it (McLafferty, 1995). Therefore, I hold privilege in terms of access to the material resources required to carry out such a research project and in terms of the production of knowledge about others (Rose, 1997). When alone during fieldwork, I was conscious of my safety in an unfamiliar environment and of cultural perceptions of a woman travelling alone, especially in rural areas. As a result, I felt limited to certain spaces and avoided venturing out after dark. This meant I surely missed opportunities at times to engage with people or expand my horizons. As Goldsmith (2003, p. 113) highlights, fears, even when abstract or

unsubstantiated, can have a disciplining effect on how, when and where the researcher moves about and generally conducts themselves.

The Spanish language has a variety of different pronouns and honorifics that vary depending on the situation and who you are talking to, and Colombia has its own particularities which vary from region to region. These act as clues regarding my positionality in relation to participants. If they refer to me as *tú*, as was usually the case with the institutional interviews in Bogotá, this indicates they see me as an equal or younger/less superior, while if they use the more formal *usted*, this suggests a more formal interaction, or *vos*, which lies somewhere in between the two. While in Bogotá *tú* is increasingly common in work situations indicating solidarity among colleagues (Uber, 2011), in Santander it would generally come across as too informal. In Santander I was normally addressed as *sumercé*. The term originates from colonial times - *su merced* (your mercy/your grace) - but as slavery disappeared across the continent, so did the term, except for in some regions of Colombia which retain the version *sumercé* and use it instead of *usted*. In these places the word has transformed from a marker of submission to that of respect, friendship and even affection (BBC Mundo, 2019). On a couple of occasions in rural Santander, people addressed me as *ingeniera* (engineer) or *doctora* (doctor), which I learned is a common way to address professionals or people with university educations, regardless of whether they are actually engineers or hold a doctoral degree. This indicates a form of respect, because I was a researcher or because I was accompanied by other *ingenieros* and therefore became *ingeniera* by association. I often heard these terms in organisational settings when someone was addressing a superior. Widely used in Colombia, *ingeniero/a*, *doctor/a*, *don/doña* are criticised by some as representing entrenched class distinctions that have become more a marker of power or perceived social status than an earned official title (Brodzinsky, 2016). Nevertheless, to adhere to the customs and show respect, I followed others in using these titles to address people when it seemed appropriate or expected. There are no strict rules for when to use the various forms of address so I generally played it safe by using the formal pronoun *usted*, unless I had spent some time with the participants and felt familiar enough to switch to *tú*, or when talking to someone in the same age bracket or younger.

Being a foreign researcher had both benefits and drawbacks in terms of gaining access to participants and data. Coming from a European university with a government-funded scholarship and with links to a respected Colombian public university helped in proving my

validity, making it easier in terms of getting responses, interviews and access to sites. Some organisations expressed an interest in the research as an external perspective could be beneficial to their work and there is little doctoral level research funding in Colombia to support this type of work. I was likely afforded privileges as a European researcher, as a couple of people commented to me that the access I attained would have been more difficult for a Colombian researcher doing the same work. This is partly due to a foreigner being seen as impartial. Colombians are notoriously distrustful of public institutions and other Colombians, a consequence of war and its effects on the social cohesion (McFee, 2019). However, it may also indicate an ongoing Eurocentrism and colonisation of knowledge, where the European perspective is given precedence over local, indigenous forms of knowledge (Lander, 2000).

That said, some participants may have agreed to an interview simply because I had travelled from so far away and therefore wanted to help me out, or because they appreciated my interest in what they had to say. On occasions being a foreigner caused apprehension and suspicion. For example, one person initially thought I was connected to the Canadian firm that now owns the hydroelectric dam and that I was in the area for purposes of land prospecting. I was conspicuous as a foreigner in a small rural village and therefore rumours began to circulate. Therefore, in the case of community level interviews, the intermediary that facilitated introductions was crucial in generating trust, i.e., 'if you have come through X person then we know it's ok to talk to you'. In some cases, there was a definite sense that the participants were glad to share their stories with someone, although this also came with a risk of generating expectation that the interview might lead to some resolution or improvement in their situation. Therefore, at the start of the interview the research assistant would explain the nature of the research, that we were independent of any of the stakeholders and that the results would provide knowledge but not influence their cases directly. Despite this, at the end of some of the interviews, participants expressed their hopes that the interview might bring new opportunities to them in the future. One participant, when asked if she had any questions, said, 'That you help us, that from this interview, when you arrive at your future waiting for you, that this helps us and that you remember us.' This presents a moral challenge and responsibility as a researcher, but also serves as a motivation to find ways to reciprocate to the participants, at the very least through the dissemination of the research results. Therefore, the aim is to publish academic and news articles in both English and Spanish from this thesis. Such expectations may have shaped responses to interview questions and these impressions

were noted down following interviews and when listening to the interview recordings, such as if the participant seemed to be talking openly from a personal perspective, or maintaining the company line, or a mix of the two.

### **3.6. Methodological challenges and limitations**

#### **Gender balance**

This research aimed to achieve an equal gender balance between participants of the study. However, this proved challenging and the final number of participants comprise 17 (33%) women and 35 (67%) men<sup>11</sup>. This is largely due to the gender imbalance among the staff involved in the ecological restoration projects. The reasons for this are explored in some of the interviews and are attributed to the logistical and physical conditions of the workplace and a *machista* culture. This gender bias represents a limitation to the study that should be taken into consideration.

#### **Access to information**

It proved challenging gaining access to information from certain groups, notably the regional environmental authorities (CARs). Despite persisting through different routes of contact, the information received was limited, through one interview and two limited responses to freedom of information requests. In retrospect, knowing now how difficult it is to get information, greater efforts would have been made from the beginning of fieldwork to get insider contacts. Nevertheless, this seems to be a common experience as commented by Colombian professionals, as these institutions have insufficient capacities and resources.

#### **Contextual understanding – urban vs rural**

The urban and the rural areas in Colombia represent different worlds. This was clearly visible in terms of the pace of life, and some people in rural areas feel disconnected or forgotten by the capital city. There is even a marked difference within departments, between the cities of Bucaramanga and Barrancabermeja compared with rural villages in Santander. One drawback of being based in Bogotá was not being able to gain a deeper understanding of the local context of rural Santander, which an alternative ethnographic

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<sup>11</sup> There were three gender options included on the informed consent form: female / male / other. All respondents identified as either male or female.

approach may have allowed for, for example choosing one community or location to be based for a longer period of time. However, since the aim of this research was to look both at the national level policy context as well as the local case study, living in Bogotá suited this objective since the majority of the public institutions, companies and NGO headquarters are based there. While site visiting offers a shallower experience than doing participant observation, it has the advantage of being able to collect data from multiple field settings as part of the same study (Yin, 2011). Visiting different locations in Santander, albeit briefly, gave an overview of different angles and perspectives of the socio-ecological conflict rather than focusing on one community or perspective, which can be contrasted with the views of national and international level stakeholders. Living in Bogotá also offered opportunities to attend regular environment-related events, talks, and conferences in the city, as well as visiting libraries and archives. While I had spent time in Latin America and Colombia previously, this was the first time carrying out qualitative research in the country, and therefore required learning and adapting to the local cultural idiosyncrasies throughout the process. Spending just under a year in total in Colombia offered enough time to gather plenty of data and get a grasp of the socio-cultural, environmental and political context, but it is only scratching the surface of comprehending a unique and complex country.

### **Tensions**

Given the tense relations between certain stakeholders in the Hidrosogamoso case, there were some challenges when talking to people on different sides of a dispute. My approach was to be open with the participants, informing them that I would be interviewing and talking with people from all sides in order to gather different perspectives, and to assure them that their identities would not be shared with other participants. In the majority of circumstances, this did not pose a problem. I believe that my position as an 'outsider' helped in assuring people that I had no ties to any organisation or group. However, there were a couple of occasions when this led to tensions, most notably in the final interview with the developer, as they knew I had been speaking the day before to an activist group (in their words, their 'enemies'). Additionally, when meeting with communities who felt excluded by the offset project and the parks authority, these visits were organised separately from those institutions, arranged through a local NGO.

### **3.7. Conclusion**

This chapter elaborated on the methodology used in this research, through a case study and qualitative research methods (document analysis, semi-structured interviews and field observation during twelve months of fieldwork in Colombia). The research was carried out within a constructivist worldview that looks to uncover meaning and that recognises multiple, subjective realities. It also recognises the role of the researcher in co-constructing data and knowledge through the interview process, the interpretation of data and the presentation of findings. My identity and position as a researcher shaped the interactions, perceptions and provided both opportunities and challenges in terms of access to data. The methodology was chosen with the aim of uncovering meanings and examining discourse related to offsetting and relationships with the environment more broadly. The themes 'biodiversity' and 'conflict' emerged as central themes in this research and are explored in the results chapters, alongside the drivers, challenges and successes of offsetting in policy and practice. Before arriving at the results, the following two chapters first set up the geographical, socio-economic and political context of the case study.

## 4. Colombia: biodiversity, land conflicts and environmental policy

### 4.1. Introduction

Such liquid masses are too copious, too irregular in their regime to be controlled by man, who till recently has scarcely been able to utilise them even for navigation. Moreover, the tepid and oppressive climate has hitherto been opposed to the acclimatisation of the white and half-caste races in large numbers. The soil, with its excessive fertility, has clothed itself with continuous woodlands, a tangled mass of vegetation overflowing with sap, where whole generations will be unable to affect more than a few narrow clearings. (Reclus, 1895, p. 6-7).

When French geographer Elisée Reclus visited South America at the end of the 19<sup>th</sup> century, he described how the geographical features and harsh climate had prevented its large-scale transformation by European colonisers, compared with the more favourable conditions of North America. Contrary to the perception of some explorers at that time of a pristine wilderness, evidence has shown that the Americas were widely humanised landscapes (Denevan, 1992, Whitmore and Turner, 1992). However, the transformation of the landscape since Reclus' visit has been dramatic. Now, the 'liquid masses' have been taken under control, through the damming of rivers to supply growing energy demands. Indeed, South America was the region with the second fastest hydropower growth rate after East Asia and the Pacific in 2018 (IHA, 2019). Generations of settlers have gone from affecting a 'few narrow clearings' to enacting widespread deforestation as a result of expanding agriculture, monocultures such as oil palm, extractive industries, and infrastructure developments. However, Latin America and the Caribbean still contains 23% of the world's forest areas and between 60% and 70% of all life forms on Earth (UNEP, 2016). Therefore, forest and biodiversity conservation have critical importance for the region, and the world.

Colombia, as a result of its geographical location and unique physical features, is a haven for biodiversity. While Colombia has some of the most advanced environmental legislation in Latin America, persistent implementation challenges hinder its effectiveness on the ground. Colombia has been afflicted by violence and armed conflict for centuries. Over the various phases of conflict, one thing has remained a central point of contention: land. To understand the significance and implications of offsetting the environmental impacts of



development and implementing conservation projects, it is necessary to first look at the historical trajectory of territorial conflicts in the country and the inequalities that lead to the persistence and resurgence of violence. The rest of this chapter explores this context through the following sections: an overview of the geographical context and status of biodiversity in Colombia; the political and socio-economic context; a condensed history of land occupation and use, and the role of land in armed conflict; the evolution of environmental policy, outlining the policy framework out of which forest and biodiversity offsetting has emerged; and finally, some concluding remarks.

## **4.2. Geography, ecosystems and biodiversity**

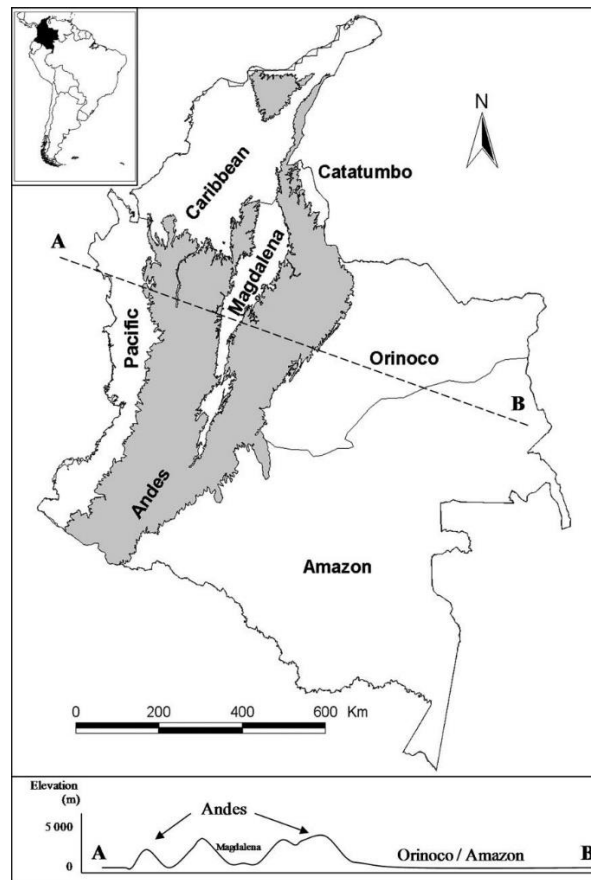
Colombia is the fourth largest country in South America, located in the north west of the continent, between the Pacific Ocean to the west and the Caribbean Sea and Atlantic Ocean to the north. Colombia shares a border with Panama, Venezuela, Brazil, Ecuador and Peru and has a total surface area of 2,070,408 km<sup>2</sup>, 55.5% of which is land, the rest sea (IGAC, 2009). The land area comprises five major regions: the Caribbean, Pacific, Andean, Orinoco, and Amazon regions (see Figure 10). The Andean region can be subdivided into the Andean ranges, the Magdalena and Cauca Valleys, and Catatumbo. The Andes mountain range extends the length of South America from Chile and Argentina in the south up to Venezuela in the north, running through Colombia in three branches, the Western, Central and Eastern Cordilleras, with altitudes reaching close to 5,800m (González et al., 2012). Colombia, located in the Neotropics, lies across the equator, meaning temperatures in any one place are relatively constant year-round, with plentiful rainfall in most of the country. However, the climate and vegetation vary considerably with the different altitude levels across the country from the hot lowland plains and savanna, *tierra caliente*, to the temperate areas, *tierra templada*, and mountainous highlands, *tierra fría*, rising to glaciers and snow-capped peaks such as the Sierra Nevada de Santa Marta. Colombia has dry forests, mangroves and rainforests and an abundant water supply coming from the river system including major rivers such as the Magdalena, the Orinoco and the Amazon, as well as wetlands, *páramos* (high Andean moors) and *ciénagas* (swamps).

This diversity of ecosystems and habitats for flora and fauna make Colombia one of the world's 'megadiverse'<sup>12</sup> countries. Colombia has 91 types of general ecosystem - 70 natural and 21 transformed – where an ecosystem refers to 'a dynamic complex of communities of plants, animals and microorganisms in their non-living environment that interact as a functional unit located in an area with homogenous biophysical and anthropic conditions' (MADS & IDEAM, 2017, p. 2). The country contains two biodiversity hotspots (the Chocó biogeographical region and the Tropical Andes), 59 national parks, six Ramsar sites (wetlands of international importance) and seven World Heritage Convention sites (InforMEA, 2019, Myers et al., 2000, PNN, 2015). One of the most positive achievements of Colombia's environmental management has been the establishment of protected areas, with national parks covering 11.3% of the national territory (PNN, 2015). The management of such a large area represents a challenge for the government and as a result, deforestation, land grabs and illegal activity such as the cultivation of illicit crops and extraction of resources pose a threat to the national parks. Additionally, an overlap of areas with mining concessions within the national parks system highlights the lack of coherence between environmental and energy policies (Paz Cardona, 2018). There are estimates that between 22,000 to 93,000 people live in Colombia's national parks, many in situations of poverty (De Pourcq et al., 2017, DANE, 2016, Departamento Nacional de Planeación [DNP], 2019b). Over half (52%) of the national territory is covered in forest (DNP, 2019a). However, between 2000 and 2019 over 4 million hectares (ha) of tree cover was lost, including 1.5 million ha of primary forest, and deforestation has been worsening dramatically since 2016, as can be seen in the graph in Figure 11 (Global Forest Watch, 2020). Driving the loss of biodiversity and ecosystem services in Colombia are agriculture, infrastructure, extractive industries, pollution, climate change and invasive species (MADS & PNUD, 2014).

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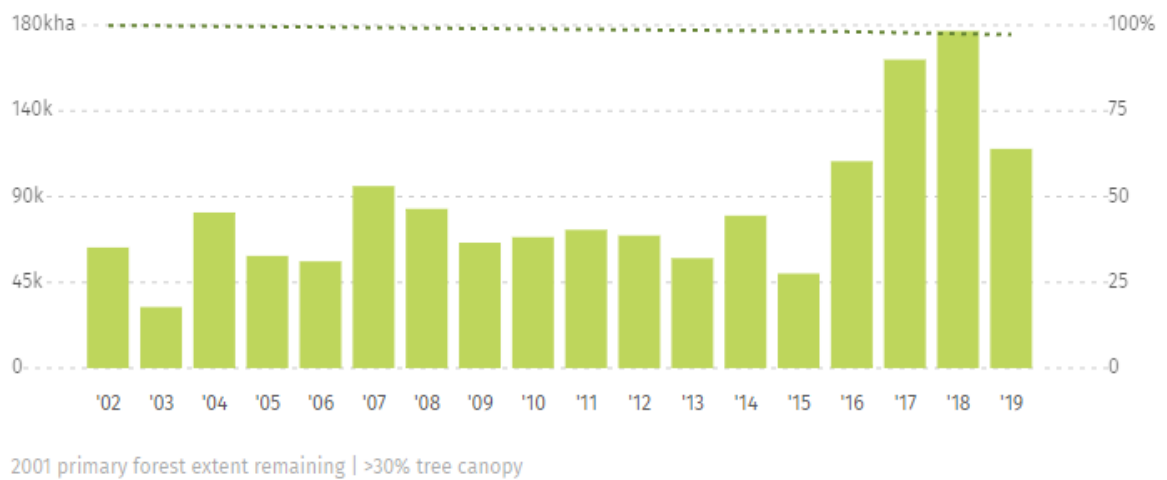
<sup>12</sup> The 'megadiverse' label was given to seventeen countries that contain important global biodiversity. To qualify as being megadiverse, a country must have at least 5,000 of the world's plants as endemics and have marine ecosystems, as well as other secondary criteria. UNEP-WCMC. 2016. *Biodiversity A - Z: Colombia* [Online]. Biodiversity A-Z: United Nations Environment World Conservation Monitoring Centre. Available: <http://biodiversitya-z.org/content/colombia> [Accessed 09 July 2019].

Figure 10: Location of Colombia showing the main regions, and a schematic cross-section highlighting the Andean region



Source: Etter et al. (2008)

Figure 11: Primary forest loss in Colombia, 2002 - 2019



Source: Global Forest Watch (2020)

### 4.3. Socio-economic and political context

Politically and administratively, Colombia is divided into 32 departments, which are subdivided into 1,101 municipalities and 20 non-municipal areas. Bogotá is the capital city. Only 0.3% of the national territory is classified as urban, and 99.6% as rural (IGAC, 2015). However, the human population is highly concentrated in urban areas, with 77.1% of Colombia's 48 million people living in urban areas, 15.8% in rural areas, and 7.1% in towns<sup>13</sup>, according to the 2018 census (DANE, 2018). The urban areas are almost all located in the mountainous Andes region, including the major cities Bogotá, Medellín, Cali and Bucaramanga, with human occupation of the region dating back to pre-Hispanic times (Armenteras et al., 2011). Colombia is both a megadiverse and a multicultural country with diverse ethnic groups - indigenous peoples, Black, Afro-Colombian, Raizales and Palenqueras and Romani populations. Indigenous peoples represent approximately 3.4% of the national population and almost a third (29%) of the national territory is categorised as indigenous reserves (International Work Group for Indigenous Affairs, n.d.) - Figure 12 shows the national land area by type of property.

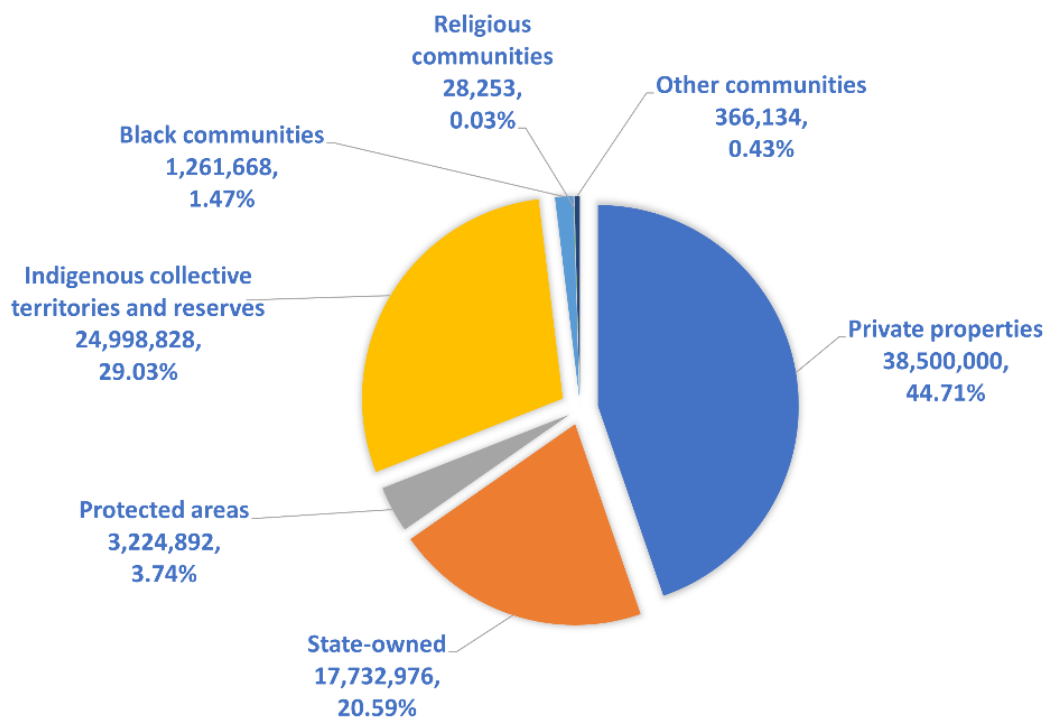
Colombia is classed as an upper middle-income country by the World Bank. Over the past two decades, GDP has increased, poverty has decreased, and well-being has improved, according to the OECD (2017). However, there are also severe inequalities in the distribution of income, wealth and land between rich and poor. In terms of income distribution, in 2017 Colombia had a Gini coefficient of 49.7% (where 0% represents perfect equality and 100% represents maximum inequality), and the richest 10% received 39% of the share of national income (World Bank, 2019). While the Gini rating has decreased over the years, it is still very high by international standards, and wealth distribution is estimated to be even more unequal than income distribution. Although there is a lack of data on the concentration of wealth, it has been estimated that 1% of the population in Colombia holds up to 40% of the total wealth (Joumard and Londoño Vélez, 2013). Land distribution is extremely unequal also, the Gini coefficient remaining around

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<sup>13</sup> Colombia's national statistics office, DANE, categorises rural and urban areas into three categories: Municipal cities (*Cabecera Municipal*); Towns (*Centro poblado*) - a concentration of a minimum of 20 homes in a rural area but with urban characteristics such as the delimitation of vehicular and pedestrian streets and; Rural area (*Rural disperso*) - area with dispersed homes and without named streets or in general, public services. DEPARTAMENTO ADMINISTRATIVO NACIONAL DE ESTADÍSTICA (DANE). n.d. *Conceptos básicos* [Online]. Departamento Administrativo Nacional de Estadística. Available: [https://www.dane.gov.co/files/inf\\_geo/4Ge\\_ConceptosBasicos.pdf](https://www.dane.gov.co/files/inf_geo/4Ge_ConceptosBasicos.pdf) [Accessed 15 December 2020].

80% since the 1960s, and has worsened in recent decades, with estimates that 80% of agricultural land in Colombia is concentrated in 1% of the largest landholdings (Guereña and Burgos, 2017). Smallholdings of less than ten hectares make up 81% of the total units of agricultural production (UPAs)<sup>14</sup> and only represent 5% of the total area included in the 2014 agricultural census<sup>15</sup>, while at the other extreme, large landholdings of over 2000 ha make up 0.1% of the total UPAs and represent 60% of the total area (Guereña and Burgos, 2017). Informality of land tenure is a persistent problem, with unclear tenure situations for a very significant amount of land, and data on rural property distribution is partial and fragmented (Guereña and Burgos, 2017).

Figure 12: National land area by type of property (ha. and %) 2009, excluding land registry of Antioquia, Cali, Bogotá and Medellín



Source: Adapted from IGAC (2012)

<sup>14</sup> The Unit of Agricultural Production (UPA) or agricultural landholding is the basis for the census information collected: 'An agricultural unit may be made up of one or more smallholdings or rural properties, located in one or more territorial or administrative divisions, as long as all the holdings share the same means of production such as the labor power, machinery or draft animals used for farming the land.' GUEREÑA, A. & BURGOS, S. 2017. A Snapshot of Inequality: What the Latest Agricultural Census Reveals about Land Distribution in Colombia. Oxfam.

<sup>15</sup> The 2014 agricultural census includes 111.5 million hectares of land.

The unequal concentration of land in the hands of a few is the result of various historical factors – Colombia’s colonial history under the Spanish, failed land reforms, internal armed conflict and certain policies such as agricultural subsidies that favoured rich landowners (Guereña and Burgos, 2017, IGAC, 2012). One of the greatest challenges to carrying out conservation initiatives like environmental offsets in Colombia, and in other countries in the region, is the issue of land tenure and availability, as will be seen in the case study of Hidrosogamoso in the next chapter. Therefore, to begin to grasp a deeper understanding of this major challenge, the following section will give a brief overview of the history of territorial occupation in Colombia, changes in land use and the role of land in the various phases of armed conflict.

The presence of humans in the territory of present-day Colombia dates back to at least 14,500 BP (van der Hammen 1992; Bray 1995, cited in Etter et al., 2008), although it was from 2000 BP that increasingly complex societies became established, accompanied by agricultural intensification, especially in the Caribbean and Andean regions (Etter et al., 2008, Melo, 1996). The physical features of the landscape influenced where and how humans congregated, with the three chains of the Andes Mountains acting as a barrier being very difficult to traverse. This meant that for a major part of its history, Colombia’s population was sparsely dispersed into groups disconnected from each other, limiting transport and economic development (Safford and Palacios, 2002). Spanish conquerors landed in the 1500s; they occupied and gained control of indigenous land, and what followed was a dramatic decline in the indigenous population. It has been estimated that fifty years after the arrival of the Spanish, only 25% to 30% of the original population remained (Melo, 1996). During the colonial period between 1600 and 1800, approximately 50,000 African slaves were brought to Colombia, mainly to work in gold mining (Ocampo, 1987, cited in Etter et al., 2008). During this period, land ownership was concentrated in the hands of a small number of families that owned extensive *haciendas* (ranches) where they kept cattle and grew crops like sugar cane and cacao, while the indigenous peoples were concentrated in smaller, less fertile lands called *resguardos* (indigenous reserves) producing annual crops (Etter et al., 2008). The Spanish undertook a Royal Botanical Expedition to the territories of ‘New Granada’ (an area covered by present-day Colombia and other parts of South America) between 1770 and 1800 and the explorers Alexander von Humboldt and Aimé Bonpland undertook a five-year expedition through South America from 1799 to 1804. The findings of von Humboldt’s expedition were published in multiple volumes and the work became extremely influential in documenting the geography

and ecology of Colombia, and South America, as well as inspiring scientists, artists and politicians around the world including Charles Darwin and Henry David Thoreau (Wulf, 2015). Humboldt combined science with a celebration of the aesthetic of the landscapes he travelled through, through illustrations that formed the basis of his theories (Serje, 2002). Despite the important scientific and cultural contributions of these natural expeditions, it has also been argued that they signified an imperial era of natural 'discoveries' that legitimised the colonial appropriation of nature through the scientific categorisation, inventory and visual representation of biological life by European scientists (Nieto Olarte, 2000, Serje, 2002).

Colombia eventually gained independence from Spanish rule in 1810, led by Simón Bolívar. However, after independence, although some public lands (*baldíos*) began to be distributed to landless and poor peasants, for the most part land stayed in the hands of the same wealthy elites who had managed it under the Spanish (Demir, 2018). After 1850, international markets drove demand for coffee, tobacco, bananas and cattle production (Etter et al., 2008). The 20<sup>th</sup> century saw a series of land conflicts in Colombia and attempts at land reform. In the 1930s, in response to movements of campesinos, the 'Agrarian Law' was passed, the first attempted land reform. However, implementation was quashed by the resistance of wealthy landholders (*latifundios*) and by a ten-year civil war between 1948 and 1958 called *La Violencia*. This period of violence was triggered by the assassination of presidential candidate Jorge Eliécer Gaitán and saw widespread forced displacements and abandonment of land. In the 1960s, agrarian reform agency INCORA was established and in the 1970s, another agrarian reform was attempted under President Carlos Lleras Restrepo and the campesino movement was strengthened. The agrarian struggles were directly linked to the emergence of the liberal guerrillas of Gaitanista origin, communist self-defence groups and especially the Revolutionary Armed Forces of Colombia (FARC)'s agrarian program (Grupo de Memoria Histórica, 2013). In 1973, the traditional parties and landowners signed the Chicoral pact and a process of modernisation and rural development began, driven by the World Bank. In the 1980s, the campesino movement was weakened, internal conflict intensified and more forced displacements followed (Chaparro Hernández et al., 2016). None of the attempts at land reform managed to successfully address the issue of land concentration and distribution, with marginal impacts on the rural poor (Guereña and Burgos, 2017). Over recent decades, large estates have grown in size and area, most dedicated to livestock, while small farmers have increasingly lost land (ibid). The reasons for this have been attributed to the power of

certain actors such as wealthy elites, as well as state inefficiencies, weak governance, violence and biased public policies that have favoured speculative and rent-seeking estates and disorderly occupation of land (FAO, 2017, Guereña and Burgos, 2017).

The most recent phase of conflict since the late 1950s has seen a war or internal conflict between the Colombian government, paramilitaries and guerrilla groups, predominantly the FARC and the National Liberation Army (ELN). Although there are no exact figures on the extent of the impact of the war, it has been estimated that between the late 1950s and early 2010s at least 220,000 people were killed (Grupo de Memoria Histórica, 2013) and approximately 7 million displaced (Guereña and Burgos, 2017). The causes, dimensions and actors entangled in the conflict are multiple and complex and will not be discussed here (see e.g. Bushnell, 1993, Grupo de Memoria Histórica, 2013, Palacios, 2006, Safford and Palacios, 2002). However, at the heart of the issue is land (access to land, land use and tenure) and it represents a key factor in both the origins and the endurance of the armed conflict (Grupo de Memoria Histórica, 2013, Romero, 2010). Throughout the years, forced displacements, land concentration and failed reform have persisted, with the addition of new dynamics in the form of drug trafficking, mining, energy and agribusiness models and criminal alliances between the various groups of actors (Grupo de Memoria Histórica, 2013).

The Colombian government has estimated the environmental costs of the armed conflict at COP\$7.1 billion (US\$2.22 billion) per year in avoidable environmental damages such as deforestation, oil spills, CO<sub>2</sub> emissions, illicit crops and mining (Weir, 2016). Forced displacement has had an adverse impact on the environment, contributing to the expansion of urban areas, changes in land use and the fragmentation of ecosystems (Moreno and Andrade, 2019). Former President Juan Manuel Santos referred to the 'ecocide' incurred as a result of the conflict and promoted the environmental and economic opportunities to be opened up by the peace process under a green growth agenda: 'it's time for peace but it's also time for the green growth that we all must commit to' (Presidencia de la República - Colombia, 2016, 27:27). Santos succeeded in attaining a peace agreement in 2016 between the Colombian government and the FARC. While the signing of the agreement was widely praised internationally and Santos was awarded a Nobel Peace Prize, within Colombia the sentiment was mixed. The public had voted by a narrow majority against the peace agreement in a plebiscite, many feeling the deal was too lenient on the rebels (BBC News, 2016). The result came as a shock to many, but the



peace agreement was nevertheless ratified by Congress. Land was one of the key issues laid out in the peace accord. However, the failure of the government to effectively implement social development and crop substitution programmes and establish a presence in these areas means that the communities and the environment continue to suffer (Somos Defensores Program, 2019). As the FARC disarmed and moved out of remote rural areas, this has opened up new areas of the country for scientific expeditions, called *Colombia BIO*, resulting in the discovery of new species (Semana, 2017). Unfortunately, it has also opened up these areas to land grabs, exploitation and illegal logging, one of the causes of the rise in deforestation since 2016 (Brodzinsky, 2017).

Colombia illustrates a dichotomy of, on the one hand, ongoing social turmoil while, on the other hand, having some of the most advanced legal and institutional frameworks in Latin America. This can be seen in the country's environmental policy, which is discussed in the following section.

#### **4.4. Institutional and regulatory framework for environmental protection**

Colombia was one of the first countries in Latin America to introduce laws for environmental protection, with laws regarding forest reserves introduced in the 1950s and the National Natural Renewable Resources and Protection of the Environment Code in 1974, in response to agreements made at the United Nations Conference on the Human Environment in Stockholm (Rodríguez Becerra, 2004). Colombia's 1991 Political Constitution and the 1993 General Environmental Law represent key milestones in the development of environmental regulation and the promotion of sustainable development in Colombia. The General Environmental Law (Law 99 of 1993) established the Ministry for Environment (now Ministry for Environment and Sustainable Development or 'MADS') and the National Environmental System, 'SINA', to implement the environmental principles contained in the Constitution and General Environmental Law. MADS manages the environmental sector through its subordinate entities – the 33 Regional Autonomous and Sustainable Development Corporations (*Corporaciones Autónomas Regionales y de Desarrollo Sostenible* – CAR)<sup>16</sup> and the urban authorities. The remit of the CARs is exclusively related to environmental matters; they are in charge of creating and

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<sup>16</sup> There are 26 Regional Autonomous Corporations and 7 Sustainable Development Corporations. The Sustainable Development Corporations are so-named due to their important ecosystems (e.g. the Colombian Amazon, La Macarena). All are referred to collectively as 'CARs'.

implementing environmental policies within their jurisdiction as well as granting or rejecting environmental licenses for certain projects<sup>17</sup>. The CARs are administratively and financially autonomous, but remain linked to MADS and are required to execute environmental policies, plans and programmes, with support from the departments and municipalities (Blackman et al., 2005). Colombia was traditionally a centralised country but after a reform in 1986 and subsequent decentralisation processes, is now the most decentralised unitary country in Latin America, giving subnational authorities significant power and influence over environmental matters (OECD/ECLAC, 2014, Yale University, n.d.). The National Authority for Environmental Licenses (*Autoridad Nacional de Licencias Ambientales* - ANLA) was created in 2011 with the responsibility for granting or denying environmental licenses, permits and authorisations, assuring compliance with environmental legislation and project-specific requirements and ensuring mechanisms for public participation are properly implemented. Since then, in an attempt to reduce red tape and administrative delays, there has been progressive simplification and increasing flexibility of environmental licensing procedures in Colombia (McNeish, 2017, Rodríguez, 2011). A 2020 report by the Inter-American Development Bank states that Colombia has the fastest average rate of permitting and approval processes for infrastructure projects in Latin America, as a result of the streamlining of administrative formalities, including electronic verification and ‘fully adopting the “silence means consent” rule’<sup>18</sup> (Cavallo et al., 2020, p. 39),

The 1991 Political Constitution outlines the obligation of the state and the population to protect the cultural and natural wealth of the nation (Art. 8). It also outlines the duty of the state to protect the diversity and integrity of the environment and guarantee community participation in decisions that may affect the environment (Art. 79), as well as its duty in guaranteeing sustainable development, conservation, restoration, or replacement of natural resources and in demanding the repair of any environmental damage (Art. 80) (República de Colombia, 1991). Colombia was the first Latin American country to give the environment such prominence in its constitution (OECD/ECLAC, 2014). The Convention on Biological Diversity (CBD), was approved by Colombia in 1994, and the National Forest Policy and National Biodiversity Policy were passed in 1996. An expanded version of the latter was released in 2012 - the National Policy for the Integral Management of Biodiversity and its Ecosystem Services (PNGIBSE) - to strengthen the framework for

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<sup>17</sup> Articles 8 and 9 of Decree 2820/2010 list projects under the authority of the ANLA and the CARs.

<sup>18</sup> The ‘silence is consent’ rule, in relation to licensing processes, means that if particular permits and licences are not issued within the statutory time limit, the activity is deemed to be approved.

conservation and sustainable use of biodiversity. Colombia's Biodiversity Action Plan 2016-2030 sets out national plans for the implementation of PNGIBSE, some of which are directly related to the global Aichi biodiversity targets, and others relate to the specific national context. Under former president Santos and the National Development Plan 2014-2018 the government strategy was to ensure 'as much market as possible, and as much state as necessary' (DNP, 2015, p. 28) and a 'Green Growth Mission'<sup>19</sup> was established.

Following on from the Green Growth Mission, under President Iván Duque the pact for sustainability outlined in the National Development Plan 2018-2022 is to 'produce conserving and conserve producing' and outlines a sustainability agenda that seeks to find 'a balance between the conservation of natural capital, its responsible use and national production, so that the natural wealth of the country is considered as a strategic asset of the Nation' (DNP, 2019a, p. 461). The use of economic instruments and the valuation of biodiversity is highlighted, including the expansion of payment for ecosystem services (PES) programs, as well as revising economic and financial instruments, the formulation of national environmental accounts, and the valuation of marine, coastal and island ecosystem services (DNP, 2019a). The next section outlines the legal framework and instruments for environmental compensation.

#### **4.5. Legal framework for environmental compensation**

The 1993 General Environmental Law introduced the concept of the mitigation hierarchy, stating that proponents requiring environmental licenses must carry out prevention, mitigation, correction, compensation and management of environmental impacts of the development or activity, which should be detailed in the environmental impact assessment. Since 1993, the number of environmental laws, decrees and resolutions in Colombia has expanded significantly, with more than 300 legal environmental instruments now in place, leading at times to a lack of coherence and a need for better consolidation (OECD/ECLAC, 2014). Article 80 of the Constitution states that the state will 'plan the management and use of natural resources, to guarantee its sustainable development, its conservation,

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<sup>19</sup> The National Development Plan defines green growth according to the OECD definition: 'fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies. To do this it must catalyse investment and innovation which will underpin sustained growth and give rise to new economic opportunities.' (DEPARTAMENTO NACIONAL DE PLANEACIÓN (DNP) 2015. Plan Nacional de Desarrollo 2014-2018: Todos por un nuevo país. Bogotá, D.C.: Departamento Nacional de Planeación.)

restoration or replacement,<sup>20</sup> adding that the state has a duty to prevent and control factors that cause degradation of the environment, to impose legal sanctions when appropriate, and to force those who cause environmental harm to repair the damage. Compensation measures are defined as actions aimed at compensating and reimbursing communities, regions, localities and the natural environment for impacts or negative effects generated by a project, development or activity, that cannot be avoided, corrected, mitigated or substituted (MADS, 2005, Art. 1). MADS has been working on a national environmental compensation strategy to guide the formulation and implementation of environmental compensation for projects, works or activities subject to an environmental license, single use of forest and extraction from forest reserves, ‘under an ecosystem vision, that contributes to conservation through the implementation of preservation, restoration in any of its approaches, or sustainable use, with measurable and quantifiable results, to contribute to the fulfilment of national conservation objectives’ (MADS, 2020).

There are five key instruments through which environmental compensation is required by law in Colombia: the environmental license; the forest use system; extraction from a forest reserve; threatened species of flora and fauna; and the compensation manual for the biotic component. The latter manual, passed in 2018, brings under one umbrella three environmental compensation requirements: biodiversity offsets for licensed projects, the forest use framework, and extraction from forest reserves. In addition to these five instruments, there are three others worth noting, that can be linked together in order to compensate for environmental impacts: payment for ecosystem services (PES), obligatory 1% investment, and habitat banks. The legal framework and description of all eight instruments is outlined in Table 1.

*Table 1: Environmental compensation instruments in Colombian legislation*

<b>Environmental compensation instrument</b>	<b>Legal framework</b>	<b>Description</b>
Environmental license	Law 99 of 1993 Decree 1220 of 2005 Decree 2820 of 2010 Resolution 1517 of 2012 Law 165 of 1994	Regulates the environmental licensing process and sets the obligation for project developers to carry out environmental impact assessment that includes measures to avoid, mitigate, restore and offset their environmental impacts.

<sup>20</sup> All translations from Spanish to English in this thesis are the author’s own.

Forest use (single use)	Decree 1791 of 1996 Decree 1076 of 2015	Establishes the forest use system and requirements to compensate for use of forests through reforestation. To obtain a single use forest permit, if the exploitation of natural forest is in areas larger than 20 hectares, the plan should contain environmental considerations detailing the actions necessary to prevent, mitigate and correct negative impacts. Criteria decided on a case-by-case basis.
Extraction from forest reserves	Decree-Law 2811 of 1974 Resolution 918 of 2011 Resolution 1526 of 2012	Regulates the process for extraction from forest reserves for activities of public or social interest and the compensation requirements. For temporary extraction, recuperation (reparation of ecosystem processes, productivity and services) should be carried out in the affected area. For permanent extraction, compensation should be carried out by acquiring an area of equivalent size to the affected area to carry out a restoration plan approved by the relevant environmental authority.
Protected species of flora and fauna	Decree-Law 2811 of 1974 Decree-Law 1608 of 1978 Law 99 of 1993 Various resolutions	Regulates the conservation, protection, restoration and promotion of flora and fauna. The competent environmental authority may authorise the partial lifting of the ban on affected protected species, ordering compensation measures such as reforestation (1:1 individuals of the same species).
Biodiversity loss	Resolution 1517 of 2012 Resolution 256 of 2018	Manual for the allocation of compensation for biodiversity loss (2012) Compensation manual for the biotic component (2018) Policy and manual to guide the compensation for biodiversity loss in projects subject to environmental license, single forest use and extraction from national and regional protective forest reserves, including the calculation of the compensation factors, where to compensate, and how to compensate.
<b>Linked instruments</b>		
Payment for ecosystem / environmental services	Law 139 of 1994 Decree 900 of 1997 Law 1152 of 2007, Art 106 Decree 953 of 2013 Decree 870 of 2017	Regulates payment for ecosystem services – monetary or in-kind incentives provided to the owners, possessors or occupiers in good faith without fault, for preservation and restoration actions in strategic areas and ecosystems, through voluntary agreements between stakeholders and beneficiaries of environmental services.
Compulsory 1% investment	Law 99 of 1993, Art. 43 Decree 1900 of 2006 Decree 1076 of 2015	Requires developers of a project or activity impacting on natural water sources to provide financial compensation amounting to 1% of the project cost.
Habitat banks	Resolution 1051 of 2017	Regulates the establishment of habitat banks – public or private areas with natural resources of high value. In

		return for the protection, management and ongoing monitoring of the area, the owner of the habitat bank can establish agreements with third parties with legal obligations to compensate for the environmental impacts of development projects (under environmental compensation or 1% investment).
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### **Environmental license and EIA**

Law 99 of 1993 established the legislative foundation for environmental licensing and enforcement, and recognised the environmental impact assessment (EIA) as the fundamental instrument for decision-making related to activities that significantly affect the environment (Baldwin, 2019). Any project that may cause serious damage to renewable natural resources or the environment or considerably transform the landscape requires an environmental license (Law 99 of 1993, Art. 49). When applying for an environmental license, developers must carry out an EIA and provide the relevant authority with information about the location of the project and the abiotic, biotic and socio-economic elements of the environment that may undergo deterioration due to the project, and the evaluation of the impacts that may occur. It must be accompanied by an environmental management plan including planned activities to prevent, mitigate, correct, compensate and manage the environmental impacts of the development or activity (El Congreso de Colombia, 1993, Sarmiento, 2014). The types of projects or activities subject to environmental license are listed in Decree 2830/2010 and are divided into those under the remit of ANLA (Art. 8) and those under the remit of the CARs (Art. 9) (MADS, 2010). Larger scale projects and projects of national and strategic interest in the mining, hydrocarbon, infrastructure and energy sectors are handled by the ANLA, while the CARs oversee regional scale projects.

### **Forest use system (and ‘forest offsets’)**

The forest use system requires proponents who wish to attain a permit to clear forest to compensate with an offset the area of at least equal coverage and extension of forest, in an area determined by the relevant administrative authority, as detailed in Decree 1791 of 1996 (MADS, 1996, Art. 12). If the area is equal to or greater than 20 hectares, the plan must include details on the actions to prevent, mitigate, control, compensate and correct environmental impacts (ibid., Art. 25) (i.e. the mitigation hierarchy). For areas less than 20 hectares the proponent is not required to detail the mitigation hierarchy, but the CAR should state the obligations for following these steps (ibid., Art. 26). Projects that do not

require environmental license from the national authority but rather an environmental management plan from the regional authority and that clear forest areas must carry out reforestation in accordance with the guidelines of the relevant CAR or urban authority (ibid., Art. 46). In general, the reforestation measures are based on the species, number of individual trees, and volume of wood extracted, without reference to the ecological area affected (Sarmiento, 2014).

### **Extraction from forest reserves**

Development within forest reserves may be permitted under certain circumstances, such as for public use or social interest (MADS, 2014). Since 2011, the proponent must carry out compensation, restoration and recuperation measures (Sarmiento, 2014). For temporary extraction, recuperation and rehabilitation measures should be implemented to ecologically restore the affected area. For permanent extraction, this should be compensated with an area of equivalent ecological value as what is being impacted. The compensation is designed on a case by case basis and should ideally be located in the area of influence of the project in the forest reserve, or, if areas are not available, outside of the forest reserve in priority areas designated by the relevant CAR for restoration or rehabilitation.

### **Threatened species**

Legislation related to protection of threatened species regulates the conservation, protection, restoration and promotion of wildlife. In Colombia there are more than 60 resolutions that enforce bans on harvesting species of flora and fauna (Sarmiento, 2014). For a planned development that may impact a protected species, a developer may apply for permission to lift the protection order temporarily or permanently on the site. In this circumstance, they must compensate by reforesting an equivalent zone with the same affected species to the ratio 1:1 (individuals), in the case of flora (Sarmiento, 2014). When impact is on fauna and the project is subject to environmental license, the developer must alert MADS or the relevant CAR who may authorise lifting of the ban if compensation measures are carried out, which will be decided on a case by case basis (ibid.).

### **Compensations for the biotic component (and 'biodiversity offsets')**

The 'Manual for the allocation of compensation for biodiversity loss' was incorporated into legislation in 2012 and updated in 2018 with the 'Compensation manual for the biotic component'. The manual lays out the requirements for compensating for biodiversity loss

arising from development projects. With the introduction of the manual in 2012, it was the first time the concepts of 'no net loss' and 'like for like' were introduced into the criteria for determining environmental compensation in Colombia, aligning with international biodiversity offset standards. The details of the two versions of the manual will be discussed in greater detail in chapter seven.

### **Payment for ecosystem services (PES)**

PES schemes are supported through legislation in Colombia. One of the first instruments developed to compensate benefits associated with forest activity was the forest incentive certificate 'CIF', created under Law 139 of 1994, allowing landowners to apply for a CIF to either carry out conservation or restoration activities on their land in exchange for monetary compensation. The restoration CIF has been developed however the conservation CIF was not effectively implemented due to financial restrictions and technical limitations (CONPES, 2017). For instance, some of the negative effects reported included a perverse incentive to intervene in primary forests in order to receive the payments for ceasing logging, as well as insufficient financial resources to respond to the demand from landowners to participate in the scheme (Forero-Alvarez and Torres-Guevara, n.d.). However, there has been an increasing focus on the improvement of PES to achieve conservation benefits, with the development of a national PES strategy in 2008 and the incorporation of the concept into the National Development Plan (PND, 2015). In 2007, it was established that the departments and municipalities must dedicate 1% of their income to finance PES schemes. President Santos launched a new PES Policy in 2017, which details plans for incorporating conservation with the construction of peace following the peace agreement (MADS, 2017a).

### **1% investment**

All projects that involve the use of water from natural sources and that are subject to environmental license, must allocate no less than 1% of the total cost of the project to the restoration, conservation, preservation and monitoring of the affected water basin. The service provider, which can be a landowner, a regional authority or a protected area, receives compensation from the developer through an intermediary (CARs, NGOs or private organisations financed by trust funds). The scheme generates significant amounts of finance to invest in conservation but also huge demand for areas for conservation (Fondo Acción et al., 2016). The fact that regional authorities can act both as intermediary and beneficiary may also pose a conflict of interest (ibid.). There are calls for better



guidelines and protocols to consolidate interpretations of the law and improve institutional coordination (ANLA, 2015).

### **Habitat banks**

A resolution was passed in 2017 that establishes the terms and conditions for registering a habitat bank with MADS as a mechanism for implementing environmental compensation and the obligatory 1% investment law, as well as for other conservation initiatives under the PES scheme. Habitat banks are defined as an area in which preservation, restoration, rehabilitation, recuperation and/or sustainable use activities for biodiversity conservation can be carried out (MADS, 2017c). Habitat banks can be private or public areas managed for their high natural resource value. In return for protecting, managing and ongoing monitoring of the area, the party responsible for the habitat bank can establish agreements with third parties who have obligations to compensate for their environmental impacts (i.e. developers). The resolution sets out five conditions the habitat banks must meet: additionality; complementarity with planning and environmental land management instruments and with regional or national conservation priorities; sustainability and continuity; payment for performance; and knowledge management - by providing biodiversity data to SiB Colombia (ibid.). The resolution states that the payments should be made by the party responsible for the habitat bank via an independent third party. Colombia established the first habitat bank in Latin America, a pilot project being implemented in the Meta department with financial backing from the Inter-American Development Bank (FOMIN, 2017).

## **4.6. Conclusion**

In his Atlas of the Geography of Colombia in 1906, geographer and cartographer Francisco Javier Vergara y Velasco noted that the conquest of the Colombian territory moulds perfectly to the typography of the land, and that this could be clearly visible if you were to superimpose the map of typography onto the map of settlements of indigenous peoples, and then onto that of the Spanish settlements, and the development of the country (Vergara-Buitrago, 2018). To a large extent, this is still the case, with the human footprint mirroring the pathways of the early settlers. Human settlement and control over land is not only dictated by the physical features of the landscape, however. Cultural factors and the imposed social order throughout history also influence the likelihood of communities to occupy new territories and shape the way in which land is used (Guhl Nimitz, 2017). In

Colombia, social unrest with long periods of violence forced millions of people to uproot, moving mainly from rural to urban areas and it also meant that certain parts of the country were for a long time off-limits to development due to the presence of armed groups. Now, with the FARC demobilised and a lack of state presence, new actors are entering these areas, threatening both the natural environment and the people who attempt to defend their territory. Colombia is a country full of contrasts and paradoxes. Its impressive biological and cultural diversity is a product of its location and varied elevations and ecosystems, but also a product of its history of colonialism and extractivism. Inequalities and disputes over land lie at the root of the conflict and facilitate the ongoing circle of violence. In contrast, it has some of the most advanced environmental legislation in the region and is embracing environmental offsets as a way to limit the negative impacts of development. The next chapter takes a closer look at one area of Colombia – the Department of Santander in the Magdalena Medio region and the location of the Hidrosogamoso dam - exploring the particular territorial characteristics, tracing the history of the construction of the dam and its environmental compensation requirements.

## **5. Background to Santander and the Hidrosogamoso dam**

### **5.1. Introduction**

The chapter begins with a short introduction to Santander's geographical and socio-economic context and an overview of historical territorial occupation in the region. This is followed by a background to the Hidrosogamoso hydroelectric project, the social and environmental impacts and compensation requirements.

### **5.2. A brief introduction to the geographical heart of Colombia**

The Department of Santander is in the central northeast of Colombia, bordering the departments of Norte de Santander, Boyacá, Antioquia, Bolívar and Cesar. Santander is divided into 87 municipalities and the capital city is Bucaramanga. Santander is framed by the Magdalena River on one side and a chain of páramos on the other, with the mountainous Eastern Cordillera of the Andes Mountains running through the centre. The Magdalena River is Colombia's principal river which stretches from the south to the north of the country, representing an important commercial route. The valley formed by the Magdalena River is called the Magdalena Medio, also known as the 'geographical heart of Colombia' (Ardila Valderrama, 2013, p. 10). Santander contains a complex river system, as well as a wetland system that provides valuable water storage functions. The principal rivers are the Chicamocha, Suárez, Fonce, Lebrija, Carare, Opón, Oponcito and Sogamoso, with 97.6% of the water of the department flowing into the Magdalena River (Torres and Quiñones, 2019). The Sogamoso River, 137 km in length, is the main contributor of the department to the Magdalena River (Ardila Valderrama, 2013). Santander is home to two national parks, Parque Nacional Natural (PNN) Serranía de los Yariguíes and the Guanentá Alto Río Fonce Flora and Fauna Sanctuary, as well as 12 regional protected areas and many more civil society reserves (Torres and Quiñones, 2019). Much of Santander's biodiversity is unknown to scientists, however, a recent Santander Bio expedition organised by the Industrial University of Santander and the Instituto Humboldt registered a significant number of species, reporting that 51% of all bird species and 24% of all plant species registered in Colombia are found in Santander, many of which are threatened by deforestation and habitat loss (Torres and Quiñones, 2019).

The Department of Santander has a population of just over 2 million people, 76.8% of whom live in urban areas and 23.2% in rural areas (DANE, 2018). According to the

government's 2018 census data, Santander is the department with the sixth lowest rate of poverty in Colombia. However, the numbers are still significant, with an average of 9.45% of the population with unsatisfied basic needs<sup>21</sup>. In rural areas poverty increases, with an average of 20.07% of the rural population with unmet basic needs. In El Carmen de Chucurí, the poorest municipality, this number rises to 43%. While historically the region was occupied by indigenous groups, nowadays there are only a small minority of ethnic groups in Santander: 0.1% of the population is indigenous, identified as those who speak their ancestral language and live in a tribal system; Black, Afro-Colombian, Raizales, and Palenqueras make up 1.3%; and Romani 0.02% (DANE, 2019).

### **Territorial occupation and conflict in Santander**

Investigating the offset project at the centre of this research meant encountering landscapes and people with a unique and traumatic history, affected by repeated cycles of conflict. The Serranía de los Yariguíes mountain range and national park are named after the Yariguíes or Yareguíes, an ethnic group that used to occupy the territory of Santander located between the Sogamoso, Opón and Magdalena rivers (Ministerio de Medio Ambiente et al., 2005a). From the 16<sup>th</sup> century the Yariguíes lived through waves of resistance and violent confrontations to defend their land - against European colonisers, evangelical priests, attempts by the state to civilize them, and finally the oil industry - until they were eventually eradicated in the early 20<sup>th</sup> century (Ruiz Nieto, 2018, Velásquez Rodríguez and Castillo León, 2006). The mountain range is also known as *Serranía de los Cobardes* (the Cowards' Mountain Range), which some say refers to mass suicides of the Yariguíes who preferred to die rather than being colonised by the Spanish (Ardila Valderrama, 2013). Others say it was named after Spanish monks who fled to the mountains after being banished from the town of Socorro by indigenous tribes (Quintana Cabeza, 2005). Nowadays, it is said that the steep terrain and difficult access is enough to make anyone 'cowardly' to approach the mountains (Quintana Cabeza, 2005).

Two of the key locations adjacent to the forest offset sites are El Carmen de Chucurí and San Vicente de Chucurí - agricultural municipalities with small bustling market towns where the main crops are cocoa, coffee, avocado, citrus fruits and banana. The locals are

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<sup>21</sup> Unsatisfied basic needs (UBN) is an index for measuring multidimensional poverty. In the Colombian case, this is based on the following indicators: inadequate housing, inadequate basic public services, overcrowding, state neglect, and high economic dependence. Households with one indicator are classified as having UBN and those with two or more are classified as living in extreme poverty ('misericia') (DANE Colombia, Principales Indicadores CNPV 2018. Necesidades Básicas Insatisfechas (NBI))

proud and appreciative of their fertile soil, clean air and abundant water, thanks to the Serranía de los Yariguíes mountains that form a backdrop to both towns. While proud of their '*pueblo sano*' ('good, healthy town'), it doesn't take too long for snippets of the past to come up in conversation or appear in the names of buildings, such as the local school Colegio Camilo Torres in San Vicente. Camilo Torres Restrepo is a prominent symbol in the Colombian conflict. He was an academic, a Catholic priest and a revolutionary guerrilla who joined the National Liberation Army (ELN) and was assassinated in the hills of Santander, near San Vicente de Chucurí. The ELN set up operations in a jungle area of western Santander, near Barrancabermeja and San Vicente and the region had a tradition of popular mobilisation and peasant occupation of land (Palacios, 2006). As historian Omar Fernando Ruiz Nieto argues, the history of land occupation in the Santanderean Magdalena Medio is closely related to the political and environmental conflicts arising from land grabs of fertile territory, the construction of roads and communication routes and the arrival of multinational oil companies. These aspects have shaped the territory as a frontier, a refuge and a place of progress (Ruiz Nieto, 2018, p. 14).

In Santander, as in other parts of Colombia, civil unrest and violence drove internal migration, pushing peasant families to the agricultural frontiers, occupying uncultivated no man's land (*baldíos*), often in areas of high biodiversity such as forests and jungles (CINEP/PPP, 2019). The Magdalena Medio region, containing the Magdalena River and valuable natural resources, is a strategic territory but one which has suffered from exclusion, inequality and poverty as a result of an extractive economy built on oil, coal and gold and compounded by an absence of the state and the presence of armed groups (Ardila Valderrama, 2013, p. 10). Oil exploitation began in 1920 in Barrancabermeja, today Santander's second largest city and Colombia's largest oil refinery. As will be discussed in the following section, hydropower has also come to represent an important aspect in the pursuit of progress in the region.

### **5.3. Background to the construction of Hidrosogamoso**

The idea to construct a hydroelectric dam on the Sogamoso river was proposed in 1943 by Santander engineering student Gerardo Streithorst Clausen in his final thesis, and he was credited seventy years later at the inauguration of Hidrosogamoso (ISAGEN, 2015b, 03:43). Plans for the construction of the Hidrosogamoso dam and the elaboration of feasibility studies started in the 1960s but it was not until the year 2000 that the

environmental license was granted by the Ministry of Environment, Housing and Territorial Development (MAVDT) (see timeline in Table 2). Throughout the decades of planning for Hidrosogamoso, the ownership of the project changed hands. In 1967 Interconexión Eléctrica S.A. E.S.P. (ISA) was established as the first national electricity network that integrated four regional electricity systems that were up to that point working in isolation. In her work on the Chivor dam, Correa-Casas (2018) describes how dams came to represent development and modernisation in the second half of the 20<sup>th</sup> century, with the consolidation of different regional interests. She writes how, during that time, the government was strengthened as the national body of control, while an imaginary was created of the regional campesino as poor and underdeveloped. In the 1990s, driven by a neoliberal model of development, processes of privatisation began, including in the energy sector, justified by the need to increase energy capacity to compensate for short supply during periods of drought (Correa-Casas, 2018). What followed was the division of ISA in 1994 into two public-private companies: ISAGEN S.A. E.S.P. (hereafter ISAGEN) in charge of generation, and ISA in charge of transmission. A consortium called Sociedad Hidrosogamoso S.A. was formed in 1997 to manage the Hidrosogamoso dam, between Electrificadora de Santander (ESSA), Fondo Energético Nacional (FEN) and ISAGEN, until ISAGEN acquired total ownership of the project in 2008. ISAGEN at that time was a mixed public-private company, 57% state-owned and the rest a mix of private funds and shares (ISAGEN, 2009). ISAGEN was privatised in 2016 when the majority share was purchased by Canadian firm Brookfield Asset Management for approximately two billion USD (Brookfield, 2016).

After being in the wings for some time, the project got the push it needed under the government of ex-president Álvaro Uribe Vélez between 2002 and 2010, as part of a package of projects aiming to increase energy generating capacity and exports (Roa Avendaño and Duarte Abadía, 2012). The construction of the Hidrosogamoso dam began in 2009 and was finalised and began operating at the end of 2014. The dam is located in the canyon where the Sogamoso River crosses the La Paz Mountain Range and consists of a 190-meter-high concrete dam, a power plant with an installed capacity of 820 MW, and a reservoir. Using the water flow of the Sogamoso River, Hidrosogamoso produces electric energy which goes to the national grid, providing approximately 8.3% of Colombia's energy (ISAGEN, 2015a). The energy mix in Colombia is dominated by hydropower, providing 86% of national electricity in 2017 (IHA, 2018). The World Economic Forum ranked Colombia 8<sup>th</sup> in the Global Energy Architecture Performance

Index, the first non-European country to make the top ten, which measures countries' ability to deliver secure, affordable and sustainable energy (IHA, 2018). However, this reliance on hydropower makes the sector vulnerable to weather conditions such as droughts and phenomena such as El Niño and La Niña. Colombia imports electricity from Ecuador during periods of low rain and also exports to Ecuador and Venezuela (U.S. Energy Information Administration, 2019). In 1992, Colombia experienced an energy crisis known as 'The blackout' (*'El apagón'*) when droughts brought on by El Niño, combined with bad management of the electricity system by ISA, resulted in energy rationing and blackouts over a period of nine months (Defensoría del Pueblo, 2017). At the inauguration of the Hidrosogamoso dam in 2015, former president Juan Manuel Santos celebrated the energy security to be provided by the dam, saying that despite El Niño, Hidrosogamoso 'gives Colombians immense peace of mind in terms of our ability to meet the growing demand for energy' (Presidencia de la República - Colombia, 2015, 01:45). Former president Santos and the General Manager of ISAGEN describe Hidrosogamoso as a 'dream' that Santander had been yearning for, for more than half a century (ISAGEN, 2015b, 03:38, 08:01).

The area of influence<sup>22</sup> of the Hidrosogamoso dam, both directly and indirectly impacted areas, covers the municipalities of Girón, Betulia, Zapatoca, Los Santos, Lebrija, San Vicente de Chucurí, Barrancabermeja, Puerto Wilches and Sabana de Torres. The reservoir, one of the largest in the country, required an area of approximately 7,000 hectares of land to be flooded, made up of agricultural land and forest. As a result of the scale of the dam, the landscape underwent a major transformation, as can be seen in the aerial photos in Figure 13. The reservoir is of a comparable size to the capital city of Bucaramanga and travelling from the capital towards San Vicente de Chucurí, on the new road financed partly by ISAGEN, the reservoir dominates the landscape. The name for the

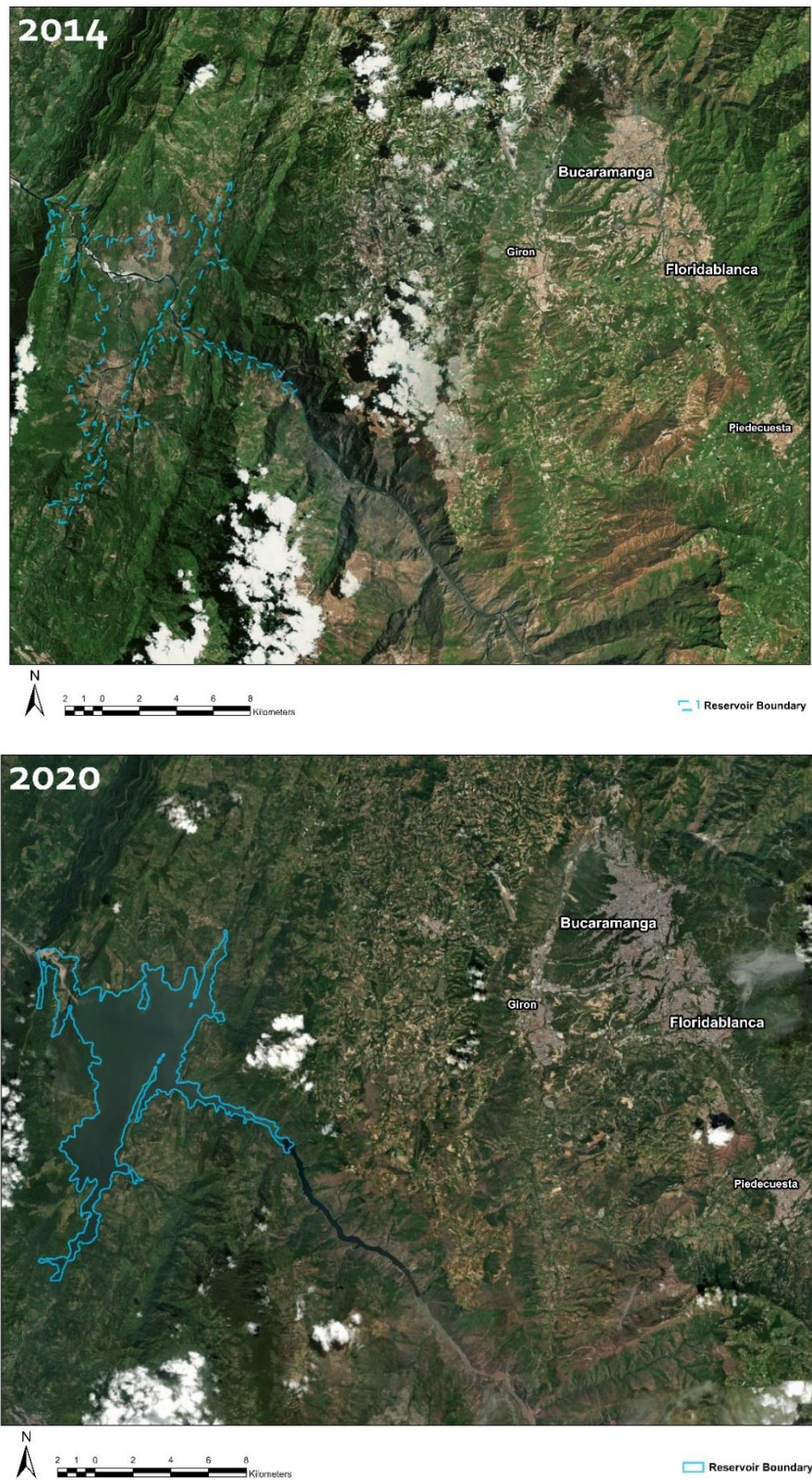
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<sup>22</sup> According to the INTERNATIONAL HYDROPOWER ASSOCIATION. 2018. *Hydropower Sustainability Guidelines on Good International Industry Practice* [Online]. International Hydropower Association (IHA). Available: <https://www.hydropower.org/publications/hydropower-sustainability-guidelines> [Accessed 09 July 2020]., direct impacts are those under the control of or caused by the project, such as changes in land ownership and/or use, changes in environmental quality and people's quality of life, while indirect impacts are those outside the control of the project, such as changes in property values and regional demographics. The EIA for Hidrosogamoso defines the area of influence as encompassing 'the areas to which the effects of the hydroelectric project's activities can extend and is defined by the ecosystems whose conditions are modified or altered, as well as the community groups that depend on [the ecosystem] services or functions' INGETEC 2008. Actualización Diseños de Licitación y Estudio de Impacto Ambiental Proyecto Hidroeléctrico Sogamoso. Revisión 1. Volumen 5 de 6. Documento No. E2-6.1-006. Bogotá, Colombia: ISAGEN, INGETEC S.A.

reservoir, *Topocoro*, was the name used by the indigenous Guane community to refer to the area now known as Betulia, the municipality that contributed the most land to the reservoir (ISAGEN, 2015a). ISAGEN named the dam *Latora*, a term they attribute to the indigenous Yariguíes peoples to mean 'place that dominates the river' (*'sitio que domina el río'*) (ISAGEN, 2015a, p. 4).



Figure 13: Aerial photos before and after construction of the Topocoro reservoir, 2014 and 2020



Source: Images from Google Earth; reservoir boundary added

The timeline in Table 2 below highlights the key milestones in the development of the Hidrosogamoso dam, from inception through to construction. The environmental license was modified various times throughout the decades; 13 times as of February 2020 according to ANLA (2020b). The timeline lists some of the most significant modifications, which appear in the introduction to the latest amendments to the license requested in 2019. It was beyond the scope of this research to examine in detail all the legal modifications. However, according to Rodríguez-De-Francisco et al. (2019) and Roa Avendaño and Duarte Abadía (2012), they represent attempts by the company to smoothen the process and minimise their environmental obligations. The first public hearing took place in 2009, nine years after the original environmental license was approved, and another took place in 2019. Excerpts of the transcripts of these public hearings are examined in chapter nine. The dam is expected to have an operational lifespan of 50 years, until circa 2064.

*Table 2: Timeline of key milestones in Hidrosogamoso and forest offset projects*

Year	Key milestones: Hidrosogamoso, forest offsets, community participation/protest
1943	Gerardo Streithorst Clausen presents his engineering thesis on the possibility of taking advantage of the Sogamoso river for a large hydroelectric power station
1959	Colombian Congress approves Law 146, providing resources for the construction of works for a hydroelectric power plant on the Sogamoso river
1960	First assessment for Hidrosogamoso project sent to Instituto Nacional de Aguas
1980	Beginning of discussions about declaring Serranía de los Yariguíes as a protected area
1996	First environmental impact assessment (EIA) for Hidrosogamoso
1997	Formation of Sociedad Hidrosogamoso S.A. (ESSA, FEN, ISAGEN and other regional entities)
2000	<b>MAVDT grants environmental license for the Hidrosogamoso project (Res. 0476 of 17 May 2000)</b>
2002	Modification to environmental license (Res. 898 of 26 September 2002)
2005	PNN Serranía de los Yariguíes declared as National Natural Park
2008	ISAGEN acquires total ownership of the Hidrosogamoso project
	Modifications to EIA and license (Res. 1709 of 30 September 2008) Formation of Social Movement in Defense of Río Sogamoso (Ríos Vivos Santander)
2009	<b>Dam construction begins</b> (roads and works)
	Modifications to environmental license (Res. 206 of 9 February 2009, Res. 1497 of 31 July 2009) Public hearing over modifications to the license; Local community expresses concern over dam
2010	Ríos Vivos oppose Hidrosogamoso application to Clean Development Mechanism
	Modification to environmental license (Res. 2649 of 22 December 2010)

2011	Deviation of Sogamoso River (January)
	Modification to environmental license (Res. 970 of 27 May 2011)
	<b>Start of buffer zone forest offset project</b>
	Community protests over construction of dam
2012	Environmental activist Miguel Pabón Pabón disappears (October)
2013	Modification to environmental license (Res. 0051 of 23 January 2013)
	<b>Start of Yariguíes forest offset project – centre-west, El Carmen</b>
2014	Modification to environmental license (Res. 363 of 10 April 2014)
	Relocation of families and filling of Topocoro reservoir (June)
	Technical error results in river levels dropping (June); ANLA investigation into error
	Community protests over drying of river and death of fish
	Threats to community leaders - fisherman Armando Caballero Toscano murdered
	<b>Hidrosogamoso begins operation (December)</b>
2015	Official inauguration of Hidrosogamoso (January)
	Community protests - 3-day march to Bucaramanga
	Court orders ISAGEN to remove decomposing biomass inside reservoir
	<b>End of buffer zone offset project; Start of Yariguíes forest offset project – North, San Vicente</b>
	Beginning of land acquisition within Serranía de los Yariguíes national park
2016	ISAGEN acquired by Brookfield Asset Management (January)
	Landslide damaged plant nurseries in Yariguíes (July)
	Modification to environmental license (Res. 807 of 3 August 2016)
2017	Modification to environmental license (Res. 1289 of 2017)
2018	<b>Finalisation of Yariguíes forest offset project (Centre-west and North)</b>
2019	Proposed modifications to environmental license and EIA
	Public hearing over proposed modifications to environmental license (December)
circa 2064	End of expected operational lifetime of Hidrosogamoso dam (50 years)

<b>Legend:</b>
Hidrosogamoso project
Forest offsets/Yariguíes park
Community participation/protest

Source: timeline created using data provided by interviewees and gathered from reports (FUNDASET-CONIF, 2016, Hurtado Hidalgo, 2014, ISAGEN, 2015a, ISAGEN, 2019, Moreno Valderama et al., 2017, Observatorio de Conflictos Ambientales, 2017, Roa Avendaño, 2019)

#### **5.4. Social and ecological impacts of Hidrosogamoso**

The Hidrosogamoso dam incurred social and environmental impacts, including reports of changes in the temperature and microclimate, effects on crops, noise and smells from rotting vegetation during construction, impacts on the ecosystem, deforestation, death of flora and fauna, loss of habitat and displacement of animals to nearby farms, impacts on livelihoods due to the loss of fishing and artisanal mining, loss of the river culture, human displacement (283 families, 1,199 people), social impacts of the influx of workers such as prostitution and drug and alcohol abuse, threats and deaths of community leaders, and impacts on family and neighbour relations (Duarte-Abadía et al., 2015, Perez-Adriana Zamora, 2019, Ríos Vivos Colombia, 2011, Roa Avendaño and Duarte Abadía, 2012, Rodríguez-De-Francisco et al., 2019).

These impacts have resulted in tensions and conflicts at the local level, with Hidrosogamoso appearing as a case study in databases of socio-ecological conflicts, including the Environmental Justice Atlas (Perez-Adriana Zamora, 2019) and the National University of Colombia's Environmental Conflict Observatory (Observatorio de Conflictos Ambientales, 2017). This is not surprising, conflicts over dams and water distribution represent one of the most common categories of socio-ecological conflict around the world (Temper et al., 2015). Large-scale hydroelectric projects are especially controversial for the extent of the ecological and social costs inflicted on local territories and people, and this controversy has been heightened by recent dam disasters around the world. For example, the Ituango dam in Antioquia (Hidroituango), Colombia, has been in crisis since 2018 when it flooded during construction, forcing tens of thousands of people to evacuate their homes, and later an incident caused the levels of the Cauca river to drop to one-fifth its normal level during three days. The project, which is located in one of Colombia's 'hot zones' plagued by violence, has been linked with serious human rights abuses and corruption, with numerous irregularities uncovered in its environmental license and resettlement approach (Coalition for Human Rights in Development, 2019).

Hidrosogamoso is included in the Clean Development Mechanism (CDM) of the United Nations Framework Convention on Climate Change (UNFCCC). The impacts arising from Hidrosogamoso were noted by the Climate Change Division of the Colombian Ministry of Environment in the CDM letter of approval to ISAGEN. The letter states that the dam 'produces severe degradation of renewable natural resources, of the environment or significant noticeable changes introduced to the landscape' and that complaints from

communities should be addressed and monitored (MinAmbiente, 2013, p. 7). Despite these impacts, the project was deemed to have met the criteria to be included in the CDM, and received approval from the Ministry. There have been criticisms of large scale hydropower projects being included under this mechanism, owing to the environmental and social impacts of such projects, and for failing to meet additionality criteria (Cames et al., 2016, Haya and Parekh, 2011, Koo, 2017). Campaigners disputed Hidrosogamoso's inclusion in the CDM, providing a list of arguments including the lack of consultation and the environmental and social impacts of the project (Ríos Vivos Santander, 2010). Nevertheless, it was approved, representing one of 14 hydroelectric projects<sup>23</sup> in Colombia under the scheme (UNFCCC, 2019).

### 5.5. Hidrosogamoso: environmental compensation requirements

The environmental license for the Hidrosogamoso dam was approved in the year 2000 (Resolution 476 of 2000). ISAGEN's Environmental Management Plan (EMP)<sup>24</sup> (*Plan de Manejo Ambiental*), approved as part of the environmental license, details the actions to prevent, minimise, control and compensate for the impacts of the hydroelectric project, covering physical (air, water, soil), biotic (fauna and flora) and social (human communities) aspects, with a total investment of 1.4 billion Colombian pesos (COP) (ISAGEN, 2015a) or approximately 700 million USD<sup>25</sup>.

Table 3: ISAGEN Hidrosogamoso - investment in social and environmental activities 2008 - 2014

ITEM	INVESTMENT (COP)
Acquisition of properties (land)	178.038.585.573
Substitute works	856.152.895.186
Complimentary environmental management	29.657.197.469
1% investment plan	19.519.261.984
Environmental Management Plan	320.873.290.174
Social management	163.142.100.345

<sup>23</sup> As of 25 November 2019 <https://cdm.unfccc.int/Projects/projsearch.html>

<sup>24</sup> A summary of the key components of the EMP is listed in UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC) 2015. Project design document form for CDM project activities: Sogamoso Hydroelectric Project (Version 07.0).

<sup>25</sup> This is based on the average COP/USD exchange rate for the year 2014, published on <https://data.oecd.org/conversion/exchange-rates.htm> (Accessed 24 June 2020). Due to the fluctuating exchange rate, the equivalent USD amount varies depending on the date calculated.

Biophysical management	157.731.189.829
<b>TOTAL INVESTMENT</b>	<b>1.404.241.230.386</b>

Created using data from ISAGEN (2015a, p. 7)

ISAGEN was subject to environmental compensation requirements under the ‘1% investment’ and ‘forest use’ laws. The obligatory 1% investment law applies to projects subject to environmental license that use water directly from natural sources. Under this law, ISAGEN was required to direct no less than 1% of the total investment cost of the project towards the recuperation, conservation, preservation and monitoring of the affected watershed (Law 99, art. 43, Decree 1900 of 12 June 2006). The 1% investment was directed towards the following activities:

- Preparation of the ‘Plan for the Zoning and Management of the Hydrographic Basin’ (POMCA) for the tributary basin of the Sogamoso River.
- Ecological restoration of 309.4 ha in Lebrija, Girón, San Vicente de Chucurí, Zapatoca, and Betulia.
- Construction of 493 sanitation facilities in Zapatoca, Betulia, Los Santos and San Vicente de Chucurí.
- Provide support for the restoration, conservation and protection of national park PNN Serranía de los Yariguíes through the purchase of 40 properties in: El Carmen de Chucurí (Delicias Alto, Honduras Bajo, Palo Blanco, Honduras Alto); San Vicente de Chucurí (Chanchon, Zona Urbana, Merida) and Simacota (Cobardes / Yariguíes).

The use of private financing to develop the POMCAs has been criticised for prioritising private interests in the plans for the hydrographic zone, with little oversight or transparency (Corporación Compromiso, 2020). Under the forest use system (*el régimen de aprovechamiento forestal*), the company was required to carry out reforestation to compensate for the impacts on the forest. The forest use permit was authorised as part of the environmental license and modified following a revised EIA (Resolution 1497 of 31 July 2009, Resolution 2329 of 2009). The permit was granted to harvest 310,251.07 m<sup>3</sup> of wood, corresponding to 361,646,751.86 kg of total biomass, in an area of 5,708 ha, corresponding to the area of land flooded to create the reservoir, comprised of natural forest, high shrub, low shrub and wooded pasture (Table 4). The company was required to reforest with native species, to isolate the plantations with protective fencing and to carry

out maintenance during the construction of the project and three years afterwards, guaranteeing a survival rate of no less than 90% (MAVDT, 2009c). The size of the area to be reforested (the offset) is calculated based on the type of ecosystem that is impacted, at a ratio of 1:1 for low shrub and wooded pasture or 1:2 for high shrub and natural forest. To compensate for the loss of forest caused by the reservoir, in addition to smaller areas impacted by substitute roads and other works, the company was required to reforest a total area of 8,046.16 ha. The sites designated to carry out the forest offsets were in areas of degraded forest in a buffer zone surrounding the reservoir (3,033 ha), in the PNN Serranía de los Yariguíes (4,913 ha) and in resettlement areas (138 ha), see Table 5.

The objectives of creating an ecological buffer zone of 100 meters in width surrounding the Topocoro reservoir were to compensate for part of the loss of vegetation and terrestrial habitat for flora and fauna, contribute to the control and management of unstable areas and the conservation of soils, establish a natural protective barrier with the aim of isolating and delimiting the project area, the property, its use and prevent free access to the body of water, and to protect archaeological sites (petroglyphs) (INGETEC, 2008, p. 7-85). The project involved the purchase of private land, which is now owned by ISAGEN, carrying out reforestation, erecting fencing and a 'live fence' using trees, as well as maintenance, control and vigilance, involving the local community members as forest rangers. The project was carried out between 2011 and 2015, by private contractors hired by ISAGEN. However, by isolating and preventing access to the reservoir, this also prevented communities and local businesses from making use of the reservoir for recreation and tourism. Since one of the promised benefits of the arrival of the dam was the opportunity to boost the local economy through tourism, there have been lengthy discussions over the planning and management of the reservoir. This conflict over access to the reservoir will be discussed in chapter eight, but for now it is important to note that in 2019, ISAGEN applied to make a revision to the environmental license, reducing the ecological buffer zone where the forest offsets were implemented by 2 ha in order to facilitate access to the reservoir. As a result, the company is subject to biodiversity offset regulations under the 2018 compensation manual for this new modification to the license.

Table 4: Compensation for forest use, Hidrosogamoso, Res. 1497 of 2009 (Art. 3)

Type of coverage	Total area affected (ha)	Compensation	Total area to compensate (ha)
Natural forest	397	1 to 2	794
High shrub	1,800	1 to 2	3,600
Low shrub	1,154	1 to 1	1,154
Wooded pasture	2,357	1 to 1	2,357
<b>Total</b>	<b>5,708</b>		<b>7,905</b>

Source: MAVDT (2009c)

Table 5: Hidrosogamoso forest offset requirements (aprovechamiento forestal)

Legal resolution	Site of forest use	Area to compensate (ha)
1497 of 2009	Reservoir	7,905
0970 of 2011	Substitute road Bucaramanga – Barrancabermeja	107.14
	Gomez Ortiz bridge	4.5
	Miramar warehouse	14
Minor compensations property of ISAGEN	Minor permissions	15.52
<b>TOTAL TO COMPENSATE</b>		<b>8,046.16</b>

Source: Created using data from ISAGEN (2018)

Table 6: Hidrosogamoso forest offset sites and area to be compensated

Compensation site	Areas compensated (ha)
Buffer zone areas	3,033
Yariguíes Park	4,913
Resettlement areas	138
<b>TOTAL TO COMPENSATE</b>	<b>8,100</b>

Source: Created using data from ISAGEN (2018)



## **5.6. Conclusion**

The Hidrosogamoso dam and forest offset case study unfolds in a region endowed with abundant water and biodiversity but afflicted by a history of social conflict. Conflicts over land mark Santander's history, from the struggles of the Yariguíes indigenous group from the 16<sup>th</sup> to early 20<sup>th</sup> centuries to more recent periods of armed conflict and forced displacement. The Hidrosogamoso project itself extends over a century. Starting from an initial idea in the 1940s, it received its environmental license in 2000, started operating in 2014 and is expected to continue producing energy until the 2060s. Over this time, much has changed in environmental policy. This project therefore represents an interesting reference, illustrating the evolution of environmental offset requirements over time. A megaproject with substantial social and ecological impacts, ISAGEN was required to compensate for the impacts on people, forest, water, and nowadays, biodiversity. The next results chapter will explore the diverse meanings of biodiversity held by stakeholders, before examining in greater detail in chapters seven and eight the forest offsets in PNN Serranía de los Yariguíes carried out by ISAGEN, in collaboration with Parques Nacionales and Patrimonio Natural.

## **6. Definitions, meanings and measures of biodiversity**

### **6.1. Introduction**

In order to set the context for the remaining empirical chapters which focus on environmental offsetting, this chapter addresses the first research question: *How is 'biodiversity' understood by different stakeholders involved in biodiversity conservation in Colombia?* It starts with an introduction to the emergence and popularisation of the term 'biodiversity' and attempts to define it. Next, some of the key themes emerging out of 40 participant responses and subjective descriptions of biodiversity are discussed: awareness of biodiversity and associated concepts; biodiversity and humans; and biodiversity as 'what we have' and 'what we have lost'. The final two sections discuss the indicators currently used to measure biodiversity in biodiversity offsetting policy in Colombia and highlights a mismatch between people's subjective perceptions and values of biodiversity and how it is measured in offset policy.

### **6.2. The origins and definitions of 'biodiversity'**

The 1980s saw a rise in the use of the term 'biological diversity' as it is currently understood, and the shortened form 'biodiversity' is said to have been coined by Walter G. Rosen at the National Forum on BioDiversity in the US in 1986 (Harper and Hawksworth, 1994). E. O. Wilson was allegedly not in favour of the term at first as he thought it 'too glitzy' but it was perhaps exactly this quality that allowed it to catch on and become a widely popular concept globally (Takacs, 1996). The Forum, along with its buzzword 'biodiversity', had a distinct political aim to promote conservation and address species loss (Takacs, 1996). Nowadays, biodiversity loss is widely recognised as one of the greatest challenges facing society (IPBES, 2019).

Arriving at a definition of biodiversity is a difficult task due to its multi-dimensional character, with each dimension incommensurable and variable at every level, meaning it cannot be reduced to a single statistic (Sarkar, 2002, Wood, 1997). Different proposals have arisen over the years to define biodiversity (e.g. McNeely et al., 1990, Sarkar, 2002, Wilson, 1992, Wood, 1997). Is it diversity at species, genetic or ecosystem level, or all of them? Is it the richness, abundance, or variety of living entities that makes biodiversity biodiversity? Is it ecosystem composition, structure and function? What about the spatial and temporal aspects, ecosystem services and cultural diversity? Ultimately, it is the

definition given by the United Nations Convention on Biological Diversity (CBD) that has become the most widely cited, defining biological diversity as ‘the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems.’ (United Nations, 1992, Art. 2).

While some see the vagueness of the concept of biodiversity (and the CBD definition) as problematic for practical conservation efforts (Meinard et al., 2019, Morar et al., 2015), others see its ‘ill-definedness’ as a strength, offering the opportunity to give the concept personal meaning (Dreyfus et al., 1999). The broad nature of the term may be one of the reasons for its success, encompassing many aspects of biodiversity - not only attractive megafauna but also the less tangible but vital aspects such as ecosystem structure and function. In this way, it can satisfy the aims of ecologists while also promoting the aesthetic and more ‘marketable’ values of biodiversity. The reduction and simplification of complex ecological processes in order to have public appeal and attain funding has led biodiversity to be seen by some as an unscientific, even mythological concept (Ghilarov, 1996). While in contrast, it is sometimes considered too complex, scientific and technocratic for the general public to comprehend. The complexity of biodiversity may be one of the reasons biodiversity loss has received significantly less media coverage compared with climate change. This has been attributed to perceptions of climate change as a more global issue, with universal and specific goals (e.g. to limit global warming to 1.5 or 2°C), as well as the longer trajectory of the Intergovernmental Panel on Climate Change (IPCC) compared to its younger sibling the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (Legagneux et al., 2018).

Others see the discourses and strategies of mainstream biodiversity conservation, focusing on ecosystem services and the value of genetic resources, as upholding the reductionist approach of modernity, reducing nature to a commodity (Escobar, 2008, Martínez-Alier, 1996). The concept of biodiversity and the network of organisations that have built up around it has been linked to a sense of crisis, constructing a narrative around the threat to the environment as well as how it should be addressed and by whom (Brosius, 1999, Escobar, 1998, Martin et al., 2013). Biodiversity, like ‘nature’, has mythic, textual, technical, political, organic, and economic dimensions which ‘collapse into each other in a knot of extraordinary density’ (Haraway 1994, p. 63, cited in Castree and Braun, 1998). Identifying, acknowledging and respecting the diverse social constructs of nature and biodiversity is important for environmental management and decision making (Buijs et al.,

2008, Hull et al., 2001, Varumo et al., 2020). In order to conserve biodiversity, it is necessary to see and comprehend the biophysical and cultural context in which it is located (Escobar, 2008). Therefore, one of the aims of this research was to uncover the personal meanings attributed to the term biodiversity (*biodiversidad*) among local stakeholders in Santander, as well as among policy makers and conservation and industry professionals at the national and international level.

Previous studies have investigated perceptions of biodiversity among the general public in Europe, the US and Canada (Buijs et al., 2008, Fischer and Young, 2007, Hunter and Joan, 2003, Lindemann-Matthies and Bose, 2008); secondary school students in Argentina (Bermudez and Lindemann-Matthies, 2020); and among conservation scientists in the US and Costa Rica (Takacs, 1996). Cerda and Bidegain (2018) investigate conceptions of biodiversity among local stakeholders in a biodiversity hotspot in Chile. In the Colombian Pacific region, Escobar identified three sets of actors, each with their own conceptions of biodiversity: black and indigenous groups, capitalist entrepreneurs and biodiversity experts (Escobar, 2008). Pérez-Mesa (2019) explored conceptions of biodiversity among biology students from the Witoto-Muruy ethnic group in the Colombian Amazonas. The results presented in this chapter aim to build on this work, providing empirical evidence of the conceptions of biodiversity held by both professionals involved in conservation and by campesino communities, a group often seen to be in conflict with conservation goals.

### **6.3. Stakeholders' subjective definitions of biodiversity**

In the semi-structured interviews, research participants were asked if they had heard of the term 'biodiversity' and to explain their personal definition of biodiversity or what biodiversity means to them<sup>26</sup>. There was a total of 40 responses, divided across the stakeholder groups as follows: 14 community (small farmers and fishers), 3 academia, 5 government, 7 private sector, 11 NGO. Only one person had not heard of the term, while five said that they had heard of it but were not exactly sure what it means; all of them small farmers from rural Santander among the 'community' group. These five were invited to expand on what they thought biodiversity means and all the resulting subjective descriptions of biodiversity were analysed. From the responses emerge various

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<sup>26</sup> Details of the participants and interviews are included in methodology chapter and in Appendix B. The question was asked in the majority of interviews; there are no responses from 12 out of 52 interviewees due to either the question not being asked because of time constraints, or the question asked but the participant not answering directly or changing the subject.

associations and themes, which are discussed in this section. The question tended to evoke laughter or nervousness as participants were put on the spot and felt they were supposed to know the 'right' answer, reflecting an insecurity around technical language (Fischer and Young, 2007). Therefore, after the first couple of interviews during which the question was posed at the beginning, the format was changed to ask the question at the end of the interview when participants were more relaxed. The discussions during the interviews and the context within which the interviews were taking place may therefore have shaped the responses to some extent. The order of questions has effects in interviews, but it also has an impact on rapport; a common strategy to build rapport is to start with easy and non-threatening questions first (Leech, 2002). The participants were assured that there was no right answer but that we were interested in what biodiversity means to them personally, what comes to their mind when they hear the word.

Figure 14: Word cloud of participants' definitions of biodiversity



### 6.3.1. Awareness of biodiversity and associated concepts

As shown in Figure 14, the top ten words most frequently mentioned by participants in their subjective descriptions of biodiversity are, in descending order: species, life, water, diverse/diversity, human(s)/people, ecosystem, animal(s), biology/biological/biologist, fish,

beings. Biodiversity is described variously as the diversity of life, the variety of life, the set of living beings or components in a system. Participants also talk about biodiversity at different levels or scales, specifically: the planet, landscape, ecosystem, populations, communities, species, genes and micro-organisms. As one farmer points out, we can conceive of biodiversity as the living things that exist at a large-scale or small-scale:

Biodiversity can have, well, a large-scale meaning or a small-scale meaning. Basically, biodiversity includes the entire set of living things that exists on the planet, right? But you can also talk about biodiversity in a certain sector. So, the living beings that exist in certain surroundings. So, it's basically how you interpret it, but more than anything it is the set of living beings that inhabit the planet. (Martin, Restoration project staff / Farmer)

In terms of species, participants mostly talk about species of fauna and flora, including humans, while others also include in their definitions the physical environment and inert life forms, such as soil. One interviewee, a community leader, extends his description to include wind, water, the sun and clouds, describing biodiversity as 'balance' and 'energy':

An ecosystem in which you have balance, where life interacts, be it human, natural life, plant life, even physical life, the winds, the waters, the suns and the clouds - all that. Because it is a balance, it is energy. (Antonio, Community leader)

One other interviewee, a biologist, mentions balance or equilibrium between species as one aspect of his understanding of biodiversity, also associating the word with resilience and complexity. The concept of balance in nature has largely been abandoned by ecologists in recognition of the dynamic nature of ecosystems (Root, 2019, Zimmerer, 1994). Despite this, metaphors such as balance, equilibrium and harmony in nature and between humans and nature remain strongly embedded in cultures around the world (Root, 2019) and balance is a commonly found association with biodiversity (Buijs et al., 2008, Hull et al., 2001, Levé et al., 2019). While the idea of balance in ecosystems has been critiqued, the concept of 'balance' between economic development and biodiversity protection is readily adopted by institutions and experts in relation to biodiversity offsets, as discussed later in this chapter.

Eight participants, across all four stakeholder groups, talk about the 'interaction' or 'relationship' between the different elements in an (eco)system:

Biodiversity, as such, I believe that in, let's say, technical terms, it is the set of living organisms that make up an environment... but that together also have processes and functions and relationships that generate agreements and that generate transfers of energy and matter that are important. In other words, not only thinking about

biodiversity as individual organisms, but it is more than that, the sum of their relationships, their exchanges and all the processes that generate interactions between some and other organisms. (Victoria, Specialist, INGO)

I think it is everything that has to do with the environment, with the relationship with all the plants, everything, I think is something like that, something similar, I do not have a very good understanding ... (Pablo, Restoration project staff / Farmer)

Qualities such as 'diversity', 'variety', 'multiplicity', 'representativeness' or 'richness' of species are quoted by some as the important aspect. Many of these attributes are found in social representations of biodiversity among studies of European groups (Buijs et al., 2008). It is primarily the 'experts', i.e. those from academia, government and environmental NGOs, who mention these particular qualities, among others such as 'complexity', 'dynamic', 'connectivity', 'resilience', 'stability' of ecosystems. The 'non-experts', while generally using less technical terms, also refer to linked concepts such as the quantity of trees, birds etc., as found in other studies (e.g. Bermudez and Lindemann-Matthies, 2020). Unique to this study, compared with similar studies elsewhere is the recurring association of biodiversity with water: '*sin agua no hay vida*' ('without water there is no life'): 'We live without many things, but not without water. If there is no water, we disappear... The day there is no water, that's where it ends.' (David, Restoration project staff / Farmer). Despite Santander containing a complex river system, páramos and high rainfall, water shortages and contaminated water remain a problem in many municipalities, and communities are resisting against increasing threats posed by mining, fracking and infrastructure in the area (Puente Bruges, 2020). Water is positioned as the source of life, an axis-mundi, and a symbol of resistance for socio-territorial movements in Latin America that resist the control and appropriation of water (Ulloa and Romero-Toledo, 2018).

Five of the participants who work in various institutions internationally and within Colombia, covering INGOs, government and the private sector, refer to the official definition of their institution or that of the CBD, Instituto Humboldt or Colombian government. Two of them offer their opinion on these definitions, commenting that the language is too formal and that the concept is excessively broad, while the other three simply say they go with the relevant institutional definition:

Yeah, to be honest it's very much aligned with what the [institution's] definition says, of course the definition has this language, you know, formal language, variety of life forms. I don't use this term but yeah, it's definitely yeah, the animals, the plants, the microorganisms. I think about endangered species, endemic species, alien species. These are the things that I think about when I think about biodiversity. So, it's not, I

couldn't say the definition as it's written but it definitely touches the topics that I think about. (Harry, Sustainability specialist, International trade association)

I don't have a strong opinion either way, to be honest with you. You know, I go with whatever institutionally makes the most sense. (Alan, Programme manager, INGO)

Two of the interviewees, one from a Colombian NGO, the other from the national government, consider biodiversity as a concept that is too complex for everyday usage, that the general public does not understand or that everyone understands it differently (e.g., as something either external and far away or close by and interconnected), which they see as a challenge when working in the conservation sector:

When you speak with a common citizen, with the common Colombian... they don't have a very clear definition and do not know what you are talking about... And that concept of biodiversity, first as a concept that is too complex and very elaborate and, also, they understand it as something external, something that they are conserving over there in the mountains. (Gabriel, Coordinator, Environmental foundation)

We have a major drawback, although it can also be seen as an opportunity, and it is that we are a multi-ethnic and multicultural country, we have so much cultural diversity and everyone understands biodiversity differently. Some understand it as something that is far away, others understand it as something that is close, as something that they use, as something that they take advantage of, as something that is part of their life. (Henry, Consultant, MADS)

While the former quote suggests a view of the general public as a homogenous group with a lack of knowledge (Fischer et al., 2014), the latter recognises the diversity of knowledges and cultural understandings in Colombia. Studies have indicated that public recognition and understanding of biodiversity is nowadays quite high, with over 70% of citizens claiming to be familiar with the term 'biodiversity', according to studies in both Europe and in ten non-European countries (European Environment Agency, 2019, SINUS Institute, 2019). Colombia, included in the study of non-European countries, scored the highest on the overall indicator for biodiversity awareness (SINUS Institute, 2019). This is likely attributed to its status as the second most biodiverse country in the world and the many environmental programmes within the country. The documentary *Colombia: Magia Salvaje* (Colombia: Wild Magic) is a film that celebrates Colombia's biodiversity and communicates the importance of conserving it. It became a box-office hit and the most-seen Colombian film in the history of the country when it was released in 2015, illustrating the appeal among the public. The film epitomises the aesthetic value of biodiversity, showcasing the wildlife and landscapes of twenty different ecosystems, as seen in Figure 15. However, it also



promotes a particular vision of 'wilderness' without people, where the images of destructive urban society contrast with the idyllic shots of nature, empty of human life.

Figure 15: Image from documentary 'Colombia: Magia Salvaje'



Source: <http://www.magiasalvaje.org>

While there is high general public awareness and familiarity with the term biodiversity, people understand the concept differently. The community members interviewed in this research include campesinos and fishers who live in rural areas, some of whom had been involved in the restoration projects examined in this research or in other environmental education programmes in the local area. Therefore, the relatively high awareness of the concept of biodiversity and conservation generally could be attributed to their involvement in these programmes and/or their occupations and lifestyles in which they are close to nature. The Santander-based interviewees, both local conservation professionals and community members, in general had much more elaborate and expansive definitions of biodiversity, compared to those seen as experts at the national and international level. These latter participants likely felt tied to the official definitions of their institutions and therefore were reluctant to offer their own take on it, although some did. One NGO project manager, when asked to define biodiversity, responded, 'personally, technically or socially?'. This highlights the subjective and dynamic nature of the term, which can be moulded to suit the context. As argued above by two interviewees, the complexity and broadness of the concept of biodiversity can represent a barrier to conservation. However, members of the public have been found to express rich views and concepts on biodiversity that are linked to their attitudes on environmental management, irrespective of their level of scientific knowledge (Fischer and Young, 2007). The divergence between scientific and

policy language and public understanding is not necessarily a bad thing, since the interests of both may align in terms of overall priorities and objectives (Varumo et al., 2020).

### 6.3.2. Biodiversity and humans

Fourteen of the forty responses include an explicit mention of humans in their definitions of biodiversity. The way this is phrased varies, in nine cases biodiversity was defined as including humans, and in five as humans relying on or living together with biodiversity. Aside from these explicit mentions, in other responses there are less explicit recognitions of humans being part of biodiversity. One example is in the response, 'el conjunto de seres vivos que *habitamos* el planeta' ('the combination of living beings that inhabit the planet'), where inhabit is used in the first-person plural, 'we inhabit'. There is no single stakeholder group that stands out in these responses; the place of humans in relation to biodiversity appears in conversations with people across the different groups – from local people to local and national NGO professionals and environmental authorities. Colombia is recognised as a country with rich cultural diversity, as described in the quotes below:

Associated with that variety of ecosystems and communities, well, there are a variety of people who make use of that biodiversity and who coexist and who have a culture that is a response to that biodiversity. In other words, I do not see biodiversity only as a, let's say, static structural matter of genes, species and communities, but as a dynamic matter that has a direct relationship with the people in the places where it is. (Veronica, Project manager, NGO)

Well, for me in particular, biodiversity is everything, that is, even us. Biodiversity also has a very high cultural and sociological component, right? So, I am within that conception, it encompasses absolutely everything. As I say, cultural issues, social issues, not only how many people would understand it, that is, "the animals that are there in the Amazon, that is the only biodiversity that must be protected". There is also a cultural background behind us and the communities, the indigenous and black [communities] and ourselves, as citizens. (Gabriel, Coordinator, Environmental foundation)

The idea that people's culture is a response to the biodiversity around them reflects a recognition of the role nature plays in constructing society (Watts and Peet, 2002b). The interconnections between biological and cultural diversity have been explored, with many biodiversity hotspots also important areas for cultural diversity, thanks to the mutually supportive roles they play, with ethnic groups maintaining biodiversity and vice versa (Pretty et al., 2009). The degree to which human communities see themselves as either interdependent components of nature or separate from it and perhaps dominant of it, has

been seen along a spectrum, associated with pre- or non-industrialised communities such as indigenous groups at the interdependent end and industrialised modernist communities at the other (Pretty et al., 2009). This vision of the 'ecological native', the indigenous as protector of biodiversity, has been an important aspect in the construction of a new indigenous identity and creating links between environmental organisations and indigenous movements, even co-opted by these movements as a strategy to further their cause in the defence of territorial rights and autonomy (Andrade, 2009, Ulloa, 2003). However, in these contexts, the meanings and conceptions of the environment and its management are the topic of constant contestation (Ulloa and De La Cadena, 2007).

Conservationists and activists often face a dilemma and an internal conflict when they are required to rationalise environmental practices to ensure their conservation, moving away from traditional practices; 'a coloniality of nature in modernity' (Escobar, 2008, p. 9). When it comes to campesinos, this group has a less favourable environmental image, associated with deforestation and the expansion of the agricultural frontier, as threats to both biodiversity and cultural diversity, especially when encroaching on indigenous territory. Campesinos are caught in the middle of the nature-culture spectrum, seen neither as modern and industrialised nor living harmoniously with nature. However, there are efforts to change this perception and recognise the rich local ecological knowledge of campesinos, respect their territorial rights and ensure their active involvement in conservation efforts that aim for integrated biological, agricultural and cultural diversity (Betancourt Santiago et al., 2017, La Vía Campesina, 2010). Proposals include the creation of community conserved areas and even to create new identities, such as '*parquesinos*' (campesinos living in national parks) (Gobierno de Colombia et al., 2018).

That a third of responses explicitly cited humans is an interesting contrast with early definitions of biodiversity found in international conservation circles. For his book *The Idea of Biodiversity: Philosophies of Paradise*, David Takacs (1996) interviewed conservation biologists based in the United States and Costa Rica and includes in the book 23 of their definitions of biodiversity. In these definitions, culture does not get a mention and only one includes an explicit mention of humans; that provided by Paul Ehrlich: 'The variety of genetically distinct populations and species of plants, animals, and micro-organisms with which *Homo sapiens* shares earth, and the variety of ecosystems of which they are functioning parts.' (Ehrlich, 1992, cited in Takacs, 1996, p. 47). In his concluding chapter, Takacs reflects that '[s]ome conservation biologists become part of biodiversity, not despite the scientific process in which they're engaged, but because of it. They identify

with – they become part of – the organisms, species, landscapes, and processes they have labelled *biodiversity*' (Takacs, 1996, p. 332). Writing in 1996, Takacs comments on the shift in conservation thinking and strategy taking place at that time, brought about by the linking of cultural and biological diversity in the Global Biodiversity Strategy. Judging by the Colombian interviews, many are well aware of the important interdependencies between cultural and biological diversity, such as the NGO project manager quoted below, who has realised through experience the need to move beyond a purely biological definition of biodiversity:

Obviously, in the national biodiversity policy there is a definition that is the one that everyone copies and pastes in all projects. But, for all the years that I have been working with the [NGO], the concept of biodiversity goes beyond that biological and so static definition. Yes, it is much more associated with what we do, the conception that it is not possible to conserve biodiversity if we do not work hand in hand with communities, if we do not do social work, if we do not involve people in some way in what we do. Well, they give us a different dimension... everything always has a human component. (Veronica, Project manager, NGO)

Looking at nature rather than biodiversity, Buijs et al. (2008) identify among their European participants two distinct notions; of humans as part of nature or distinct from it. There is international recognition of the links between biodiversity and cultural diversity, or biocultural diversity, defined as 'the total sum of the world's differences, no matter what their origin. It includes biological diversity at all its levels, cultural diversity in all its manifestations (including linguistic diversity), ranging from individual ideas to entire cultures; and, importantly, the interactions among all these' (Loh and Harmon, 2005, cited in UNESCO, 2008). However, these initiatives tend to focus on biological diversity primarily, perceiving cultural diversity as a secondary objective (Pretty et al., 2009).

### 6.3.3. *Biodiversity is 'what we have' and 'what we have lost'*

Many of the participants associate biodiversity with 'the environment' in general, and specifically with their local environment in the case of many of the interviewees from Santander. When asked about their definition of biodiversity, some go on to discuss specific environmental attributes of their locality – clean air, rivers, water, the forests, animals, and so on. The interviewees living close to the Yariguíes national park express an appreciation for the biodiversity and abundance of natural resources in their area, conscious that what they have is unique compared to many other parts of the country or world, in the words of one farmer, a 'paradise':

In this area it rains a lot, it is a paradise, it is a paradise. Starting with the oxygen we have, the water, the nature, the food... We must not pollute, then not deforest and take care of the water. Those are the three fundamentals, I say, as a farmer from here from San Vicente de Chucurí. We have to keep it in mind, for the whole world. (Pedro, Farmer)

Biodiversity is associated with words like 'jungle', 'forest', 'mountain', 'green', and one woman specifically equates nature reserves with biodiversity. These community members tend to associate biodiversity with 'care' for the environment. They express both the value given to them by biodiversity and the importance of appreciating, defending and caring for biodiversity, especially conserving trees and water:

Well, for me, biodiversity, as I have understood it, is having so many forests, so many trees, taking care of them, and from there they feed another part of biodiversity which are the animals, the little birds, any number of birds around here and other animals. Water is the most important thing, taking care of that, and also having the knowledge that in these areas, trees grow fast and stay very green, very good compared to other parts of the world. There is quite a value in that. (Bruno, Restoration project staff / Farmer)

It is an added value that the farm has in practically every way because it is a way of us valuing it, taking care of it. You can also take advantage of it to a certain extent, but it is spectacular to see all the biodiversity there is. (Ana, Farmer)

I understand it, for me, for example, the wealth, I mean, the riches that are very, very, how do I say, very important to us, human beings, right? Because we without forest are nothing, we without water are nothing. I mean, without any of that, we are nothing. So, well, for me, this means a lot and that's why I defend it. That's why I defend it, because nature, that is, everything that's called life in one way or another, well, of course, that's very, very important. (Angela, Farmer)

A similar moral obligation towards protecting local biodiversity was also found by Cerda and Bidegain (2018) among farmers and employees of enterprises in a biodiversity hotspot in Chile, groups often assumed to be in conflict with biodiversity conservation objectives.

The below quote from a community leader highlights the risk of taking biodiversity for granted, losing the 'capacity for wonder' and becoming enslaved by needs:

The problem is that we have lost the capacity for wonder. I mean, from so much seeing, we don't see anything... you do not notice the biodiversity because you do not see it, you do not enjoy it...the problem is that sometimes the human being, the more he has, the more necessity he creates, so the more enslaved he becomes. (Antonio, Community leader)

On the other hand, those living near the hydroelectric dam, when asked about their conception of biodiversity, immediately discuss the loss of biodiversity and negative changes to the environment over time. One community member defines biodiversity as 'what we used to have'; something that was lost with the arrival of the hydroelectric dam and is not replaced with compensation efforts:

For me, biodiversity is what we used to have. I call it what we used to have. Because biodiversity is when a river is free, when a river is clean, when a river runs and brings its food to the people. For me, the little birds, the trees, for me, all of that is biodiversity. The different animals, the different number of trees, the different streams, rivers, for me that is biodiversity. And for me, Hidrosogamoso totally destroyed it. Even if they say, "Madam, I take 10 trees and I plant 100 ...", they are growing and planting trees that do not work. For example, even the fishermen say, "The bocachico fish that ISAGEN is currently restocking is not the same fish as before. This fish is a small fish that does not grow, does not move from there". (Anya, Activist)

Another woman from the fishing community talks nostalgically of the native trees, lists off a range of fish species that they had in the past and attributes the loss of biodiversity to development projects like Hidrosogamoso and the Ruta del Cacao highway, part of Colombia's 4G infrastructure programme:

Here we used to have catfish, bocachico, hocicón, picuda, dorada, toad fish, barbudo, nicuros, chocas, corocoros, baralcaldes, shrimp, pinchos, crabs, blanquillo, doncella, arencas, golosas, manamana, lampreys ... and other things that I can't think of... There were 63 kinds of species. [...] That tree coverage that we had, so beautiful, that air, all that coolness that we had, it's gone. Because the native trees were the ones that brought us our shade ... the coolness, all that is gone. And now, on top of that, the Ruta del Cacao [highway] finishes us off. You might have seen it when you came here, all that felling of trees? Now, even the snakes are arriving to the houses, all those little animals that were taken out of there, they arrive. I mean, it has been terrible for us, we have lost everything, we have lost everything. (Monica, Fisher / Activist)<sup>27</sup>

A local man involved in ISAGEN's offset project in the buffer zone surrounding the Topocoro reservoir describes biodiversity as complementary elements or systems that live in harmony. He sees climate change as a consequence of a lack of harmony, the alteration of biodiversity, and the offset project as an effort to undo the damage and contribute to a better world:

Well, for me, biodiversity is a group of systems that are complementary to each other. For example, the human being, the fauna and the flora, the soil, the water, that is, to

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<sup>27</sup> The scientific names of many of the fish mentioned here can be found in CASTELLANOS-MORALES, C. A., MARINO-ZAMUDIO, L. L., GUERRERO-V., L. & MALDONADO-OCAMPO, J. A. 2011. Peces del Departamento de Santander, Colombia. *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales*, 35, 189-212.

live in harmony, all those elements ... Because, how are we living, that is, if we realise how climate change has affected us because we have altered that biodiversity. But, with what we are doing, we are helping to improve this. So, then, we hope that, after about 20, 30, 40 or 50 years, we will take up all this again, that this contributes to the betterment of the world. (Juan, Project manager, Environmental consultancy)

Meanwhile, one participant from the community group who was unsure of the meaning of biodiversity, associated the word with 'imbalance' and changes to the environment over time, alluding to climate change:

The changes. In other words, that generates changes. Also, imbalance, it means to me. Because suddenly one says, "We are in November, why is it raining now in November when it should be summer?" So, it changes. That's why it's global, it's all over the world. The same can happen in your country. The planet belongs to everyone, not just to one. (Pedro, Farmer).

Having examined the diverse conceptions that the research participants associate with biodiversity, the next section will analyse how biodiversity is conceived of and measured in biodiversity offsetting policy.

#### **6.4. Measuring biodiversity in biodiversity offsetting**

Figure 16: Cover image for Colombia's Compensation manual for the biotic component



Source: MADS (2018a)

The diversity of conceptions and definitions of biodiversity make measuring it a difficult task. This presents a central challenge for biodiversity offsetting - how to accurately measure and compare biodiversity losses and gains to ensure impacts are sufficiently compensated for. When designing methods to measure biodiversity, it is a challenge to find a happy medium between the use of complex metrics that can more accurately measure biodiversity, and the need for a level of simplicity for ease of exchange. Approaches to calculating the metrics in biodiversity offsetting will not be discussed in detail here, but are widely examined elsewhere (Bull et al., 2014, Gibbons et al., 2016, Goncalves et al., 2015). In general, there has been a move away from simple metrics such as ecosystem area (e.g., hectares of forest or wetland) towards a landscape or habitat level approach (Kennedy et al., 2016), a focus on ecosystem services (Sonter et al., 2020a, Tallis et al., 2015) and regional or national biodiversity targets (Simmonds et al., 2019).

To evaluate success in the forest offset project in PNN Serranía de los Yariguíes, the following indicators were used in the north sector project: percentage of plant survival, growth (height of plant and diameter of base); proportion of unwanted exotic species (percentage and frequency of exotic coverage); recruitment of native species (abundance, richness, presence of species that are indicator, rare or have high conservation value, composition of species or typologies); structure of vegetation (number of layers, average height of layers, coverage of layers) (UT Jaguar Corredor Norandino, 2018a).

The latest Colombian offset manual contains details on three aspects (MADS, 2018a, p. 20-31):

1. *What to offset*: based on structure, function and composition of an ecosystem;
2. *How much to offset*: based on an offset factor calculated based on the representativity of the ecosystem in the National Protected Areas System (SINAP), its rarity, remanence and rate of annual transformation; and
3. *Where to offset*: in ecologically equivalent areas located ideally in the hydrographic subzone of the project, with connectivity areas where the offset is smaller than the impacted area, they should ideally link with regional or national compensation/restoration/conservation priorities and plans, adjacent to other offset sites identified in the Unique Register of Ecosystems and Environmental Areas, REAA.



In the Colombian context, ecosystems are the 'currency' used to calculate losses and establish compensation obligations, acknowledging the highly complex, dynamic and heterogeneous nature of ecosystems. Two management indicators and fourteen impact indicators are proposed that evaluate the losses or gains of biodiversity according to the criteria of: composition, structure/landscape context and function. The information produced by these indicators facilitates the visualisation of trends of biodiversity gains and losses, as an approximation towards no net loss, but they are not intended to demonstrate a balance between profit and loss, nor to define compliance with a license obligation (Instituto Humboldt and The Nature Conservancy, 2019).

In terms of the social dimension, the manual states that it aims to generate a balance between the environmental priorities and the well-being of human communities:

[The manual] incentivises proper land use in accordance with its ability in compliance with the social and ecological function of the property, closing the gaps between the countryside and the city and creating conditions of well-being and living well for the rural population through the protection of areas of special environmental interest and the generation of balanced alternatives between the environment and the well-being for the population that adjoins or occupies them, under the principles of community participation and sustainable development. (MADS, 2018a, p. 9)

One of the elements to be included in the offset plan is the 'Evaluation of the potential biotic, physical, economic and social risks of the implementation of the compensation plan and a proposal to minimize them.' (MADS, 2018a, p. 33). However, when it comes to the actual calculations of what, how much and where to offset, this is measured using strictly ecological indicators based on the ecosystem. While social impacts should be taken into account, they are not included in the core calculation of biodiversity losses and gains. This presents a dilemma between conceptions of biodiversity that include humans and their cultures, and an offsetting policy that addresses ecological impacts only, as one interviewee points out:

[Biodiversity is] perhaps an excessively broad concept that gives a name to everything that is alive, but everything that is alive not only the living, physical, but also material and non-material culture and all of this is part of biodiversity. That is a good part of our conflict because the [biodiversity offsetting] manual in particular addresses the part of that biodiversity that is due to loss of biodiversity and has to do with the biodiversity of fauna and flora associated with the impact of the projects. All those issues of culture, society, food sovereignty that go as marginal, are attended to by other types of compensation not exclusively by the other one. (Carlos, Researcher)

## 6.5. Conclusion

Biodiversity, as with other concepts - sustainable development, wilderness, nature, forest – means different things to different people. Consequently, when it comes to conserving biodiversity, different people have different priorities they want to conserve (Redford and Sanderson, 2000). The brainchild of Western ecologists with political conservation motives, the concept of biodiversity has now become widely adopted into the global public sphere. In Colombia, biodiversity has become an important attribute of national identity, employed to promote a different side to the country and move away from negative images of violence and narcotraffickers. Indigenous movements have found an ally in the biodiversity movement, as a way to recognise the important role these groups play in conserving biodiversity, and a strategy to defend their territories. This involves however a constant negotiation between different visions of biodiversity and different forms of knowledge. Campesinos, often seen as at odds with the aims of biodiversity conservation, are now finding ways, through programmes, associations and networks, to defend and express their particular relationships with the environment, seeking sustainable livelihood opportunities.

The definitions of biodiversity offered up by the participants in this research, encompassing both conservation professionals and rural campesinos and fishers, illustrate the diversity of conceptions but also with many similarities in the associated concepts – life and the diversity of life across scales, a focus on species, their quantity and richness, as well as dynamic concepts such as the interaction and relationships of elements in an ecosystem. Unique to this study, compared with similar studies elsewhere, is the strong association of biodiversity with water - '*sin agua no hay vida*' ('without water there is no life'). There is also a strong association with people, with a third of the respondents from across different groups make an explicit mention of humans in their definitions of biodiversity, whether relating to humans being part of biodiversity or closely connected to and reliant on it. While the professionals tend towards institutional definitions and technical terminologies, biodiversity takes on a more personal meaning for the community members – expressed in terms of their local environment, how they care for it, and how it is lost over time with the arrival of development projects and climate change. The recognition of the social and cultural component of biodiversity, however, gets side-tracked when calculating biodiversity losses and gains when it comes to biodiversity offsetting. The divergent perspectives over whether people are actually *part of* biodiversity or *users* of it represents a challenge when these policies are put into practice. Takacs refers to biodiversity as 'a

scientized synonym for nature' (Takacs, 1996, p. 105). Nowadays though, scientists and policy makers appear to be moving towards the use of 'nature' and 'nature's contributions to people' (as opposed to the more instrumental concept of 'ecosystem goods and services'), with the intent of recognising diverse worldviews on human-nature relations (IPBES, 2018). The next chapter will examine why and how environmental offset policy has developed in Colombia over the past fifty years.

## **7. Offsets in policy: Why and how environmental offsetting policy has developed in Colombia**

### **7.1. Introduction**

Chapter four introduced the key developments in environmental policy in Colombia since the 1970s, outlining the regulatory framework out of which environmental offsetting has emerged. This chapter expands on this, to answer the research question: *Why and how has environmental offsetting policy developed in Colombia?* It explores the evolution of environmental policy in Colombia over time, from the emergence of compensation requirements as part of the environmental licensing process, the movement from monetary compensation towards compensation-in-kind, first as forest offsets and later as biodiversity offsets, and which actors and institutions were influential in this process. Drawing on the insights gathered from interviews with national and international level stakeholders involved in offsetting policy development and implementation, the reasons for the stalled implementation of the 2012 biodiversity offsetting policy are explored, as well as the changes between the two versions of the biodiversity offsets manual – the 2012 policy and the updated version in 2018. Finally, the current status of offsetting in Colombia and future considerations will be discussed.

### **7.2. Environmental compensation and forest offsets: the drivers**

The environmental licence, the evaluation of the environmental impacts of projects and monetary compensation for the use of environmental services first appeared in legislation in Colombia in 1974 under what was called the Environmental Code, following the North American model of environmental regulations (Rodríguez, 2011). Early developments on environmental issues and environmental impact assessments (EIAs) were also being adopted in the private sector, under pressure from international lenders, specifically the World Bank. As an environmental professional who was working in the energy sector during the 1980s explains, certain companies, the national electricity system Interconexión Eléctrica S.A. E.S.P (ISA) in the electricity sector and Ecopetrol in the oil sector, started working on environmental issues even before a ministry of environment existed in Colombia, because of the World Bank's lending requirements:

The World Bank, which was the main lender of this, began to put pressure on the environmental issue ... I participated and I went to work with other people because we were several [working] on that issue and that's where this environmental work began in ISA ... That was the operating scheme and that's why environmental policy, even at that time when the environmental policy appears in ISA ... there was no Ministry of the Environment. There was an institute that, say, handled those aspects but basically, they did not do environmental studies, nothing was controlled. Several entities started to do that, one of those was Ecopetrol on their side but on the side of the electricity sector, ISA started doing it. (Sergio, Ecologist / Consultant)

However, as mentioned in chapter four, wider incorporation of EIAs and environmental compensation really began in the 1990s, following the 1991 Constitution and the General Environmental Law of 1993, when sustainable development and the concept of restoring or replacing resources became enshrined in Colombian environmental policy. Manuel Rodríguez Becerra held the position of Colombia's first Minister for Environment and remains a key figure and commentator on Colombian environmental policy. In his book *Environmental crisis and international relations: towards a Colombian strategy* (Rodríguez Becerra, 1994a), written as the national and sub-national biodiversity strategies were being developed, he says that these strategies had their own motivations at the domestic level, but were incentivised at the international level by at least two processes: a request by the UN to sixteen countries, including Colombia, to elaborate national studies for biodiversity conservation; and second, the development of the Global Biodiversity Strategy (WRI et al., 1992). According to Rodríguez Becerra, biodiversity and its conservation was at that time a concept and a priority that was foreign to megadiverse countries; of little interest to those working in the Colombian public and private sectors or to the general public (Rodríguez Becerra, 1994a). Providing suggestions to be incorporated into the strategies, he talked of the need to incorporate biodiversity as a factor intimately linked to social and economic processes and to move away from a conservationist approach to conservation: 'If we are not able to incorporate our biodiversity into economic development, we will be condemned to the sad role of the gendarmes of a large national park for the use of industrialised countries.' (Rodríguez Becerra, 1994a, ch. 6). He further acknowledged the challenges facing Colombia in implementing a biodiversity strategy without sufficient resources coming from either inside or outside the country and the need to be realistic in determining which areas can be protected and which cannot: 'The strategy, as well as indicating those priority areas for conservation and sustainable use, will also have to choose those that we must sacrifice.' (ibid.). While the concept of sustainable development was actively being adopted into Colombian policy, there were

also warnings coming from Rodríguez Becerra and others in the environmental sector of the risks associated with this narrative in terms of masking environmentally destructive activity:

The worst risk is that sustainable development becomes installed as a conception that serves to mask actions harmful to the environment, or to build a rhetorical discourse about the "great advances" that are registered at the local, national or planetary level in order to heal the social and environmental wounds that afflict us, when in reality everything remains the same. (Rodríguez Becerra, 1994b, p.15)

Colombia published its National Biodiversity Policy and National Forest Policy in 1996, and legislation requiring compensation for logging was introduced under Decree 1791 of 1996, *el régimen por aprovechamiento forestal* ('forest use system') whereby proponents applying for a logging permit are required to plant trees to compensate for the trees felled. In general, these forest offsets were carried out via reforestation based on the volume of wood extracted, without taking into account the ecological area affected (Sarmiento, 2014).

### **7.3. From forest offsets to biodiversity offsets**

It became apparent over the years that the process for creating forest offsets under *aprovechamiento forestal* was too weak, did not quantify biodiversity losses and gains and therefore projects were unable to avoid residual biodiversity loss (MADS, n.d.). Meanwhile, there had been a growing recognition of the importance of an ecosystem level approach to environmental management within the country, heavily influenced by international policy and industry standards. It was against this backdrop that biodiversity offsetting legislation was passed in 2012 under the framework of the National Policy for the Integral Management of Biodiversity and its Ecosystem Services (PNGIBSE), fifteen years after the National Biodiversity Plan was first formulated. Colombia's National Development Plan 2010-2014 promoted the importance of protecting biodiversity and the provision of ecosystem services as essential to human wellbeing, and consequently, to development and economic growth. It stated the need to 'improve environmental compensation mechanisms for a fair, equitable distribution of the investment of these resources and according to national priorities, based on the regulation of environmental permits and licenses' (Departamento Nacional de Planeación, 2011, p. 587).

The move towards biodiversity offsetting and an ecosystem or landscape level approach to compensating for environmental damage accompanied a growing focus on ecological restoration in the country. Plan Verde (Ministerio del Medio Ambiente, 1998) promoted restoration as a mechanism for compensating for the environmental impacts of infrastructure. The Colombian Restoration Ecology Network (REDCRE) was formed in 2006 by the School of Ecological Restoration at the Universidad Javeriana in Bogotá and held its first national congress on ecological restoration in 2009. Since then, research and practice on both offsets and restoration have been developing side by side, with a symposium dedicated to offsets at the 2018 REDCRE congress. Offsets are driving ecological restoration, providing an opportunity to implement restoration projects and advance the field of research, and offsets have been identified as an important source of financing for the implementation of both Plan Verde and the National Restoration Plan (MADS, 2015). In turn, and as indicated by interviewees, expertise coming from the field of ecological restoration has fed into offsetting policy, encouraging a move from a narrow focus on single trees to looking at the wider ecosystem<sup>28</sup> - its composition, structure and function-, as well as analysing its transformation over time:

There are two types of offsets that have been used, the purely forestry, forest offsets, which is "Sow 5,000 sticks<sup>29</sup> or sow 30,000 sticks" and that's it. And that is what happened years ago and that is what has not allowed offsetting to be seen as something truly important, favourable, and successful, right? To really achieve the goal you want. When we talk about restoration, we must begin to understand those issues, biodiversity, when I restore, I do not put down one tree or two trees. When we restore, it's necessary to read what happened over time in that ecosystem, as it was before, right? Which elements have been transforming it, which have remained and which can be recovered, as well. So, it's understanding that if I am going to do restoration on this site, I must take into account what there was, what there is.  
(Eric, Coordinator, NGO)

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<sup>28</sup> The map of continental, coastal and marine ecosystems of Colombia acts as an important reference for the classification and monitoring of Colombia's ecosystems and for planning conservation initiatives. Colombia has 91 types of general ecosystem - 70 natural and 21 transformed – where an ecosystem refers to 'a dynamic complex of communities of plants, animals and microorganisms in their non-living environment that interact as a functional unit located in an area with homogenous biophysical and anthropic conditions'. MINISTERIO DE AMBIENTE Y DESARROLLO SOSTENIBLE (MADS) & INSTITUTO DE HIDROLOGÍA METEOROLOGÍA Y ESTUDIOS AMBIENTALES (IDEAM) 2017. Presentación del Mapa de Ecosistemas Continentales, Costeros y Marinos de Colombia (MEC) Escala 1:100.000 actualización 2017. Ministerio de Ambiente y Desarrollo Sostenible y Instituto de Hidrología, Meteorología y Estudios Ambientales.

<sup>29</sup> Sticks (in Spanish '*palos*') is a colloquial term used to refer to trees.

With offsets driving ecological restoration, there is a need to take into account the gaps between offset policy expectations and restoration realities, since assuring no net loss through restoration is very challenging due to the uncertainties, time lags and costs involved (Maron et al., 2012). The interviewees explained that there was a growing awareness among the scientific community of the need to work towards a more integrated, ecosystem level approach. There was also a general recognition among many groups of stakeholders that the existing compensation approaches were not working in attaining a balance of impacts versus offsets:

I think that the main engine for change has been that there is no balance, I mean, really, there hasn't been a balance in the effectiveness of those investments. Even if they were already being implemented for some time, well... neither the authorities, nor the companies, nor the local groups recognise the compensatory effect of the measures. So, I think the change of approach has been inspired by the fact that... what we have been doing, it has not left a real balance between the impacted [and] the compensated. (Marian, Coordinator, Trade association)

From the side of the private sector, companies and trade associations started to show an interest in improving offset activities, in order to fulfil their legal obligations and get their environmental licenses approved on the one hand, while also fulfilling their social obligations with communities to improve their social licence to operate, on the other. This is noted by the interviewees below:

Many companies are already aware, well, the paradigm is changing, oil companies, hydroelectric companies too - they all have to meet environmental standards and that paradigm shift has also influenced the way in which companies assume these types of obligations and implement offsets. So, for them it's also important that there is a way to show they are fulfilling their environmental obligations. (Gonzalo, Researcher, INGO)

So, I think that there is an agent of change that affects the loss of social license that companies have had facing their activities and their operations in the territory. I think that even the companies themselves, from their work and their operations, have prompted changes in vision, in how to go about it, and I think that also from the trade associations, we are generating new approaches that demand new working models in the subject of public policy. (Marian, Coordinator, Trade Association)

Certain companies have been prominent in developing offsetting strategies, among them Empresas Públicas Medellín (EPM) and Ecopetrol, developing strategies to conserve biodiversity, identifying priority areas for offsets in their operating areas, and being involved in national level discussions and activities around biodiversity offsets (Ecopetrol, 2016,



Foros Semana, 2017, Grupo EPM, 2019). However, these companies, while being at the forefront of offset methodologies and strategies, are also behind some of the biggest environmental controversies in the country. Ecopetrol was responsible for an environmental disaster after an oil spill into the Magdalena River in 2018 that killed at least 2,400 animals (Zachos, 2018). According to Rodríguez Becerra (2018), Ecopetrol is likely to be the company with the most environmental liabilities in the history of Colombia. EPM is the company building Colombia's largest hydroelectric dam, Hidroituango, which has been at the centre of a long-standing controversy. It caused flash flooding when a tunnel burst during construction in 2018, forcing tens of thousands of people to evacuate their homes (Parkin Daniels, 2018). It also came under intense criticism in 2019 for widespread environmental damage when the levels of the Cauca River dropped after the company closed the floodgates to prevent further flooding (Latin America Reports, 2019). Other examples of companies with a large environmental footprint taking the lead on offsetting can be seen in examples across the world, with mining companies like Rio Tinto (Bidaud et al., 2018). Since the operations of these companies are limited to specific locations where particular natural resources are located, it is in their interests to find solutions that allow them to proceed with the project.

While there was a certain momentum for change coming from inside the country, macro policies, standards and trends towards biodiversity financing and offsets at the international level, including the Convention on Biological Diversity (CBD), have also largely driven changes in policy and practice in Colombia, as described by an interviewee involved in offsetting processes:

There are other movements, such as financing for biodiversity, which signal the potential contribution of the private sector to biodiversity management. Also, I believe that the Convention on Biological Diversity has given signals about the responsibility that the sectors have to generate real changes in the management of biodiversity. So, I think that those macro policies too have pushed new models. (Marian, Coordinator, Trade Association)

To summarise, it was a combination of drivers that drove the development of biodiversity offsetting policy in Colombia. Amid increasing environmental degradation and a lack of effective results from existing compensation mechanisms, combined with the influence of international trends in impact assessment and biodiversity offsetting, there was a recognition of the need to improve offsetting processes, expressed in the National Development Plan 2010-2014 and in the PNGIBSE. The push for change came both

internally from the government, the conservation and restoration scientific community, the private sector and externally from international NGOs and other bodies, such as the World Bank, and the following section identifies the key actors influential in this process.

#### **7.4. Key actors in the development of offsetting policy**

The Colombian environment ministry, Ministerio de Ambiente y Desarrollo Sostenible (MADS), acts as, in the words of one of the interviewees, the 'mother institution' in developing national biodiversity offsetting policy, alongside the national authority for environmental licenses, Autoridad Nacional de Licencias Ambientales (ANLA), with support from national and international organisations. The Nature Conservancy acts as the lead organisation providing consultation to MADS on biodiversity offsets, in collaboration with other international NGOs and agencies. Conservation International and World Wildlife Fund were involved in the development of the first manual, while the Instituto Humboldt, and the German development agency GIZ were part of the advisory group for the 2018 version (see Figure 17). These institutions, among others such as Fondo Acción, Fundepúblico, Wildlife Conservation Society, environmental consultancy Terrasos SAS, the MacArthur Foundation, and the trade association ANDI have all been active in analysing the regulatory framework and developing strategies for the development of environmental markets, biodiversity offsets and habitat banking in the country (Buitrago Garzón, 2017, Fondo Acción et al., 2016, Fondo Acción et al., 2017, Fundepúblico, 2017, Fundepúblico et al., 2019, Instituto Humboldt et al., 2018, Instituto Humboldt, 2018, Instituto Humboldt and The Nature Conservancy, 2019, Sarmiento, 2014, Sarmiento et al., 2015a, Terrasos, 2016, Terrasos, 2018, Terrasos, 2019). Certain larger regional environmental authorities have been involved in the identification of priority areas for the development of regional level offsetting schemes (GIZ, 2017).

Figure 17: Key international and national actors involved in biodiversity offsetting in Colombia



According to a consultant working with MADS, NGOs with international knowledge of offsetting were greatly influential in the formulation and implementation of public policy around offsetting in Colombia. Internationally, The Nature Conservancy has played a strong role in developing international standards on offsetting, including their involvement in the BBOP Standard on Biodiversity Offsets (BBOP, 2012b) and the International Union for the Conservation of Nature (IUCN)'s Biodiversity Offsets Technical Study Paper (IUCN, 2014), as well as being involved in offset implementation through their 'Development by design' programme (Kiesecker et al., 2010). It is common for conservation NGOs to play an advisory role in offsets, especially with extractive industries operating in low and middle-income countries (Koh et al., 2019). Igoe et al. (2010) describe how, in postcolonial contexts with fragmented state control, networks of conservation, commerce and the state are forged, where outsiders such as conservation NGOs bring money, expertise and technology, while government officials bring legitimacy and sovereignty. All the international organisations mentioned above - The Nature Conservancy, Wildlife Conservation Society, WWF, Conservation International and GIZ - have been involved in implementing carbon offset projects around the world in the form of REDD+ (Reducing Emissions from Deforestation and forest Degradation). Thus, the same environmental NGOs that have been involved in efforts to offset carbon with REDD+ turn to biodiversity to apply a similar approach. There are also proposals to align and integrate biodiversity compensation and REDD+ programmes (Lanius et al., 2013). However, so far REDD+ has generated more hype than results (Fletcher et al., 2016, Massarella et al., 2018) and has received criticism for reinforcing social inequalities and conflicts (Hein, 2019, Hunsberger et al., 2017).

Aside from involvement in policy development, these international NGOs have been working with companies involved in mining, industrial and infrastructure development in Colombia to try to mitigate or compensate for their environmental impacts (see Conservation International, 2013, López Arbeláez and Quintero Sagre, 2015, The Nature Conservancy, 2018, UNDP, 2013, Wildlife Conservation Society, 2019). However, some environmentalists in Colombia have criticised the international NGOs involved in developing the offset manual for having close ties with the companies who need to offset their impacts (Gómez and Echeverri, 2017). INGOs such as these play a prominent role, especially in middle and lower-income countries, as mediators between governments, industry and civil society, but have been accused of dominating the conservation discourse and advancing market-led conservation, and as a result, muting local perspectives and

dissenting voices (Brockington and Scholfield, 2010, Büscher et al., 2012, Escobar, 2008). As Igoe et al. (2010, p. 499) argue, conservation NGOs and their networks are often involved in 'promoting the idea that the ecological ills of late market capitalism can be offset by protecting exotic nature and stimulating economic growth'. With regard to collaboration between the different NGOs in Colombia, there were reports in informal conversations of competition between some of the organisations who do not always work together, each vying for funding and to sell their own products and conservation tools. One person talked of a clash of 'egos' between the organisations when trying to decide the best way to proceed with the first edition of the manual and the tool to be promoted alongside it. As argued by one of the interviewees (Sergio, Ecologist / Consultant) where there is a lack of governance, there is a constant fight between civil society and the private sector, with NGOs in the middle living off the fight, and 'everyone lives off that chaotic system'.

Also, with changes in the government comes changes in terms of which providers are preferred or have contacts in government. As a result, there were different collaborators on the advisory panel on the first and second manual, and there was greater collaboration with the private sector during the development of the second manual. The trade association ANDI and oil company Ecopetrol were highlighted as important actors in offset development and in bridging the gap between the private sector and the environmental sector, moving from 'enemies' to a more harmonious relationship:

There's a very important actor that we've worked with lately, and it's the ANDI... [Previously] the Ministry of Environment, in terms of environmental issues, saw companies as the enemy, and [ANDI] has managed to ensure that gap does not grow, but, on the contrary, is reduced, and that they can work in a very harmonious way between the industry and the environment... also, Ecopetrol, as a public entity, so big, well, the largest oil producer, has also been very interested in proposing novel strategies, in supporting research, which previously was not very common in the country, which has also favoured the integration of the issue of development with the issue of biodiversity. (Victoria, Specialist, INGO)

The regional environmental authorities (CARs) have had varying degrees of influence regarding the development of offsetting policy. In general, one of the weaknesses stressed by the interviewees is the lack of capacity and expertise within these environmental authorities. Therefore, they rely to a large extent on the advice provided by the NGOs and the Instituto Humboldt. However, certain CARs with stronger capacity have been making advancements in terms of offsetting plans and projects, taking part in the PES programme

BanCO2 and involved in developing regional portfolios of priority areas for biodiversity offsets (e.g. CORTOLIMA, 2017, GIZ, 2017, Instituto Humboldt and The Nature Conservancy, 2019).

Other institutions that were not directly involved in the formulation of the manual, but which represent key actors in its implementation include Parques Nacionales and Colombian NGO Fundación Natura, who have been involved in developing and implementing offset projects for various companies. In general, private environmental consultancies seem to take on a role of implementation rather than strategy or policy development, gaining offset contracts through tendering processes. This was the experience found in the Hidrosogamoso case. One exception is Terrasos, a consultancy piloting the first habitat bank in Colombia, and in Latin America, with finance from the Inter-American Development Bank. They have been proactively developing offsetting strategy and lobbying for changes in policy, such as the passing of an administrative act that regulates habitat banks (Terrasos, 2019). It is likely, though, that as the implementation of the policy progresses, an increasing number of environmental consultancies will look to the business opportunity offered by offsetting, as experienced elsewhere like in Australia, where a 'mini offsetting industry' became established, made up of consultancies and assessors (Personal communication, Environmental consultant); something that has also been seen in the US wetland banking scenario (Robertson, 2000).

As the official authority on biodiversity research in Colombia, the Instituto Humboldt is regarded as a very important entity in providing scientific knowledge to inform the development of offsetting, forming part of the advisory group in the second version of the manual. The institute has different levels of involvement in offsetting, on the one hand supporting the government in an advisory capacity on offsets and biodiversity, and on the other hand supporting companies looking to carry out offsets. It is a well-respected institution, seen by some to provide an 'objective' view in relation to discussions on science and policy:

So, all these discussions should give the floor much more to institutes like the Humboldt that really does an excellent job in biodiversity and if you look at [their] statements, they are normally balanced statements. I mean, pass these discussions to scenarios where scientific research, technical opinion prevails, and not politics nor ideology, which is often what emerges from all this... So, for me, that is the biggest challenge - how do we try to bring this to some discussions that are really more technical and scientific than political and ideological? (Ricardo, Senior manager, ISAGEN)

In a related discussion, a researcher asserts the importance of ensuring that the 'state of opinion' does not prevail over the rule of law:

We have now very strong citizen oversight systems that even puts a state of opinion above the rule of law. By that I mean that the company may make a good offset proposal. The authority accepts it because it is good. But the community didn't like it, for whatever reason, and they start posting Tweets and things like that [...]

[We need] sufficient information to ensure that the state of opinion does not prevail over the rule of law. So that we have confidence in our rules, in our laws, in our procedures and we are not going to give them away every time there is a Twitter network saying things that are or are not. We trust our laws. (Carlos, Researcher)

The debate of 'state of opinion' vs. rule of law (*el estado de opinión vs. el estado de derecho*) has been associated in Colombia with the controversial ex-president Álvaro Uribe (who is currently under investigation for numerous allegations), who declared that the state of opinion, citizen expression, was superior to the rule of law (El Tiempo, 2019). This was in the context of him trying to hold a referendum on changing the constitution to permit a president to hold a third term after he already successfully changed the constitution to allow him to serve two consecutive terms. The Constitutional Court's ruling that a referendum would be unconstitutional was therefore widely seen as a win for democracy and the 'state of law'. Therefore, in a country with a fragile rule of law, the populist expression of 'state of opinion' is rightly seen as a dangerous threat to the constitution and democracy. On the other hand, by framing offsets as a scientific, technical tool to be evaluated by a select group of stakeholders, who are seen as more objective and neutral, risks the depoliticisation of the issue and the exclusion of others, such as civil society groups (Apostolopoulou, 2019). It is a challenge therefore to ensure that the opinions of diverse stakeholders are heard, and requires associations, NGOs and lawyers to provide advice to ensure the right to participation and community consultation is upheld through the correct legal routes.

## **7.5. The creation of the 2012 biodiversity offsets manual**

Biodiversity offsets were written into legislation in 2012 via Resolution 1517 and the 'Manual for the allocation of compensation for biodiversity loss'. However, preparations go back earlier to 2006-2007 when the first proposal for a guide on offsets was developed within the then Ministry of Environment, Housing and Territorial Development (MAVDT) in the licensing, permits and procedures department, prior to the creation of ANLA (Ospina

Arango, 2006). The idea behind this guide was to broaden the approach towards compensation beyond simply reforestation and planting trees to an ecological restoration approach, and additionally to create a standard to guide the process, which, prior to then was left to the judgement of the person evaluating the environmental license application, as one of the interviewees who works for the government explains below:

The compensation measures were historically established through the project evaluator. So, the person who evaluates the environmental impact assessment is the one that decides ... Well, it was up to the judgement of the individual or if it seemed to them that suddenly the ecosystem was not important or that the coverage that they were intervening in was not important, then they said, "Ah, well no, there is no need to compensate". So, many projects were not even required to offset. Because of that, that was why that guide was developed, which was not so much left to the judgement of the one who was evaluating but rather complied with something more thorough. (Cecilia, Environmental professional, MADS)

The early version of the guide was never published but was picked up again by the Ministry who developed the 2012 manual to help guide and standardise the determination and quantification of offsets, and break from the old model of how offsets were done in the past, as one of the interviewees describes:

Although environmental offsets do not [first] appear with the 2012 manual, but rather are included in the current legislation from 1993, law 99. In any case, it is in 2012 when there is an attempt in some way to generate a break in the paradigm and focus more on issues of restoration rather than reforestation, more on issues of "he who impacts compensates", instead of "he who impacts pays". (Carlos, Researcher)

Just as it was considered a pioneer in developing the Environmental Code back in the 1970s, Colombia was also hailed for taking a lead in biodiversity offsetting in Latin America (Murcia, 2017, Sarmiento, 2013). The manual was introduced in order to give clarity to the private sector and end the uncertainty they face when implementing projects across the country (MADS, 2012a). According to José Yunis Mebarak, a representative of The Nature Conservancy Colombia, the manual represented 'conservation for the 21st century' that ensures that compensation happens on the same ecosystem as what is impacted: 'an eye for an eye' (MADS, 2012a). However, compensating an 'eye for an eye' on the same ecosystem raises both practical and ethical challenges in terms of deciding what constitutes equivalence, as well as the inevitable loss of unique place-based and intrinsic values associated with particular ecosystems (Ives and Bekessy, 2015, Takacs, 2020).



Six years after the first manual was passed into law, implementation of biodiversity offsetting on the ground remained practically non-existent and this led to the development of a new version of the manual, which was released in 2018. Some of the key implementation challenges and bottlenecks that were highlighted during the development process of the second manual include: high levels of uncertainty due to a combination of technical, economic, financial and legal factors; lack of articulation between different offset obligations (i.e. for impacting forests, biodiversity, forest reserves, threatened species, etc.), leading to duplicated efforts or isolated offset projects that are not aligned with local and regional land planning processes; lack of available areas for implementing offsets; lack of interinstitutional coordination; insufficient incorporation of biodiversity into sectorial plans and business strategies; lack of indicators for monitoring and evaluating the effectiveness and additionality of offsets; and conflicts with communities (Corzo Mora et al., 2018, Toro Vásquez and Peña, 2015). The key adaptations between the first and second versions of the manual and a comparison of the general, technical and temporal aspects are discussed in the following section.

## **7.6. An analysis of the 2012 vs. 2018 biodiversity offset manuals**

### *7.6.1. General aspects*

The second version of the manual released in 2018 is called 'Compensation manual for the biotic component', referring to fauna, flora, vegetation cover and landscape context of natural continental terrestrial ecosystems and secondary vegetation (MADS, 2018a)<sup>30</sup>. The rationale for changing the title from 'biodiversity loss' to 'biotic component' was that 'biotic' would represent an umbrella term to incorporate several types of offsets. This change addressed the confusion among companies who were subject to multiple offsetting requirements, for example as part of their application for the environmental license, and again for impacting on forests, or being subject to forest offsets by the CARs and then biodiversity offsets by ANLA. This new addition to the manual incorporates three scenarios (environmental license, forest use, forest reserves) at two levels (regional and national), allowing companies to create one single offset plan to cover all their offset requirements, thereby aiming to streamline the process and allowing offsets to be combined.

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<sup>30</sup> The manual does not cover marine and freshwater ecosystems; the government has plans to develop an offset manual for marine and freshwater ecosystems.

The expansion of the second manual to the regional level to be adopted among regional environmental authorities is an important development. The first version of the manual only applied to projects whose environmental license was approved by ANLA. This meant that projects, which, due to their size or magnitude only needed to get permissions from the regional autonomous corporations (CARs), were 'left out', not knowing how to compensate for their impacts, according to one of the interviewees (Victoria, Specialist, INGO). Up until the new manual was released, at regional level the offset requirements were decided on a case by case basis, according to the criteria of the civil servant responsible for evaluating the environmental license (Sarmiento, 2014). This incorporation of smaller-scale projects at the regional level was seen as a notable improvement since it aims to standardise offsetting practices across the country. However, it also poses immense challenges, given the weak institutional capacity of many of the CARs. As noted by researchers interviewed, the experience and capacity among the CARs when it comes to offsets varies greatly:

We don't know what impact this will have on the CARs of the country. They are many and very different. There are CARs with well differentiated characteristics, very different administrative strengths, officials with totally different capacities. That is a gigantic challenge. Because this [Manual] may be useless in the CARs, in many of them. In some it may work well. There are CARs that are very proactive, very judicious, hardworking but there are others that are not. There are some who are known for their corruption or because they do nothing. So, let's see what it achieves doing this there and how it can be supported from our work, but also from the government. (Gonzalo, Researcher, INGO)

Table 7: Comparison between biodiversity offset manuals 2012 and 2018: General aspects

Aspect	Biodiversity offset manual, 2012	Biodiversity offset manual, 2018	What changed 2012 vs. 2018
<b>Title of the manual</b>	‘Manual for the allocation of compensation for biodiversity loss’. <i>Manual para la asignación de compensaciones por pérdida de biodiversidad (Resolución 1517 de 2012)</i>	‘Compensation manual for the biotic component’.  <i>Manual de compensaciones del componente biótico (Resolución 256 de 2018)</i>	‘Biodiversity’ changed to ‘biotic component’.
<b>Types of projects required to offset</b>	Development projects that are granted environmental licenses from ANLA and have residual impacts on natural terrestrial ecosystems and secondary vegetation.	All projects subject to: - Compensation for biotic component in environmental license. - Permits for forest exploitation. - Extraction from regional or national forest reserves.	Groups different compensation requirements together to apply the manual.
<b>Environmental authorities</b>	ANLA responsible for authorising offset plans and overseeing their implementation.	The relevant regional or national environmental authorities responsible for authorising and overseeing offsets (i.e. MADS, ANLA, CARs, CDS, large urban centres).	Scope is expanded from national to regional level so that regional authorities must apply the manual to projects in their jurisdiction.

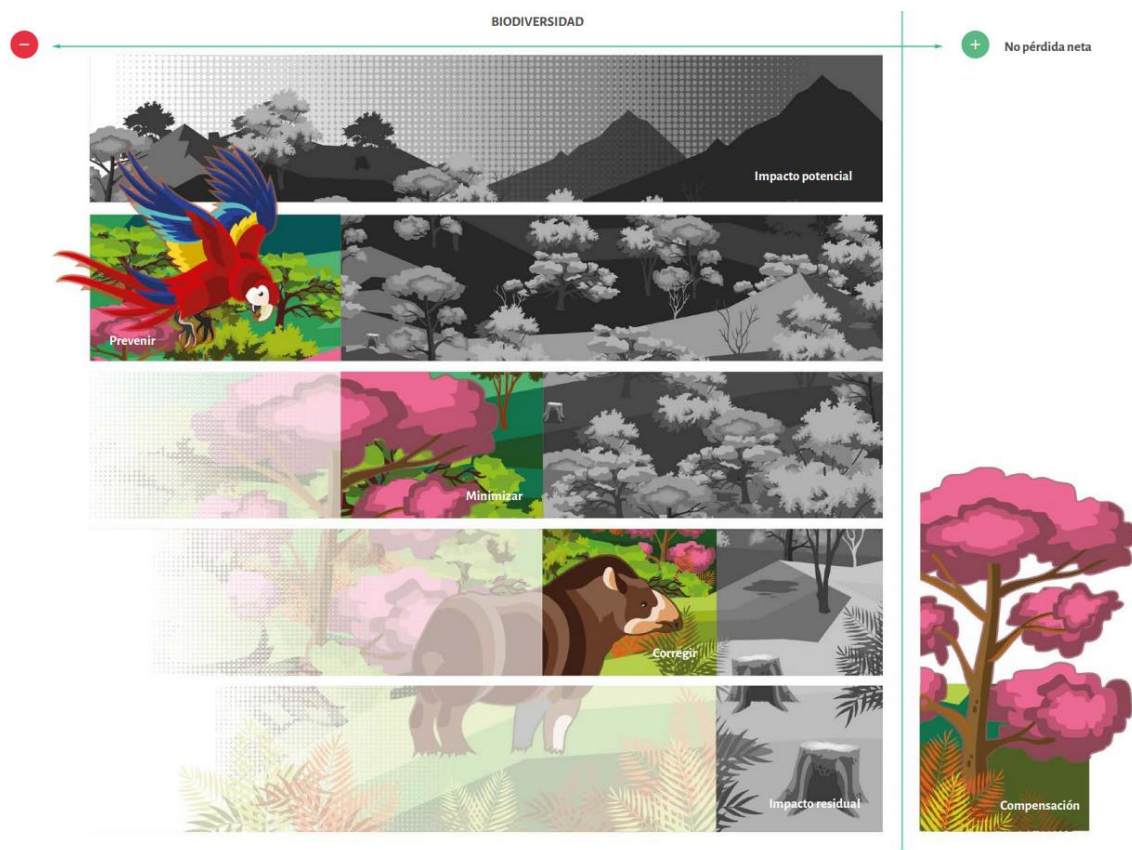
Analysis of data from MADS (2012b, 2018a), Terrasos (2018).

### 7.6.2. Technical aspects

In an effort to bring some clarity to concepts widely used at international level, but poorly understood at national and local level, especially when it comes to demonstrating them in

practice, the second version of the manual dedicates sections to explaining technical concepts including the mitigation hierarchy, no net loss, ecological equivalence and additionality. Both versions of Colombia's biodiversity offsetting manual include the term 'mitigation hierarchy' (*jerarquía de la mitigación*) and the four steps (prevention, mitigation, correction and compensation) are described throughout the document (see Figure 18). The second version of the manual is more explicit in addressing the mitigation hierarchy, with multiple references and a dedicated section explaining it as one of three guiding principles, along with no net loss and additionality.

Figure 18: The Mitigation Hierarchy in 2018 Compensation manual for the biotic component



Source: MADS (2018a, p. 16) Text in image reads (from top down): Biodiversity, No net loss, Potential impact, Prevent, Minimise, Correct, Residual impact, Compensation

The issue of 'non-offsetable impacts', as highlighted in the IUCN Policy on Biodiversity Offsets (2016), is addressed in the Colombian policy but the action to be taken in such cases is vague. It states that in cases where the impacts of a project are deemed non-offsetable (for example, impacting on rare, unique or endangered ecosystems, species or ecosystem services areas that provide critical ecosystem services) or when the

compensation measures proposed are not appropriate, it simply states that 'stakeholders or environmental authorities should make the appropriate decisions' (MADS, 2018a, p. 17). Criteria for determining the limits to offsets and when offsets can be considered inappropriate or unfeasible have been elaborated in the literature (Pilgrim, 2013) but involve challenging decisions, made more difficult in situations where there is lacking data and technical expertise (Brownlie, 2013).

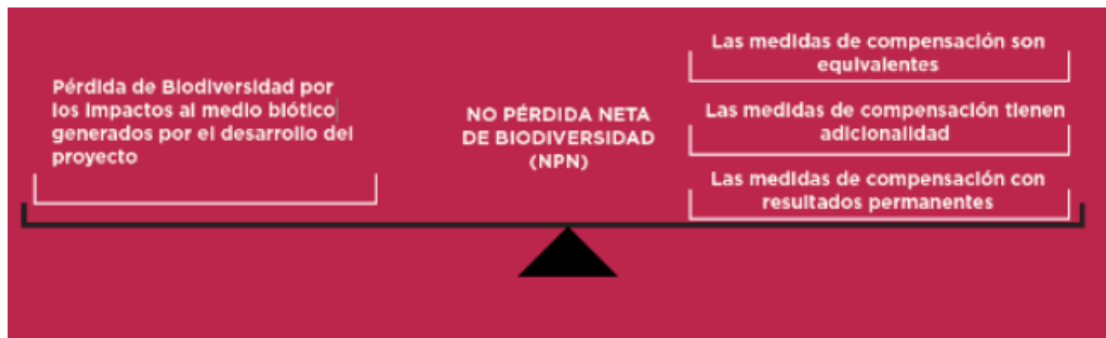
No net loss (*no pérdida neta*) is a central component of both versions of the manual, aligned with international offsetting standards. No net loss is defined in each of the versions as follows:

No net loss of biodiversity refers to biodiversity compensation that is designed and executed to achieve measurable conservation results in situ, that can reasonably be expected to result in no net loss (BBOP, 2012).  
(MADS, 2012b, p. 39).

No net loss: The point where biodiversity losses generated by negative affectations or impacts of a project, work or activity are balanced with the biodiversity gains via the implementation of offset measures, based on the baseline defined in the technical support studies of the projects, works, or activities whose execution generates the affectation or impact (adapted from BBOP, 2012)  
(MADS, 2018a, p. 14).

The definition provided in the second version of the manual seeks to stress the concept of finding a 'balance' between project impacts and offsets that are equivalent, additional and permanent (Figure 19). The first version of the manual required developers to demonstrate no net loss and ecological equivalence in their offsets, compared with the baseline. This represented a challenge to implementation since no net loss is very difficult to demonstrate in practice, as has been widely shown around the world (Bull et al., 2016, Gardner, 2013, Quétier et al., 2014). Therefore, in the new version of the manual, the proponent is no longer required to demonstrate no net loss in order to show they have fulfilled the requirements. Rather, they must demonstrate that the objectives and goals of the offset plan have been met, as an approximation towards the aim of no net loss. The Instituto Humboldt and The Nature Conservancy are working on developing a system of monitoring and evaluation, proposing common indicators against which to measure the approximation towards no net loss of different projects, with the aim to eventually publish them through an online platform (Instituto Humboldt and The Nature Conservancy, 2019).

Figure 19: No net loss of biodiversity



Source: MADS (2018, p. 14)

Text reads from left to right: Biodiversity loss due to impacts on the biotic environment generated by the project development – NO NET LOSS OF BIODIVERSITY (NNL) – Offset measures are equivalent, Offset measures have additionality / Offset measures with permanent results.

When asked about the concept of ‘no net loss’ and how attainable it is in practice, the overall response from interviewees was that it is a goal to work towards, an ideal, but that measuring it and demonstrating it in practice is extremely difficult, due in large part to the difficulty of attaining an accurate baseline. A lack of baseline data is a particular challenge in Colombia, therefore making it unclear which particular elements of biodiversity are lost as a direct result of the project impacts.

No net loss is placed in the manual as a principle, but it is a principle that pursues an unattainable goal, a utopia, in the end. And that's why it stays. What we are really looking for is the balance between loss and gain that generates additionality, but that additionality is not to return to an original state that, I don't know, we lost in the Pleistocene and already in the Anthropocene it is impossible to recover. We are aware of that and it is merely a philosophical statement, if you like.  
(Carlos, Researcher)

There is monitoring of some key species but in most cases, it is simply assumed that if the coverage is the same or similar, there is no net loss.... It is clear that we are losing biodiversity and that the offsets as they are created at this moment do not allow us to assure no net loss. That's how it is. [...] We defend biodiversity and do what we can, but there are points when it's necessary to be pragmatic too. Discussing with the Instituto Humboldt also, we are clear that the goal of no net loss of biodiversity is a goal and we want to go there but securing it technically is too complicated, more so in the Colombian context.  
(Gonzalo, Researcher, INGO)

I believe that this [NNL] is something that is very difficult to measure, and I am going to tell you why I think so and it is more from the practical part that we have experienced.

There isn't a good baseline. I mean, we do not know exactly what was the biodiversity that was impacted by the project. We know what plant coverings it impacted, we know what types of ecosystems, where it passed through, the sites affected, even some timber species that were cut down with the construction of the line. But no, we do not have baseline information, for example, of other levels of biodiversity, of species, of fauna, that allow us to see, for example, how this offset will guarantee that there is no net loss of biodiversity. [...] It's an abstract concept, I think. First, I think ANLA does not understand it. I think companies do not understand it and we, who are biologists that should understand it, have a hard time putting it into practice, I mean, making it a reality in practice. (Veronica, Project manager, NGO)

The aim of no net loss is maintained in the policy as an aspirational goal to work towards. However, without a clear baseline or reference scenario against which to measure no net loss, the concept is meaningless (Maron et al., 2018). The monitoring and evaluation system, SEMCA, aims to continue working towards developing indicators and methods to measure an approximation towards no net loss. However, the act of removing the requirement to prove no net loss seems to be an admission of its lack of attainability in practice, instead focusing on the more tangible goal of achieving the targets and deliverables set out in the offset plan. Incorporating greater flexibility of offset rules is a common occurrence in many countries around the world, and is generally to appease developers while undermining ecological outcomes (Zu Ermgassen et al., 2020).

Additionality, another key principle in offsetting, refers to conservation outcomes above and beyond what would have occurred if the offset had not taken place (BBOP, 2012b). The 2012 manual does not include any mention of additionality. According to one of the interviewees, it had originally been included but was deleted as it was seen to be too restrictive. However, it is re-introduced in the 2018 version:

Offsets must provide a new action that contributes to meeting the objectives and conservation goals other than that which would have occurred in the absence of it (Adapted IUCN 2016). i.e., the offset must deliver demonstrable gains in the state of biodiversity conservation, which would not have been obtained without its implementation, with new results, that are additional and product of the offset actions. Likewise, to guarantee additionality, it must also be ensured that the negative impacts to biodiversity are not transferred to other areas. (MADS, 2018a, p. 19)

In Colombia, restoring degraded areas within national parks, or offering greater protection to areas in parks under threat of degradation are seen as viable offsetting activities. It is debatable whether offsets located within protected areas constitute 'additional' actions, since these areas should in theory already be protected. IUCN states that only the

expansion of existing protected areas or the creation of new ones can be valid biodiversity offsets, and only so long as they do not displace or reduce existing or future public funding. It acknowledges that some countries are using offsets to make progress towards meeting biodiversity conservation commitments and advises that 'national policies should be designed to move away from such use of offsets. Funding for conservation should not be dependent on the destruction of biodiversity elsewhere.' (IUCN, 2016, p. 6). However, in the Colombian scenario, offsets are permitted within the National Protected Areas System (SINAP) and within private protected areas, as long as 'the actions of preservation, restoration or sustainable use assure a gain in biodiversity, additionality and are aligned with the management plans of the protected areas' (MADS, 2018a, p. 49). The rationale for allowing offsets within protected areas, according to the interviewees involved in the policy process, is that they are seen to be additional to the reality:

We have a great particularity, in that we do not have resources to administer and manage our protected areas, the government does not allocate sufficient resources for the management of those protected areas. So, we consider that investment through offset actions, not the delivery of money, but investment through offset actions, such as restoration, can contribute a lot to the gain in biodiversity within those protected areas. (Henry, Consultant, MADS)

A similar issue related to additionality is that the government openly promotes offsets as a way to deliver on national ecological restoration targets (MADS, 2018b). The rationale offered by the government for this is the same, that 'any action that is done is going to be additional' (Consultant, MADS). It has been argued that in very specific situations, using offsets to finance protected areas can deliver additionality, but is context-dependent and comes with the risk of undermining existing legislation and generating perverse incentives (Githiru et al., 2015, Maron et al., 2016a). If the government uses offsets to meet national restoration targets or to fund conservation in areas which are in theory 'protected', without taking into account the fact that the offset incurs additional negative impacts to the environment, this can endanger biodiversity at a national scale. To avoid such a 'misuse of offsets', transparency in reporting and accounting for losses and gains is key (Maron et al., 2015, Maron et al., 2016a). Colombia's national parks represent the country's most important conservation strategy but face many challenges when it comes to their management (Clerici et al., 2020). However, if offsets widely fail to attain no net loss, it is highly questionable whether offsetting within protected areas can improve this situation rather than exacerbate it.



The new manual updated the geographic information with a more up to date national map of ecosystems produced by IDEAM in 2017. This represented an improvement since it translates into maps with a larger scale and better resolution, facilitating the identification, quantification and analysis of affected ecosystems and potential offset areas. This reduces the disparities between what is planned on paper and what is actually found in the territory when teams go out to the field, allowing a better understanding of what exists in the territory. The previous version of the manual worked under ecosystemic units and, due to the great diversity of ecosystems in Colombia, there were more than 1,700 different ecosystemic units in the country. With such a high number of ecosystems categorised according to unique characteristics, finding a matching offset site that was ecologically equivalent was very difficult. The new version of the manual incorporates IDEAM (2017)'s updated National Map of Ecosystems, which uses the unit of analysis 'Biome - Biotic Unit' (*Bioma – Unidad Biótica*), which has a total of 399 units at country level. With ecosystems classified into 399 instead of 1,700 units, this will make it easier to find offset sites that can be considered 'equivalent'. The difficulty in finding equivalent ecosystems illustrates a fundamental challenge in biodiversity offsetting (Bezombes et al., 2017). However, instead of amending a goal that is unattainable, like no net loss, the narrative of equivalence is sustained while the rules are changed to facilitate the processes.

Table 8: Comparison between biodiversity offset manuals 2012 and 2018: Technical aspects

Aspect	Biodiversity offset manual, 2012	Biodiversity offset manual, 2018	What changed 2012 vs. 2018
<b>Objectives and concepts</b>	Mitigation hierarchy. Must demonstrate 'no net loss' and ecological equivalence.	Mitigation hierarchy. Must demonstrate that objectives and goals of the offset plan (approved by the environmental authority) have been met, as an approximation towards 'no net loss' and 'additionality'. Ecological equivalence.	No longer need to prove no net loss but must demonstrate the objectives and goals set out in the offset plan have been met. The concept of additionality has been added.
<b>Scale of</b>	1:500,000	1:100,000	Offsets will now be

<b>ecosystem maps</b>			evaluated based on maps using a larger scale with more detailed biological information.
<b>Units of analysis (offset factor)</b>	Biogeographical districts defined by Corzo, G. and Andrade, G. (2010). Biomes defined by (IDEAM et al., 2007). Ecosystems defined by (IDEAM et al., 2007).	Biome – biotic unit ( <i>BIOMA_IAPH</i> ): Biome defined by (IDEAM et al., 2017). Biotic unit defined by (IDEAM et al., 2017).	Updated biome-biotic units (reduced from 1,700 units to 399)
<b>Where to offset</b>	Should be located in the area of influence of the project, or in absence, in hydrographic subzone of the project, or in the surrounding hydrographic subzone, as close as possible to the impacted area.	Should be located in the following order of priority: a) hydrographic subzone of the project or surrounding subzones; b) hydrographic zone of project.  If the areas proposed as offsets are less than the impacted area, they should include connectivity areas with restoration potential.  Contribute to regional & national conservation and restoration targets.  Adjacent to other offsets identified in strategic ecosystem register (REAA).	Greater detail is provided on where offsets should be located and how they should link with regional and national targets and activities.
<b>How to offset</b>	1. Actions (conservation, restoration and/or landscape management tools, or a combination).	1. Action (preservation, restoration, sustainable biodiversity use);	Incorporates a wider range of mechanisms for offsets.

	<p>2. Conservation: Creation, amplification or 'sanitation' of public or private protected areas or establish voluntary conservation agreements.</p> <p>3. Restoration: ecological restoration, rehabilitation or recuperation in priority areas identified in National Restoration Plan.</p>	<p>2. Modes (e.g., conservation agreements, payment for ecosystem services, and others);</p> <p>3. Mechanism (direct offsets, third party offsets, habitat bank, forests for peace);</p> <p>4. Forms (individual or grouped offsets).</p>	<p>Allows grouping of offsets for projects with multiple requirements.</p>
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### 7.6.3. Temporal aspects

There is a new requirement that the offset plan must be submitted with the EIA when applying for the environmental license, a change from the previous situation when developers were required to submit an offset plan within one year following the approval of the environmental license. This led to a situation where many licenses were approved, but the offset projects were in limbo, as plans had been submitted that were not approved by ANLA. There is also a new requirement that offset projects must begin within 6 months of the beginning of the impact. Therefore, developers must now consider offsets early on, making it more difficult for them at the beginning of the process, but easier towards the end, as explained by the offset advisor below:

If the compensation process were a room with an entrance door and an exit door, in the previous manual the entrance door was difficult, but it was possible to enter. But the exit door was very difficult to leave ... Then you stayed locked in the process. In this case, it is now a bit more difficult to pass through because you have a very difficult entry door which is an offset plan that gets approved and, instead, a very easy exit door. (Carlos, Researcher)

The first version of the manual required offset projects to last at least as long as the lifespan of the development project. This varied greatly across projects, with some projects lasting only a few months and others, such as hydroelectrics, lasting decades. This component

was changed in the second version of the manual, so that, currently, an offset project ends once the objectives in the plan have been achieved. However, this presents some uncertainty, since the objectives require a strong baseline and it may be unclear at the start of a project if objectives will be met in three years or twenty years (Interview with Gonzalo, Researcher, INGO).

Table 9: Comparison between biodiversity offset manuals 2012 and 2018: Temporal aspects

Aspect	Biodiversity offset manual, 2012	Biodiversity offset manual, 2018	What changed 2012 vs. 2018
<b>Deadline for submission of offset plan</b>	Within 1 year of receiving approval of environmental license (Resolution 1517 of 2012, Art. 3).	Must be submitted as part of the environmental impact assessment (EIA) and evaluated in the application for the environmental licence.	The approval of an environmental license is now contingent on the offset plan (as opposed to being approved first, offset plan developed later).
<b>Deadline to begin implementation</b>	Not specified.	Implementation of offsets should start at latest within six months of the realisation of the impact. Can be extended.	Deadline added for offset plans to start within six months of the impact.
<b>Duration &amp; Monitoring</b>	Offset project and monitoring should last no less than the duration of the development project.	The offset project and monitoring requirements end once the objectives of the plan have been achieved.	Duration of offset project changed from a set timespan (duration of development project) to once the objectives of the offset plan have been achieved.

## 7.7. The status of offsetting in Colombia and future challenges

During fieldwork in 2018, all interviewees involved in offsetting at the national level were asked if they had information on the number of offset plans approved to date since the

2012 manual or if any projects were being implemented. There was a lack of clarity around this; some thought that no plans had been approved, while others thought that a handful were approved and being implemented. Information was collected from ANLA through official requests at different stages throughout 2017-2020. In July 2018, ANLA provided an Excel document containing a list of 186 projects licensed since 2012 that are subject to biodiversity (or 'biotic') offsets by ANLA, although it did not include the status (i.e. if the offset plan had been submitted, approved, etc.). In a meeting in August 2018 with the team of the Environmental Permit and Procedure Group in ANLA, they explained that since under the first version of the manual the projects had 12 months after receiving licence approval to present the offset plan and since there were delays going back and forwards between ANLA and the company, it was likely that almost none of the 186 projects in the list had finalised offset plans and even less likely that any projects were 100% executed.

In June 2020, ANLA launched an online platform called '*Apuestas por la biodiversidad*'<sup>31</sup> ('Betting on biodiversity'). It compiles information from the environmental licenses information system (SILA) on projects subject to environmental offsets under two mechanisms: '*compensación*' (referring to everything that comes under the biotic compensation manual) and '*1%*' (referring to the obligatory 1% investment). Over 400 million COP have been approved through 1% investment and more than 32,000 hectares have been allocated for conservation and restoration actions. There are, as of November 2020, 486 projects in 28 departments with compensation requirements and 380 projects in 26 departments with 1% investment requirements. The majority of these projects are in the hydrocarbon sector, followed by infrastructure, energy, mining and agrochemicals. The vast majority of the compensation projects (382) are using reforestation (ANLA, 2020a). However, it is not clear from the information available to date what stage each of these projects is at. Additional information received from ANLA includes a list of 3,391 projects that received an environmental license between 1991 and June 2020.

As a consultant commented, 'We already have a tool, but it has not started to be implemented... So, we are not going to know positive or negative results yet... results-results we will begin to see after ten years' (Interview with Henry, Consultant, MADS). The greatest challenges for the future of offsetting in Colombia, according to interviewees, are corruption, lack of transparency, weak institutional capacity, implementation, legal

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<sup>31</sup> <http://www.anla.gov.co/proyectos/apuestas-por-la-biodiversidad/noticias-biodiversidad>

disarticulation, governance, lack of information, lack of areas for offsets, managing expectations and competing interests, working with communities, and long-term results and monitoring. The lack of baseline information is a great challenge in Colombia, due to the diversity of ecosystems with so many particularities, but also the distribution of information and articulation among different institutions poses a challenge. Some of the interviewees commented on the difficulty getting information from civil servants in environmental authorities, often because there is a lack of standardised procedures and it is left up to the capacity of the individual to review offset plans. This situation causes fear among civil servants and reluctance to share information or make decisions, because if something goes wrong, it is they who are held accountable:

The civil servant who has to sign the approval is very afraid to do so. So, they start to delay, try to pass anything that seems complicated to someone else so that someone else is going to get sacked later. (Carlos, Researcher)

A major challenge is implementation in the territories, coordinating between communities, institutions and competing interests and avoiding offsets being used as a vehicle to fill gaps in the regions, or to be swayed by the interests of the current government or civil servant in office (Interview with Marian, Coordinator, Trade association). Another challenge is finding areas to restore, whether it is obtaining land to be conserved in the long-term or working with landowners on conservation or sustainable use projects. Corruption is a barrier here, as one interviewee explains the types of issues they have had in the past where reforestation was carried out on a private property that was later logged once the five years were up:

There is another problem that is not minor and is associated with corruption in the country, but actually on the planet; it is a fairly global issue. And not so much because the process is corrupt; of that I have no idea. I'm sure it was corrupt when the compensation was associated with reforestation, and reforestation was only for five years, which was what happened before 2012, since it was very likely that the environmental authority would send a few thousand trees to be planted on the farm of a friend of the mayor or whatever, because after five years I will basically have wood that they gifted me. So, it lent itself to that kind of corruption. Now, no longer because it must be maintained in time and so on. (Carlos, Researcher)

What remains are challenges for those working to protect biodiversity in a system that they see as working for the private sector:

The institutional weakness that we have in our environmental authority that sometimes it seems not to work to conserve biodiversity but to help the gentleman of the company obtain his construction license. That is an issue that worries us a lot because this compensation is being seen a lot as a recipe. Like, you do one-two-three-four and *voilà*, you wash your hands and offset the impact. And it turns out that I believe that no matter how good the compensation is, it will not be able to compensate for the impact caused by the construction, either in terms of biodiversity or in social terms. (Veronica, Project Manager, NGO)

## **7.8. Conclusion**

Environmental compensation was introduced into Colombia in the 1970s and 1980s following the North American model of environmental regulations and to meet the requirements of international lenders, specifically the World Bank. In the 1990s, Colombia established a Ministry of Environment and the concept of sustainable development was enshrined in policy, as were forest offset obligations. Two decades later, biodiversity offsetting legislation was introduced amid evolving trends at the international level and an awareness at the national level of the need to improve efforts to find a balance between the environmental losses and gains of projects. Following some hype surrounding the introduction of biodiversity offsetting legislation in 2012, implementation was stalled, and offset projects were stuck in limbo as no (or very few) offset plans were getting approved by ANLA. This was due to a combination of factors, such as lack of clarity and capacity on both the side of the companies and the side of ANLA regarding what a suitable offset plan should look like. The 2018 version of the manual addresses a number of the barriers to implementation that were present in the earlier version. This will make it more challenging for developers at the beginning of the process, as they have to get their offset plan approved in order to be granted an environmental license. However, by adjusting some of the rules, it is expected to make it easier to get a plan approved and implemented. The process to do this, however, has meant relaxing rules on ecosystem equivalence, and the achievement of no net loss is measured not necessarily on ecological losses and gains, but rather on a set of actions that aspire towards no net loss.

This has been a common trend in the implementation of offsetting policies in different countries, where standards are relaxed to over time and are failing to deliver on promised environmental outcomes (Goncalves et al., 2015, Nature Conservation Council of NSW, 2016). Offsets have also been criticised for leading to the weakening of existing protections, challenging the common defence of offsets as being 'better than nothing' (Moreno-Mateos et al., 2015). This is a real risk in Colombia where many institutions look

with anticipation to offsets as a way to finance their activities. What is clear from the discussions with stakeholders is that goals such as 'no net loss', 'ecosystem equivalence', and even in many cases 'additionality', are considered idealistic, 'philosophical', but not practically attainable. In response, the rules of the game are changed, rather than the discourse. The discourse promoted by offsetting fits nicely into international sustainable development and green growth agendas, making it easy for governments and the private sector to embrace. In Colombia, like across the world, offsets seem to be an extension of a long-term trend, where the contradictions between extractivist development and environmental policy have led to the moulding of environmental policies to fit a neoliberal model, with the progressive privatisation of environmental management in favour of business initiatives (Guhl, 2015).



## **8. Offsets in practice: The trials and errors of Hidrosogamoso's forest offsets**

### **8.1. Introduction**

This chapter takes a closer look at offsets in operation, addressing the second research question: *How has environmental offsetting been implemented in practice in Colombia?* This chapter and the next represent 'sub-unit 2' of the research case study, focusing on the case of the Sogamoso hydroelectric dam, known as 'Hidrosogamoso', and a pioneering ecological restoration project within Parque Nacional Natural (PNN) Serranía de los Yariguíes. This restoration project represented part of the dam developer (ISAGEN)'s environmental compensation requirements under Colombia's compensation for forest use legislation (*aprovechamiento forestal*), hereafter referred to as 'forest offsets'. Looking at this case, the present chapter explores the challenges encountered during the implementation of the forest offsets and the perceptions of success and failure, according to different stakeholders. The results presented in this and the next chapter are based primarily on data collected through semi-structured interviews with key stakeholders: ISAGEN; staff members from the consortium of NGOs and institutions involved in the forest offset project, some of whom were based in field offices in Santander and others based in Bogotá headquarters; project staff from the local community; a regional environmental authority; community members whose land was purchased for the project and some who live nearby; community leaders; activists and academics (34 interviews with 42 people, see Appendix B). Additionally, it draws on data received from: freedom of information responses from the national and regional environmental authorities; relevant legal documents; final reports from the offset project; the environmental impact assessment; transcripts of two public hearings; an independent audit report; peer- and non-peer reviewed papers; online news articles; videos; and NGO reports and websites.

After introducing PNN Serranía de los Yariguíes and the forest offset project, the rest of the chapter will discuss the key social, ecological, institutional and economic challenges confronted by the stakeholders involved and their differing perceptions on the degree of success or failure of the project. The chapter concludes with some reflections on the local level experience with offsetting and ecological restoration.

## **8.2. Ecological restoration in PNN Serranía de los Yariguíes**

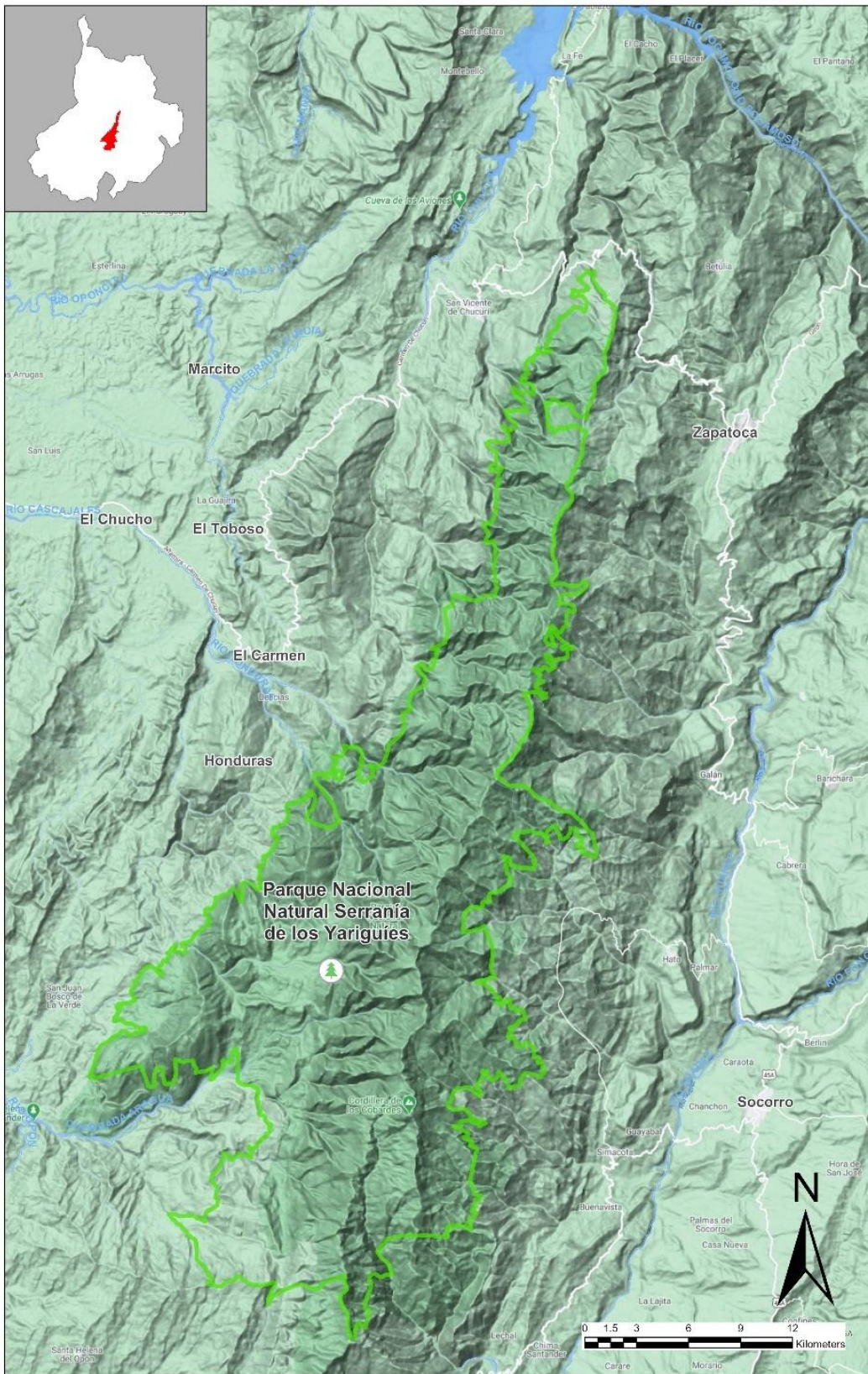
PNN Serranía de los Yariguíes is a protected area covering 59,063 hectares that was declared a national park in 2005. It is located entirely in the Department of Santander, crossing seven municipalities: El Carmen de Chucurí, El Hato, Simacota, Santa Helena del Opón, Galán, Chima and San Vicente de Chucurí. Surrounding the park is the Integrated Management District of the Yariguíes, a type of regional protected area. The park is not open to the public, except for biological expeditions and bird watching tours organised by Fundación ProAves, which owns a reserve within the park. The altitude of the national park ranges from 500 metres to 3,200 metres above sea level. The park contains different types of forest from tropical rainforest to high Andean forest and has been recognised for its important biodiversity, especially bird diversity, and is home to the jaguar, spider monkey, Andean bear and puma (Díaz, 2008). The park's management plan, published in 2008, identified threats to conservation, including the expansion of the agricultural frontier, deforestation for commercial wood and firewood, hunting, and mining of coal and uranium. It stated that the presence of armed groups in the area had an impact on the ecosystem and on the daily management of the park and that the cultivation of coca has generated impacts on the vegetation cover, especially towards the south-west (Díaz, 2008).

Environmental compensation mechanisms through forest offsets and compulsory 1% investment from development projects represent for the national parks' authority a potential source of financing for the park and surrounding area. In the case of Hidrosogamoso, to undertake the forest offset project within PNN Serranía de los Yariguíes, an agreement was signed between three entities: ISAGEN, Parques Nacionales Naturales de Colombia, and Patrimonio Natural Fondo para la Biodiversidad y Áreas Protegidas, a Colombian non-profit fund that invests in environmental projects. By combining technical (Parques Nacionales), administrative (Patrimonio Natural) and financial (ISAGEN) efforts, the objective was to contribute to maintaining ecological integrity and the provision of ecosystem services of the national park, through ecological restoration, environmental education and local and regional communication (FUNDASET-CONIF, 2016). The Yariguíes offset project represents a pioneering project in two senses, firstly by using ecological restoration, as opposed to traditional forms of reforestation, and secondly by combining the efforts of public and private institutions to carry out a project within a protected area, something that had little precedent in Colombia. The project has

been presented by Parques Nacionales as 'one of the most important ecological restoration projects carried out in a protected area, not only in terms of the impacted area or assigned resources, but also due to the scientific rigor used in each of the stages developed' (Villamizar Durán et al., 2018, p. 20).

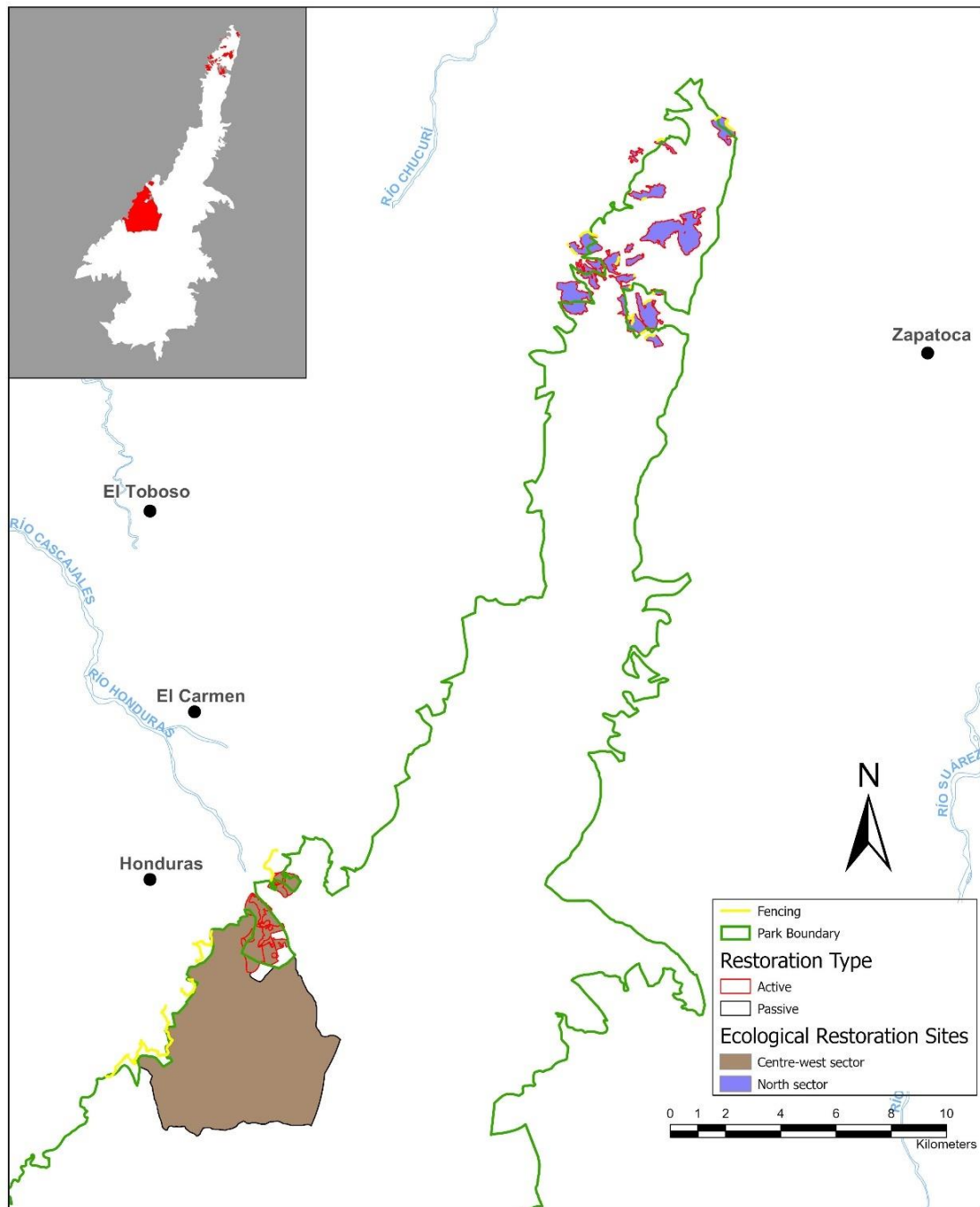
Ecological restoration refers to an intentional activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity and sustainability (Society for Ecological Restoration International Science & Policy Working Group, 2004). The Yariquíes project involved restoration that was both *active* (direct intervention by humans in order to accelerate or influence the restoration process) and *passive* (removing the stressors or disturbances generated by humans to allow spontaneous natural regeneration to occur) (Moreno Valderama et al., 2017). The target was the ecological restoration of 4,472 hectares inside the park in two locations – the centre-west sector in the municipality of El Carmen de Chucurí, and the north sector in the municipality of San Vicente de Chucurí. According to interviews with project coordinators in ISAGEN and Parques Nacionales, target areas were identified based on the park management plan - areas that had been degraded by farming, cattle and logging and that were preferably in the hydrographic sub-zone of the Sogamoso River.

Figure 20: Location and boundary of Parque Nacional Natural Serranía de los Yariguíes



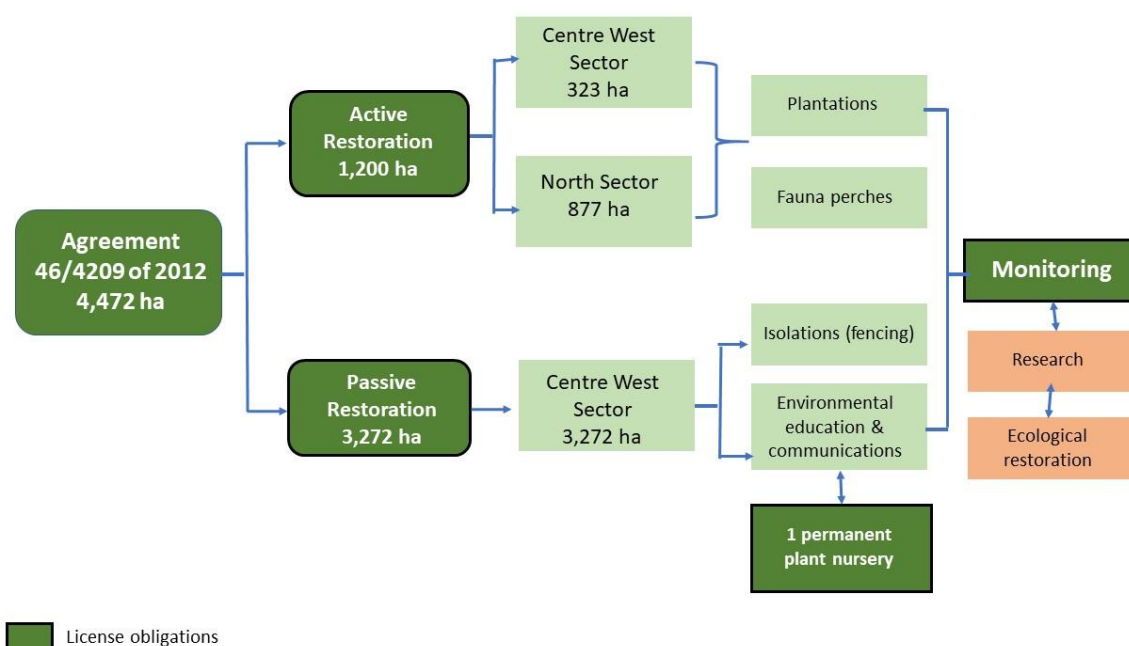
Map: Created by Wahaj Habib; data supplied by Parques Nacionales Naturales de Colombia

Figure 21: Location of ecological restoration sites in centre-west and north sectors of Parque Nacional Natural Serranía de los Yariguíes



Map: Created by Wahaj Habib; data supplied by Parques Nacionales Naturales de Colombia

Figure 22: Operative diagram of the Yariguíes forest offset project (Agreement 46/4209)



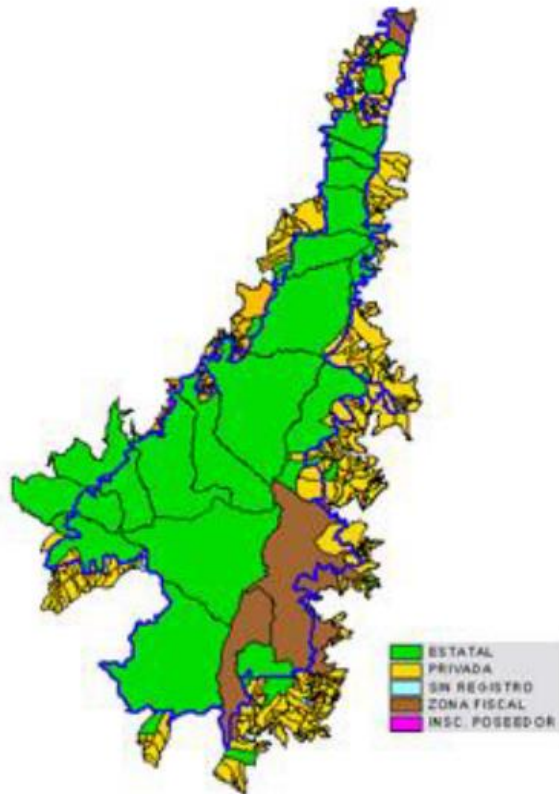
Source: Adapted from Parques Nacionales Naturales de Colombia et al. (2016, p. 7)

In the centre-west sector, El Carmen, the restoration project was implemented between August 2013 and August 2016 by a temporary consortium called FUNDASET-CONIF formed by two organisations - Fundación para el Desarrollo Agrícola Social y Tecnológico (FUNDASET) and Corporación Nacional de Investigación y Fomento Forestal (CONIF). The actions involved active restoration in 323 hectares of sub-Andean humid forests through the propagation in plant nurseries and planting of 102,865 plants belonging to 26 native species. Passive restoration was carried out in 3,272 hectares, through the installation of 12km of fences and surveillance and control as well as environmental education (FUNDASET-CONIF, 2016). Aside from the coordinators and professionals, some of whom were from different parts of Colombia, the labourers were all locals - farmers and young people, the vast majority male. Additional monitoring took place between August 2017 and February 2018, through an agreement with the university Pontificia Universidad Javeriana. In the north sector, San Vicente, the offsets were implemented between June 2015 and February 2018 by a temporary consortium called the Unión Temporal Jaguar Corredor Norandino, formed by three institutions: Fundación Natura, Fundación Estación Biológica Guaya canal, and Corporación Desarrollo y Paz del Magdalena Medio. The project involved the propagation and planting of 165,000 plant

specimens of 86 native species in seven vegetation units distributed across 642 hectares of high Andean humid forests (Fundación Natura, 2018b).

When PNN Serranía de los Yariguíes was declared a national park in 2005, much of the land within the boundaries was still privately owned or occupied, some by occupants with legal title to the land, others without. The declaration of the park meant that properties within the boundaries were subject to restrictions – the owners or occupiers were not allowed to extend their crops, keep cattle or mules, bring vehicles in, cut down trees or hunt animals. The properties were labelled as being environmentally affected (*'afectación ambiental'*), making it extremely difficult for people to access credit or subsidies. *'Saneamiento predial'*, literally translated as 'property sanitation', refers to a strategy whereby the state purchases property located inside conservation units, such as protected areas, from land owners or possessors (Ministerio de Medio Ambiente et al., 2005b, p. 42). In 2008, a total of 90 properties were identified inside the Yariguíes park limits: 32 state-owned, 56 private and 2 belonging to NGOs (Díaz, 2008). The park management plan set a long-term goal to acquire all the properties within the park and bring them under state control and ensure no tenure conflicts (Ministerio de Ambiente Vivienda y Desarrollo Territorial [MAVDT], 2010). Since Parques Nacionales lacks the funds to purchase property within national parks, environmental offset mechanisms have arisen as a way to finance the property sanitation process. ISAGEN, with obligations under the compulsory 1% investment legislation for the Hidrosogamoso project, invested part of these resources, 4,495 million COP, towards the purchase of 40 properties within the Yariguíes park, since it contains the source of water flowing into the Sogamoso River (PNN, 2016).

Figure 23: Legal situation of property within and along the border of PNN Serranía de los Yariguíes in 2008



Green = State-owned; Yellow = Private; Blue = Not registered; Brown = property of territorial entities (e.g., the district or municipalities); Pink = properties in process of being registered

Source: Díaz (2008, p. 59)

### 8.3. Challenges in environmental offsetting

Drawing on interview data and project reports, key challenges emerge in relation to offsetting and ecological restoration processes at the local level. The stakeholders involved in the offset project identified several social, ecological, institutional and economic challenges, which are discussed below.



### 8.3.1. Social challenges

- Acquiring land for offsets

One of the greatest challenges raised by the interviewees was the acquisition of land to carry out the restoration. In theory, the purchase of land with finance from ISAGEN was an opportunity to resolve existing tensions between Parques Nacionales and the people with land inside the park who were caught in limbo with restrictions applied to their use of the land since 2005. However, as will be illustrated later in this chapter, this was a complex and contested process. The acquisition of land within a protected area posed two separate challenges. First was the decision to offset within a protected area, which can be argued does not meet the criteria of additionality. As explained below by a manager in ISAGEN, after internal debates, it was ultimately agreed to offset within the park since there were unprotected degraded areas that would have continued to be degraded without the offset:

The reality is that there were private properties, there were interventions within the park. One thing is what the law says, another thing is reality. In the studies that the authority, Parques, did, they found that the 1% resources could be used to do restoration in parks. That had not been done in the country yet. That is, the standard existed but had not been applied. That has happened a lot, we [in Colombia] make rules that stay on the shelves. So, we had to first internally - and that was, let's say, in inverted commas, "a fight" between them internally - to define: do we touch it [the park] or not? If it is not touched, the interventions will continue. If you touch it, you can recover, you can try to recover... So, the first phase was, "and how do we do restoration in an area that is not ours?" It is a park, but it does not [all] belong to the state. The areas that are preserved are owned by the state. But you cannot do restoration there because, what are you going to do where it is already preserved? Where is it done? The zones that are totally intervened. So, those intervened areas required property sanitation, which was part of the diagnosis... and from there began the processes, defining actions, procedures and doing all the studies of what would be done in each part. It was very difficult; it was not easy. (Camilo, Environmental manager, ISAGEN)

The second challenge was that the land designated for the offsets was occupied. There were disparities between the areas that had been identified on maps as target offset sites and the actual status of the land. As a result, when teams went out to the territory to start implementing the restoration activities, they discovered that areas that had been presumed vacant were in fact occupied by people. Negotiations with the owners and occupiers of land were lengthy and complicated, due to complex land tenure issues and contested valuations of the land. This conflict over the purchase of land is discussed in greater detail in the next chapter. In terms of the implementation of the offset, the planning issues and

discrepancies over land occupation caused a significant delay to the project, as well as impacts on and tensions among the community. A similar situation was confronted in the buffer zone area surrounding the reservoir, with the contractors arriving to the zone to start the reforestation and finding that the land had not been obtained, as one contractor explains below:

What was the problem? Well they hired me to plant [trees] and I arrived and the man said, "No, no, they haven't paid me, they haven't bought [my land]", I don't know what, but we had no management in that... My job is to plant, not to manage people... It was very tiresome. (Javier, Consultant, Environmental consultancy)

For those with land inside the protected area, the 'environmental affectation' devalued it significantly. Meanwhile, according to some of the contractors, many landowners with large tracts of land surrounding the Topocoro reservoir benefited considerably from the sale.

- Community relations

A further challenge was the tension between the organisations implementing the offsets and the local community. This was highlighted by interviewees as an issue in the forest offset projects in PNN Serranía de los Yariguíes as well as in the Topocoro reservoir buffer zone. From the point of view of some of the company representatives, local authorities and contractors, members of the community posed a problem by disrupting the offset project. There are examples of local farmers letting cattle graze on protected land, breaking fencing and, in the case of the Yariguíes project, there was an incidence of direct obstruction when community members living inside the park closed the path to workers in protest at not being involved in the project. Interviewees from the company attribute this to a lack of education and culture among the community regarding conservation. From the point of view of interviewees from the local community, the offset project was planned and implemented without proper consultation with the local people. Therefore, they felt excluded and the strategy employed by Parques Nacionales divided the community:

Of all the land that Parques bought, they came and looked for the most diligent, the heads of the area, the leaders. And, to them, "Come here, we'll pay you a lot" ... They were leaving the communities without a representative, right? If they paid one, why didn't they pay the others? Yes? That is the way to silence the people, the communities. (Ramon, Farmer)

The [other] challenge was, it must be said, it was the community itself because the community in the first place did not fully accept the presence or formation of the park, which is an expected response because they arrived here before the park arrived. They had their ways of life already established and the park from one moment to the next... the park fell on top of them. And, on the other hand, they knew that the project was financed by ISAGEN so they had very high economic expectations about what the project could bring. So, some people in the community tried to charge for their services or their work four or five times more than the work normally cost. (Luis, Ecologist, Research institute)

The forest offsets in the Yariguíes park highlight the social consequences of offsets. As Bidaud et al. (2018) highlight in their work in Madagascar, there is a contradiction whereby some stakeholders perceive offsetting inside a protected area to be preferable to outside it, in order to avoid conflict. However, as Bidaud et al. point out, if there are no threats to biodiversity then there is no justification for a biodiversity offset and if there are threats due to land encroachment or extraction, then there will be local costs to restricting access to and use of natural resources.

- Gender-related challenges

The vast majority of the staff working on the Yariguíes offset project were male. The small number of females had roles such as coordinator, seed sorter and cook. One woman spoke of the challenges at the beginning of working in a male-dominated team and earning respect, especially in a leadership position. The low number of women in the offset project was attributed to the physical nature of the work, which involved long treks and carrying heavy materials:

Well, as a woman... at the beginning it was a little difficult, but later I felt the respect and support of my colleagues, because I was also very excited to participate in the project. So, to recognise everyone's role and the importance of it, the one who collects the seeds does a very important job, and so on. Very few women in the project, because of what I was saying, it was very heavy work, but they were given priority in the seed work, bagging, planting, in the kitchen support, too... But yes, there were way more men involved, due to the issue of the heavy work. (Carolina, Technical coordinator, NGO)

Another woman from one of the participating institutions at the local level also said the low participation of women in the project was due to the physical nature of the labour and also highlighted the issue of security, where as a woman she feels safer going to the field accompanied by a man. The excerpt below from our interview highlights some subconscious gender biases and contradictions, where Santanderean women are seen as

strong and tough but also delicate, not supposed to do certain activities like handling a mule:

As a woman, I feel a little more secure - not because I am *machista*, but I, as a woman, feel a little more secure when I go out to the field with a man. I don't know, perhaps they are a little less nervous or show a little more assurance. So, I feel a little more secure personally. But, within the project, it was not the masculine issue, obviously, it was necessary to look at the roles. For example, in unskilled labour, the roles of women were cooking, women's roles were to pack substrate into the bags, maybe because, I don't know if it would look good, a woman handling a mule. I know that women here are very strong, very tough. But I don't know if it's because, obviously, our body is a little more delicate, we cannot be jumping from one side to another as men do, our female organs, obviously, would atrophy, right? Maybe that's why. However, yes, women could have been involved a little more, perhaps in other ways, I don't know, in seed collection. (Gina, Social manager)

At the beginning of the project, the wives of the male labourers did not like the idea of a female cook entering the project, a sole woman working among their husbands, and they visited the project coordinator to request the woman to be sacked. Their request was refused, however, and the issue was resolved, with organised family events helping to build morale and trust (Interview with Carolina, Technical coordinator, NGO). In Colombia in general, there are many women in administrative and managerial roles in the environment sector. However, the gender disparity is more visible in rural areas, where there are sizeable gaps in labour market participation and education among men and women, and a higher prevalence of patriarchal social norms (World Bank Group, 2019). In rural areas, women generally bear the burden of childcare as well as working on their farms, which means leaving home to work in the field is not possible for many. Likewise, in the Topocoro buffer zone, the majority of workers in the offset project were male, as were all the forest rangers.

The final report of the offset project in the centre-west sector states that women made up almost half of the participants of a socio-economic survey carried out prior to the project, and were involved in environmental education programmes (FUNDASET-CONIF, 2016). The final report of the north sector does not specify the gender balance in reference to 'families' and 'communities' involved (UT Jaguar Corredor Norandino, 2018a). Part of the project agreement involved the development of a 'Historical-cultural investigation of the man-nature relationship and its effect on the ecosystems of the PNN SYA' (UT Jaguar Corredor Norandino, 2016a). The 115-page study is comprehensive in many ways but

includes only two references to women. One is in a proposal for an educational awareness programme aimed at women and children (ibid., p. 102). The other is in a passage cited from the Zapatoca Mayor's Office referring to '*la chusma*', explaining that in the 17<sup>th</sup> century this term was used to refer to women and children as a group who did not pay taxes (ibid., p. 34). '*La chusma*' is a derogatory term that can be translated as 'the mob' or 'the riffraff', providing historical context to the marginalisation and subjugation of women.

While there has been increasing recognition of the human dimension in ecological restoration, and growing consideration of gender in environmental issues generally, the gender dimension in ecological restoration specifically has been largely overlooked (Broeckhoven and Cliquet, 2015). Integrating gender into restoration offers opportunities not only for greater involvement of women in restoration projects, but also their meaningful participation in consultation and decision-making processes, such as decisions over which species to plant and what areas should be prioritised for restoration (Basnett et al., 2017, Broeckhoven and Cliquet, 2015).

### 8.3.2. Ecological challenges

The local environment posed many challenges in the implementation of ecological restoration in PNN Serranía de los Yariguíes, as highlighted by the interviewees and in the final project reports (FUNDASET-CONIF, 2016, UT Jaguar Corredor Norandino, 2018a). The key ecological challenges are discussed below.

- Weather, ecosystem and terrain

The field area is humid with high rainfall. The interviewees and final reports cite excess humidity and frequent, heavy rain as a major challenge for the propagation of plants and the logistical implementation of the project. Established grasslands and the presence of fungi threatened restoration efforts and resulted in tree mortality. Since it was taking place in a protected area, organic methods were used to tackle diseases. The diversity of the ecosystem brought with it pros and cons; numerous plant species that formed the basis for the selection of species, but also varied periods of fruiting, scattered seed sources and difficult access (UT Jaguar Corredor Norandino, 2018a, p. 92). Interviewees cited the difficulty locating the seeds of target species, especially threatened species, and therefore the list of species had to adapt dynamically throughout the project according to the local conditions:

When they sent the lists [of species] to the field, being in the field one realises if it works, if it does not work, the changes, so these lists were very dynamic. Obviously, it was discussed with the [restoration professional] and you worked with the team. (Carolina, Technical coordinator, NGO)

Steep slopes made the erection of fencing difficult in some areas, and the original target of metres of fencing was reduced (UT Jaguar Corredor Norandino, 2018a). Falling branches and trees and unstable rock formations are also cited as challenges, as the area is prone to landslides. In June 2016, the 'Yariguíes Experimental Garden' and permanent plant nursery, part of the offset project in the centre-west sector, were severely damaged by a landslide, leaving them unsafe and forcing them to be abandoned.

Figure 24 shows photos of the damage and Figure 25 shows a landslide encountered during fieldwork in El Carmen de Chucurí in 2018. One of the project coordinators pointed out that the disaster might have been avoided through a thorough soil and geological analysis, although it was not required by the authority for the construction of a single-storey building.

- Remote locations

Steep terrain and remote locations with long distances between offset sites made distributing vegetation material difficult; it was carried by mule as far as possible and then by the workers in baskets for distances of up to one kilometre. In the centre-west sector, it was a two hour walk in dense forest from the border of the park to arrive at the offset site 'La Roña'. Camps were set up at the site for team members to stay for periods of a week or so at a time. One woman walked three to four hours each day, on top of working from 7am to 4pm, in order to return home to her family every night. In the north sector, workers also had lengthy treks of up to three hours each way to arrive at some offset sites, as described by one of the local labourers below:

For example, they grow three hundred plants, those three hundred plants have to be taken and put on six mules and carry all of them... and we spent about three hours on the way and if one was missing, to return about three hours on the way to look for it, they were well counted ... We worked with up to twelve mules between two of us. And making two trips a day, that was working from five in the morning and arriving at around at six in the afternoon... It was really muddy up there, it's far, ugly paths with the mules and everything. They sometimes got frightened, we had to stop and go again, because what else can you do. (David, Restoration project staff / Farmer)

Figure 24: Photos of natural disaster in Vereda Cañaverales, Yariguíes offset project centre-west



Julio de 2016

Source: FUNDASET-CONIF (2016, p. 66)

Figure 25: Photo of landslide blocking road in El Carmen de Chucurí



Photo: Jane Feeney, October 2018



- Health risks

Working in a tropical forest environment posed certain health threats to the team. There were illnesses among the workers with incidents of dengue, leishmaniasis, chagas as well as fungus from handling seeds (Interviews with Gina, Social manager and Patricia, Farmer). Workers also encountered venomous snakes and tarantulas. However, an important benefit of hiring local people from the area is that they are familiar with such threats, as a contractor from the buffer zone project mentions below. Motorcycle accidents also pose a risk, especially with a culture of not wearing helmets in some rural areas.

There are many risks, above all, accidents because they travel on motorcycles, the snakes and all that. They [the workers] are very sharp and they know, in fact one time I was in a nursery, two snakes came out, two "Talla X", but they know how to handle that and catch them, scare them away. (Javier, Consultant, Environmental consultancy)

### 8.3.3. Institutional and economic challenges

The offset project reveals many institutional and economic challenges – decisions over how to best restore the ecosystem, tendering processes, hiring and retaining staff, dealing with bureaucracy, working to tight timescales and budgets, and limited financing for monitoring.

- Decisions over the restoration approach

Since the field of ecological restoration in Colombia is young and the Yariguíes project involved many different institutions, there were conflicting opinions on the best restoration strategy to take. Therefore, one of the challenges was to find agreement on what kind of restoration to do and how to do it, as one of the ISAGEN executives explains below:

And the other issue that was very complex to solve was the issue, let's say, among the schools of ecological restoration - who is doing ecological restoration in a park, at that time? No one. What has to be done? Does assisted natural restoration work? Does it not work? What do you do, that is, who gets involved? It was very complicated, it was one year, one long year that it took us to come to an agreement between the different schools on who was capable of deciding how to do ecological restoration in a national park. (Cristian, Environmental coordinator, ISAGEN)

Another challenge discussed was of resolving the gaps between expectations of academics on the team and the experiences on the ground. However, the involvement of

multiple institutions with different capacities was also highlighted as a positive aspect, setting a precedent for future projects of this kind.

- Tendering processes

The tendering process to hire contractors for the offset project was cited as a risk to the effectiveness of projects, since it is often the organisation that offers the lowest bid that wins, rather than the organisation with best technical capacity and experience in conservation or restoration. This was highlighted as a problem in both the Yariguíes and Topocoro buffer zone offset projects:

It is necessary to mention that [the contractor] won this tender not because they had a background of work in biodiversity. They won because they had a background in the administrative part and in the operational part. That has a good part and a bad part. The bad part is that until they integrated prepared people into the team, the project did not go well. After they brought in people with the appropriate knowledge, the project started to go well. I want to emphasise this because, well, that bad part that we are talking about is a latent risk. At any other time, some other institution without scientific and technical capacity can win the bids and the projects can be a failure, so you have to be careful with this aspect. (Luis, Ecologist, Research institute)

Further evidence of this challenge emerged during fieldwork in relation to a restoration project being implemented by an engineering firm contracted by the regional environmental authority, CDMB. In a meeting with the contractor, the coordinator of the project explained that the company had no prior experience in reforestation and that their last project was supplying missiles for the Ministry of Defence (Personal communication, Project coordinator, Consultancy).

- Staff hire and retention

The formation of a competent and appropriate team to carry out the restoration posed a challenge. Initially, the temporary consortium in the centre-west sector sought highly experienced people with PhDs and other candidates that were not easily found, whether due to the lack of experienced restoration professionals in the country or due to the specific profiles not existing (e.g., seeking a person with expertise in both restoration and administration). The project required more labourers than experienced restorationists and as a result, the first team that was formed was unsuccessful and the organisations had to redefine the profiles and hire new staff, all of which resulted in delays to the project. The

coordinators and labourers pointed out that there was a high turnover in staff, due to the conditions of the work (e.g. long hours and physically challenging).

- Bureaucracy

Slow bureaucratic processes to get approvals from institutions resulted in significant delays and affected monitoring processes and the effectiveness of the restoration, as explained by one of the professionals below:

The bureaucracy... has prevented this monitoring from being carried out within the required times. It has taken too long. This has prevented us from monitoring the impact of our plantations more rigorously. It was a job that we should have done as soon as the plantations were finished, but because of the bureaucracy of the [institutions], that took a long time... The elaboration of the agreement and the beginning of the agreement to monitor took practically a year. That is not good from the point of view of scientific rigor, this is not good. (Luis, Ecologist, Research institute)

- Timescales

Meeting the targets in the designated timescales is a challenge brought up by many of the interviewees involved in the Yariguíes and Topocoro buffer zone projects, especially when dealing with unexpected weather conditions and plant mortality, as one of the project coordinators explains below:

Well, generally, the plans have indicators, saying ... "In so long it must be concluded..." But, for example, let's say, the number of individuals that must be there, their survival, the mortality, the climate change that at that time began to be felt. So, periods that were supposed to be rainy, weren't, and obviously then the plantings were carried out considering those cycles... So, that made it necessary to reprogram it, do the planting, that is one of the very important things when it comes to restoration. (Borja, Consultant, Environmental consultancy)

- Budgets and resources

According to some of the contractors, the project designs were unrealistic and budgets under anticipated. A consequence of the tendering process, when the project is offered to the lowest bidder, is that resources are stretched, and teams are pressured to meet targets with tight deadlines and limited resources. Some contractors argued that community members tried to exploit the situation of a megaproject coming to their area by charging more than their normal rates for work or supplies. On the other hand, while the manual labourers interviewed were appreciative of a regular income during the project, from their point of view they were paid the bare minimum, and one man talks of how he felt there

was a disproportionate gap in salaries between the 'simple operators' and the 'professionals':

Well, [the pay was] not so good, but there you go, you take it, because what else can you do? ... They paid at the end of every month, so something would arrive, for a cold one, as they say here in Santander [laughs]. (David, Restoration project staff / Farmer)

Not for us workers, we were even a little dissatisfied as such because although it is true that we were simple operators and the professionals, well, are professionals, but there was a tremendous disproportion in terms of salaries. Because we were basically paid the minimum and if you start to analyse the provision of services, if you apply the same as everything under the law, it even comes out a little less. But then as it is a rural area, it still works because you don't have many expenses... But they could have paid a little better. You know, what I was saying, they wanted to save resources as much as they could. (Martin, Restoration project staff / Farmer)

The Contraloría, the Office of the Comptroller General, an independent government institution and Colombia's highest form of fiscal control, carried out an audit of the organisation Patrimonio Natural and the forest offset project in PNN Serranía de los Yariguíes and found various instances of non-compliance. According to the report, there was a lack of transparency with contracts and lack of provision of social security for workers, at least in some instances (Contraloría General de la República, 2019).

- Finance for monitoring

Concerns were raised over the lack of financing for ongoing maintenance and monitoring of the restoration sites, which undermines the long-term success of the project. In the buffer zone area, ISAGEN has agreed to monitor for a period of ten years after implementation - annual monitoring of indicators at species/population level, and monitoring at ecosystem/landscape level every five years (Interviews with Camilo, Environmental manager, ISAGEN and Leonardo, Environmental professional, ISAGEN). Within the Yariguíes park, ISAGEN was responsible for funding monitoring for the duration of the agreement (the legal responsibility is for three years). After that, the responsibility is handed over to Parques Nacionales. For the north sector, the monitoring program sets out criteria to be monitored annually, with objectives for the short-term (to 2020), medium-term (to 2028) and long-term (to 2038) (UT Jaguar Corredor Norandino, 2016b). For the centre-west sector, the 2018 monitoring report proposes a strategy for monitoring involving Parques Nacionales, Universidad Javeriana and Instituto Humboldt (Garibello-Peña et al., 2018). Additionally, ANLA are required to do follow ups of the projects for the lifecycle of

the Hidrosogamoso dam, which is fifty years. However, it is unclear where the money will come from to fund this work and ultimately, the long-term success of the project will be dependent on the ability of these institutions to secure funding. According to a professional involved in the restoration project, after the change of ownership when Brookfield Asset Management purchased ISAGEN, there was less will within the company to finance monitoring beyond their legal requirements:

Well, with the agreement as such, monitoring goes only until the agreement ends. But initially, there was an endowment fund that was supposed to fund monitoring for a long time. What has happened is that with the change that occurred in ISAGEN in its structure, well, with the sale, that also changed, they are not interested in sustaining this type of thing... What has happened is that the previous manager did have the will, in addition to the five years [monitoring], additional time to evaluate what was happening there. But, well, not now. Now what they say it is, "Comply with what is required, no more", right? So, that money, it has to be spent, what was going to be invested in monitoring has to be spent before the agreement ends because if not, then, well, they collect it and it goes elsewhere. So, what is that money going to be spent on? On property sanitation, on buying property. (Diego, Biologist)

This is an example of how during company takeovers, environmental commitments that are hard to measure may not be valued, and be abandoned as a result (de Silva et al., 2019). This change to the plan is also underlined in the audit by the Contraloría. It states that the management committee (involving ISAGEN, Parques Nacionales and Patrimonio Natural) decided in 2018 to direct the resources originally allocated to maintenance of the plantations to the purchase of more land in the area of the national park and to hire security contractors. According to the auditor's report, 255.2 million COP is to be directed towards 'prevention, control and vigilance', involving the contracting of security guards, which, it highlights, represents an insistence by Parques Nacionales on a restrictive and prohibitive approach to conservation, rather than a participatory one (Contraloría General de la República, 2019, p. 62). It also states that 20 million COP is to be directed towards formalising 19 land purchase agreements affecting 400 people, 'converting these agreements reached into a palliative measure more than a true intention to involve these communities in the process' (Contraloría General de la República, 2019, p. 65).

#### **8.4. Perceptions of success and failure**

At the time the stakeholder interviews were being carried out in 2018, the implementation phase of the forest offset project was over, the final reports were being compiled and the project tied up. In an article published on the website of the Santander newspaper

*Vanguardia* in September 2018, it describes the ‘titanic restoration of the Yariquíes Natural Park in Santander’ (Arias, 2018). A director from Parques Nacionales is quoted, saying, ‘We are handing over to the country a restored natural park’ (ibid.). The interviewees were asked if they consider the offset project a success, and their answers show that perceptions of success vary substantially according to the stakeholder. All the professionals from ISAGEN reported that the project overall was a great success, which is perhaps to be expected. However, the professionals interviewed from the other two institutions involved in the agreement – Parques Nacionales and Patrimonio Natural – were more apprehensive about referring to it as a success, citing areas that could have been managed better, such as planning and the involvement of local communities. Among the contractors and labourers, some said the project was successful in achieving the objectives, while others were less convinced, and some said it was too early to judge, since it will take many years for the effects on the ecosystem to be seen. Those most critical of the project were local community members who felt excluded from the project and locals and activists critical of Hidrosogamoso, who viewed the offsets as a waste of money or even as a money laundering scheme. From the discussions on the successes and failures of the project, three key dimensions of success emerge: social, ecological, and economic/administrative. Each of these is discussed below.

#### *8.4.1. Social dimension of success*

The offset project benefited some sections of the community, while failing others. One of the clear successes of the project was the positive experience of local community members who were hired to work on the restoration project. In the centre-west sector, the core team was around 20 people (FUNDASET-CONIF, 2016). In the north sector, 40 professionals and technicians from the region were hired (Fundación Natura, 2018a). As mentioned previously, at approximately minimum wage for labourers, the job was not considered particularly well paid, especially given the harsh environmental conditions. Nevertheless, for small farmers living in rural areas, the income was welcome. One young man was able to purchase a motorbike and a laptop with the savings, which allowed him to enrol in a distance learning course. In addition to the socio-economic benefits, the local workers spoke of how being involved in the project and the community environmental education programmes gave them a new perspective on conservation:

I think - no, I'm *sure* the conservation project was successful here in El Carmen. First, a lot of employment was generated for many people, also all these workers, all those

people came out with a mentality that we should conserve. So, all this helps us to have a much better environment, very good water, very healthy. So, there was a lot of training by the people who came, telling the people, explaining and many people left there with a different mentality than they had before. (Pablo, Restoration project staff / Farmer)

Well, since it was a project to basically compensate for environmental damage, to consider it a success, even if the goals have been met, I do not think it would be wise to really consider it a success... The experience as such was positive because, first, it provided employment to the community and those who participate, whether a little or a lot, we acquire a different mentality, a different way of seeing things. So, I think that yes, it was a good experience, well not a success as such because it will take a long time to try to recover an ecosystem that has been damaged. (Martin, Restoration project staff / Farmer)

However, there were others among the local community who had a very different experience, as explored in greater detail in the next chapter. The lack of consultation and participation of local communities is seen as a failure by many, not only by those community members not included, but also by the coordinators of the project and the Contraloría in their external audit. The inadequate planning and administration of the project had negative knock-on effects at many levels. The lack of up to date information about land use and occupation caused delays in the implementation of the restoration projects and negatively impacted local communities, who were put under pressure to leave their land. The contractors were not provided with sufficient information or coordination from Parques Nacionales and Patrimonio Natural and, due to the delays, were put under pressure to achieve results on tight timescales.

The incorporation of local people's knowledge is highlighted as an important element for the success of a restoration project. For example, in the north sector, the selection of plant species was based on three sources of information: vegetation surveys; local ecological knowledge of the species, especially timber trees extracted intensively from the forests; and species found during the process of identifying seed sources (UT Jaguar Corredor Norandino, 2018a, p. 24). One of the project coordinators from the north sector highlights the importance of community members' expert knowledge of their area and the biodiversity:

The diagnosis obviously had the participation of local experts, people from the community, that is, who know the species, their phenology. Several of the species that were propagated and sown in this project were proposed by the people who lived there, in those places; by those who used to chop the wood, by those who used to hunt. They,

in the end, were the ones who gave us a lot of information, well, their relationship with the forest, well, it is quite intimate, so they know many things. This is how the project designs were decided. (Diego, Biologist)

On the other hand, there was not the same level of involvement of local people in the planning of the centre-west project, and contractors from this project highlight as a learning the importance of involving communities not only in manual labour but also from the beginning of the project in the formulation of the restoration plan, as their knowledge could have been useful in determining the best areas to restore (Interview with Carolina, Technical coordinator, NGO). One NGO coordinator critical of the project saw the use of local knowledge as cultural appropriation of campesino identity, using the local people for their knowledge and labour:

They took popular wisdom from the campesinos, that is, they took the campesinos, they used them, they got information from them, they collected the seeds and all that stuff. That's called identity theft of campesinos, cultural theft of campesino identity, and they made the [plant] nurseries, they used them for that, they used the campesinos and they went and planted some trees. (Mateo, Coordinator, NGO)

This highlights the key role of local knowledge in the design and success of a restoration project, but also the ethical challenges associated with participatory projects of this kind. NGOs and activists in the Latin American context are wary of the unethical appropriation of the traditional knowledge and genetic resources of indigenous and local populations, for bioprospecting or to serve the interests of Western-style conservation (Escobar, 1998, Martinez-Alier, 2002). There are also challenges in arriving at decisions when participatory restoration projects involve people with different cultures and visions of nature (Ceccon, 2013). Nevertheless, there are examples of how campesino and indigenous movements are gaining legitimacy and autonomy in such spaces, re-appropriating and deconstructing imposed knowledges and natures, with a constant negotiation between the technical and local forms of knowledge (Porto-Gonçalves and Leff, 2015).

#### 8.4.2. Ecological dimension of success

The offset project met the overall ecological targets following the implementation phase and first stage of monitoring, according to those who implemented them. However, the targets were also changed throughout the process and the true ecological success of the project will only become evident in the long term. Results from monitoring showed the



importance of maintenance activities for the survival of the plantations, and the redirection of resources from ongoing maintenance represents a real threat to the restoration projects.

In the centre-west sector of the park, monitoring took place two years after planting, the results of which are published in a report by Garibello-Peña et al. (2018). Overall, the survival rate of the trees was 56% and, according to the report, the results suggest that conditions of high light and the absence of grasses are determining factors for greater survival in humid tropical forest. In terms of the structure and composition of vegetation, the intervened sites were found to be similar to the reference sites, suggesting that high-density planting of natives and successive control of grasses is a successful strategy, at least two years after the intervention. The report notes that this result is likely to be thanks not only to the intervention, but also to biophysical conditions of the sites - abundant and diverse seed bank and seedlings, high rainfall, average temperatures and fertile soils. The report concludes that the restoration strategies implemented were successful in achieving the targets so that the intervened site resembled the reference ecosystem. It is unable to conclude, however, which strategy was more effective – active plantation of certain species or the control of grasses. The results show a paradoxical situation whereby in the short term the achievement of restoration targets is not necessarily linked to the high survival rates of planted trees. However, the authors are careful to point out that these results are not generalisable and that this does not necessarily mean that opting for the (simpler and cheaper) approach of controlling grasses rather than planting trees is the solution. Rather, they stress that future projects should follow an experimental approach, isolating and monitoring different strategies in sites with different climatic and soil conditions and with different histories of use (Garibello-Peña et al., 2018). In terms of the effectiveness of passive restoration (where fencing was erected to protect the area from cattle and people), the original objective was to evaluate the development of vegetation after the establishment of the fence. However, no information was gathered on the condition of the vegetation before the fence was established. Therefore, it was decided instead to evaluate mature forest areas protected by the fencing to serve as a reference ecosystem against which to compare natural regeneration in grasslands. The plots were established in the sector Vereda la Victoria, containing the longest section of the fencing, and because it was the area where Parques Nacionales had the best relationship with the habitants of the zone (ibid.). This highlights how social relations directly influence restoration decisions.

The final monitoring report for the north sector presents data for each of the plots monitored according to various indicators (plant survival and growth, presence of unwanted exotic species of ferns and grasses, presence of native species, and vegetation structure). The report discusses the results for each plot and in the conclusions lists some of the results against the targets, which seem to have been surpassed for the most part, with survival rates higher than in the centre-west sector. However, the report lacks an overall discussion of the significance of the results or learnings, except that maintenance of the plantations had a positive outcome on survival rates, with sites that had received three maintenances performing better than those with only one. A total of 406 bird perches were established, but the results of this were inconclusive. The difficulty obtaining the materials (*guadua*) in the zone meant additional efforts and time to transport them, concluding that an alternative strategy should be followed in future in terms of fauna (UT Jaguar Corredor Norandino, 2018a, UT Jaguar Corredor Norandino, 2018b).

The discovery of two new species of the 'molinillo' tree (*Magnolia*: Magnoliaceae) during the ecological restoration project also represents a successful achievement (Aguilar-Cano et al., 2018). One ecologist interviewed highlighted that while it was a positive learning experience and the goals were met, as a restoration project it was not necessarily successful in terms of improving ecosystem services in the area, one of the stated objectives:

The monitoring we have done so far suggests that the goals were met even within a much shorter time frame than we initially set. We wanted to meet these goals in ten to fifteen years, and we found that many of these goals were met just two years after planting... I have mixed feelings about the results of this restoration project. I can say that we have learned many things, yes. We learned how to successfully restore an ecosystem with certain conditions, but I am not sure that our intervention has been instrumental in improving the supply of environmental services in the region ... In other words, the project had enormous benefits as a research project but no, I don't think it has had an important impact as a restoration project as such, no. As a research project yes, as a restoration project I am not very sure. (Luis, Ecologist, Research institute)

From the vantage point of some of the local people living near to the restoration sites, they saw how the trees planted died due to lack of maintenance and weeds, and therefore saw the restoration as a failure, as discussed in the conversations below with community members in the north sector:

Where they washed 5,200 million [COP], that was money laundering. And do you know what this money laundering represents at this moment, at this moment? Nothing. ... They went and sowed new grasslands, at this moment it is not known what happened to that little tree, what life, what luck that little tree had. They are finished. Why? Because they did the restoration, but never the maintenance. The same thing happens to a tree as when one is born. If one's mother arrived and brought them into this world and [said] "Good luck, off you go." And that happened to the little tree. The grass came and covered it. (Alberto, Farmer)

ENRIQUE: They went and threw some trees there in one of those areas.

RITA: Maybe it was bad planning or ...

ENRIQUE: They didn't do maintenance on them again, nor did they look at them again. They sowed them and left them there. Today they do not exist, most of the trees do not exist.

ENRIQUE: Of the 100% they sowed, I think there will be 20% out there ...

RITA: If even.

ENRIQUE: If even 20%; 80% died.

RITA: There was no restoration that gave results...

ENRIQUE: This was like a legalisation of money, all those trees. Because if they had been fair, they would have been doing maintenance, they would have taken it into account. But no, they haven't done maintenance.

RITA: I mean, one who is in the area and sees them all, every 8 days that you go up, you see them [trees] and say "Oops, no ..."

ENRIQUE: Yes, I mean, one who has knowledge of the area, knows what management the trees need and how they are, in what conditions they are.

RITA: It was not justified... I mean, we can't understand, if you sow a [tree], you must try to not let the weeds eat it. But no, they arrived, they planted them and there they stayed... But no, since they sowed little [trees], the weeds got them and killed them. The ones that were really from there and that were born in the middle of the weeds, there are some that managed to survive. But the vast majority failed. The vast majority failed.

(Interview with Rita & Enrique, Farmers)

These quotes present conflicting accounts of the survival of the trees compared with the results presented by the company. The final report of the north sector reports survival rates of around 80%, while these community members say only around 20% survived. Ultimately, to know the success and survival rates requires ongoing monitoring. ANLA is responsible for environmental monitoring to ensure that ISAGEN meet the objectives laid out in the environmental management plan and deliver environmental compliance reports every six months during construction and every year during operation (Ministerio de Ambiente Vivienda y Desarrollo Territorial (MAVDT), 2009c). ANLA produces technical reports (*conceptos técnicos*) based on desk-based evaluations of the compliance reports or site visits. A professional from ANLA describes the process:

For some things, yes everything is visited. But there are others where there are like sample points, for example Yariguíes, we have not been able to cover all of it because of the size of the park within the time we had, the distances and so on. So, you go to the quadrants or the points in which they could show us as models how the others were developing, or according to the administrative acts, some critical point is chosen to do regular visits...

Within the environmental compliance reports they [ISAGEN] have to give us annual information on how [the trees] have grown or how all the measures they have implemented have progressed, for compensation, for restoration, for different issues. So, based on that information, because they give us reports on the height of the trees, mortality, survival, number of plantings, how many prunings were done. All supported with documentary evidence. So, from that information, when we go to the field, we can verify that it is really developing like that.

(Sara, Biologist, ANLA)

The technical reports then conclude on the compliance or non-compliance of each legal obligation within the period of evaluation. The most recent technical reports for the Hidrosogamoso project were obtained from ANLA, corresponding to site visits in June 2018 and June 2019 (ANLA, 2018a, ANLA, 2019). These reports, at over 500 pages each, are a window into the immensity of the project and the complexity of the environmental impact assessment and compliance processes. The 2018 technical report stated that the forest offsets within Yariguíes had been compliant, based on the monitoring to that date and the survival rates of the plants. However, the same aspects were found non-compliant in 2019, since ISAGEN had not provided sufficient information for that period. Regarding the purchase of land for the forest offsets, ISAGEN did not provide documentary evidence demonstrating that the purchase of properties was carried out following the legal norms and with prior review of land uses in the municipalities, nor evidence clarifying the area purchased for the buffer zone. Therefore, on this point the company was found non-compliant in 2018 and 2019 (ANLA, 2018a, ANLA, 2019).

The ecological success of a restoration project is not necessarily linked to the survival rate of what is planted. This was demonstrated in the centre-west sector, where there was lower than expected survival of the planted trees. However, new trees grew in their place, from seeds already in the ground, which may not have happened without the intervention. Therefore, that community members saw many trees die does not in itself mean that the restoration project failed. Still, there remains a large discrepancy between the ecological success detailed in the reports and the ecological failures perceived by people in the area. Going on what ANLA has reported, the project was legally compliant in ecological terms

as of 2018, however, the lack of evidence provided in 2019 sends a concerning signal regarding future ongoing maintenance.

#### 8.4.3. Economic/administrative dimension of success

One question raised in the interviews was if it would have been more cost-efficient to have followed a passive restoration approach rather than the resource-intensive active restoration in the national park. One of the restoration professionals discusses below how the project would have benefited from a better analysis of the baseline conditions to evaluate the most appropriate approach and to better understand the final outcomes:

This type of forest system, because of its resilience, because of the weather, because of the level of degradation, they are very prone to regenerate themselves. I would have liked for this to have been first evaluated, through chrono-sequence, what is the capacity of these sites after we took out the livestock, after we took out the agriculture, when there was no longer application of herbicides, how the system was capable of recovering. To know if it was necessary or not to invest some resources in actively restoring. But, well, that did not happen here. Here it was assumed that it was necessary and therefore, all the dynamics of the project begin and obviously all the avant-garde techniques were applied, and we turned to the latest methodological and conceptual approaches that they apply in various parts of the world. (Diego, Biologist)

He also points out that the negative impacts of actively restoring inside a forest should be measured against the gains: 'because one does not know if by introducing mules... loaded with material, all the impact that can be had with planting inside a forest to enrich it, is worse than what one can gain by regeneration, yes?' (ibid.) A learning for future projects is to follow a more experimental strategy, collecting better baseline information and trying different approaches, in order to evaluate the effectiveness of each approach under specific conditions and against a reference site. The delays at the beginning meant that when the restoration project did start, there seemed to be a rush to get it done without taking the time to test the best way to do it. In a study highlighting best practice in ecological restoration, Rohr et al. (2018) found that the more successful restoration projects had adequate monitoring, employed adaptive management, had significant community and stakeholder involvement, and formal evaluation throughout the restoration process.

The challenges confronted in the ISAGEN-Parques Nacionales-Patrimonio Natural inter-institutional alliance, each institution with its own particular strengths and weaknesses, resulted in procedural problems – miscommunications, delays and lack of oversight. A

coordinator from the centre-west project pointed out that bureaucracy delayed the monitoring processes, resulting in failure to get approval to go out and monitor at crucial times, meaning that monitoring was delayed by over a year (Interview with Luis, Ecologist, Research institute). From an administrative point of view, the Yariguíes project suffered significant delays, lasting nearly seven years instead of the originally planned three years. This was because the project had to be reformulated, both due to initial staffing insufficiencies, leading to the formation of a new team, and because land planned for the offsets was occupied and had not been purchased, resulting in lengthy negotiations. This also had implications for the ecosystems, because in that two to three year delay, the conditions changed, weeds grew. Due to the additional work and costs involved to restore these areas, this resulted in an agreement to reduce the final number of hectares to be restored; in the north sector the target was reduced from 750 to 641.7 hectares (Interview with Diana, Project manager, NGO). This decision reflects how targets are modified to fit budgets, rather than to meet the ecological objectives. In the quote below, a professional from one of the partner institutions talks about how institutional weaknesses in Parques Nacionales meant that they didn't deliver what they were supposed to on time, such as the land, and points to the divergence between academic expectations and field-realities, highlighting the importance of being self-critical in order to adapt as the project progresses:

Because Parques said, "We have the property", and the property was not prepared, "We have this", and that was not prepared. Then, the lags began to occur, they considered it as something done, that existed, and later, it was not available. So, a combination of these academic pretensions with some institutional weaknesses, well, it complicates things a lot. And, there is one factor, and that is that you have to at least be self-critical, and if you are not, but try to show the appearance that things are working, well, it gets messier and more difficult. I think that this project achieved an important part of its tasks, but, if you evaluate it on the basis of what was initially proposed, then speaking of successful, it would be a big stretch.  
(Gustavo, Director, Environmental foundation).

The audit report by the Contraloría also highlights that the two temporary consortia FUNDASET-CONIF and Jaguar Norandino lacked basic information and materials needed to carry out their work, because Parques Nacionales and Patrimonio Natural failed to provide them on time, leading the latter institutions to lose control over the project, delegating their tasks to the contractors and relying on their reports, rather than providing proper oversight:

It was evidenced in the documentary review that the contractors themselves were the ones who elaborated, arranged and decided on the basic materials for the execution of the work (the assessment, socioeconomic study and basic cartography), causing the entities that signed the agreement to lose control and monitoring of the same from the beginning, therefore it was not possible to establish with certainty the efficiency and effectiveness of the activities carried out by the contractors and to know if they were in accordance with the provisions of the aforementioned MADS resolution [Resolution No. 476 of 2000, in which ISAGEN was granted the environmental license for Hidrosogamoso]. (Contraloría General de la República, 2019, p. 69).

## **8.5. Conclusion**

The forest offsets in PNN Serranía de los Yariguíes, as part of ISAGEN's legal obligations to compensate for the environmental impacts of the Hidrosogamoso dam is considered a pioneering project in the country, in terms of both environmental compensation and ecological restoration, providing important insights into offset experiences on the ground. The stakeholders confronted interlinked social, ecological, institutional and economic challenges when implementing the project, which led to successes and failures across these respective dimensions. Discrepancies between the predicted and actual status of land, in terms of its ecological condition and ownership/occupancy resulted in lengthy negotiations, tensions with the community and delays to the project. The project brought socio-economic benefits to local communities by employing local workers and carrying out environmental education programmes, with some people reporting a change in mentality and a desire for more conservation projects in their area. However, these were not always inclusive and left part of the community negatively impacted and feeling excluded. There was low participation of women in the restoration project, attributed to the type of work involved and likely shaped by cultural gender norms, which highlights an opportunity for greater engagement of women in ecological restoration at the local level.

The environmental conditions of the remote field sites, with high rainfall, steep terrain and rich biodiversity was both a blessing and a burden – the conditions made the work challenging, with incidents of landslides and illness, but the area also showed high regeneration potential. Little restoration expertise in the country meant that finding the right team was difficult, as was finding agreement between different institutions and visions of restoration. Competitive tendering processes risk prioritising cost-effectiveness over technical capacity and knowledge, with knock-on effects on the contractors and local workers, who have to work to tight timescales with limited resources, undermining the long-

term success of the intervention. The reports of ecological success are mixed, and the results depend on long-term maintenance and monitoring. From ISAGEN's point of view, the offsets are guaranteed in perpetuity, since the Yariguíes offsets are within a national park protected by the parks authority and the buffer zone is owned by the company and managed for the lifetime of the dam. Of course, this is dependent on the finance available to the parks authority to monitor and protect the areas, and the commitment of the company to do the same around the Topocoro reservoir, with visibility and transparency in reporting the results. With budgets for monitoring cut since the takeover of ISAGEN by Brookfield Asset Management and noncompliance in reporting since the end of the project, these are worrying signals. Jackson et al. (1995, p. 73-74) identify at least four conditions that determine the success of a restoration project: how nature is valued by society, the extent of the social commitment to the project, the ecological circumstances under which restoration is attempted, and the quality of the judgements made by the restorationists. The experiences with the Yariguíes forest offset project reveal how social factors shape both the decisions made by restorationists (for example, which properties to carry out the restoration or erect fencing on), the design of the project (incorporating local knowledge) and the ultimate success of the project (capacity of teams, institutional bureaucracy and relations with local communities). The next chapter examines the dimensions of socio-ecological conflict that arose over the Yariguíes forest offsets.



## **9. Offsets in practice: Forest offsets and socio-ecological conflict in PNN Serranía de los Yariguíes**

### **9.1. Introduction**

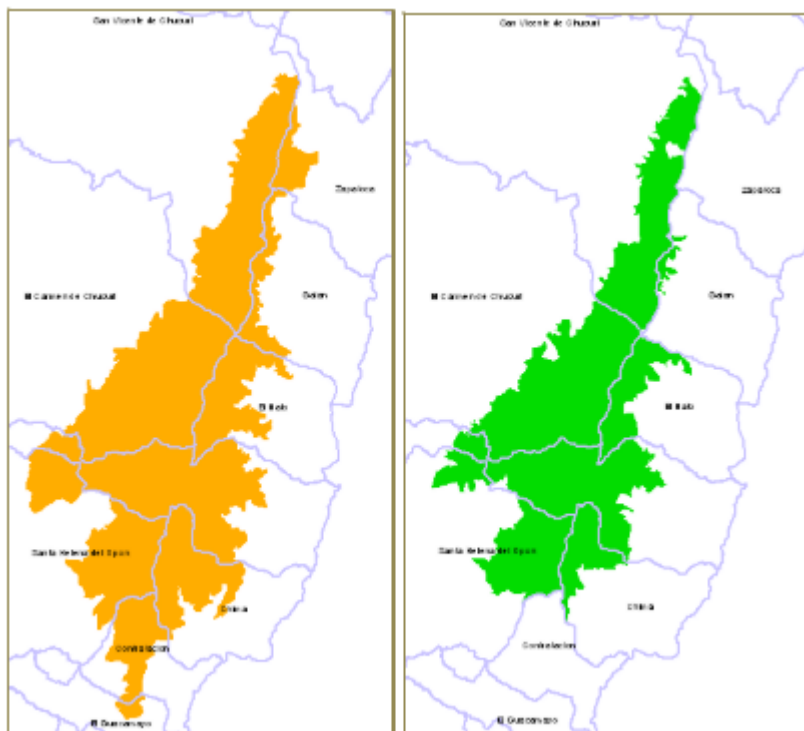
The previous chapter introduced the forest offsets project in Parque Nacional Natural (PNN) Serranía de los Yariguíes and discussed the challenges faced and the perceptions of success from the perspective of the various stakeholders. The aim of this chapter is to analyse in greater detail the conflicts that arose from the implementation of the offsets in the national park. This will be done by employing an analytical frame that combines theories of conflict and violence from peace and conflict studies and political ecology. Using Galtung's conflict triangle and typologies of violence as a guide and informed by political ecology analyses of socio-ecological conflict, this chapter will examine the specific dynamics of this conflict at a local level and in relation to the wider historical, social, economic and political context. First, the background to the conflict is discussed. Second, three elements of the conflict are examined: contradictions, behaviours, and attitudes or assumptions. Third, parallel processes of conflict between the dam and the offsets are explored. Fourth, the lack of consultation and different manifestations of violence are discussed, in relation to the forest offsets, the dam, and the declaration of the park, before some final conclusions.

### **9.2. Background to the conflict**

In 2005, when PNN Serranía de los Yariguíes was declared a protected area, there was some confusion over the delimitation of the park boundaries due to cartographic errors and inconsistencies presented in legal resolutions. As explained below by one of the interviewees, the limits were declared without a proper analysis of land occupation, use and tenancy and therefore the park limits were re-defined in 2008, following visits along the entire perimeter. The new area was 20,000 ha less than the area originally proposed (see Figure 26), to avoid land use conflicts with the landowners and occupiers:

Because, possibly, the declaration task was not done in the field, or it was not done so accurately in the field and when the declaration was made, they later realised that the polygon covered many properties, So, that was going to be a problem of use, occupation, because, well, you had to deal with those people, right? Or, one of two, either you had to buy the properties from them, or you had to evict them. (Gina, Social manager)

Figure 26: Limits of Parque Nacional Natural Serranía de los Yariguíes, according to Resolution 603 in 2005 (left) vs Resolution 637 in 2008 (right)



Source: (Díaz, 2008, p. 61)

This situation generated confusion and understandable dissatisfaction among both communities and municipalities, who were left waiting for clarification about whether their land was inside or outside the national park. This is not a unique case; as an ecologist explained, he came across a similar situation working in another Colombian national park, PNN Paramillo, which contained a complex mix of inhabitants, among them guerrillas and indigenous groups. He expressed his dismay at the solution proposed by the Ministry of Environment - to reduce the size of the park, rather than address the social tensions:

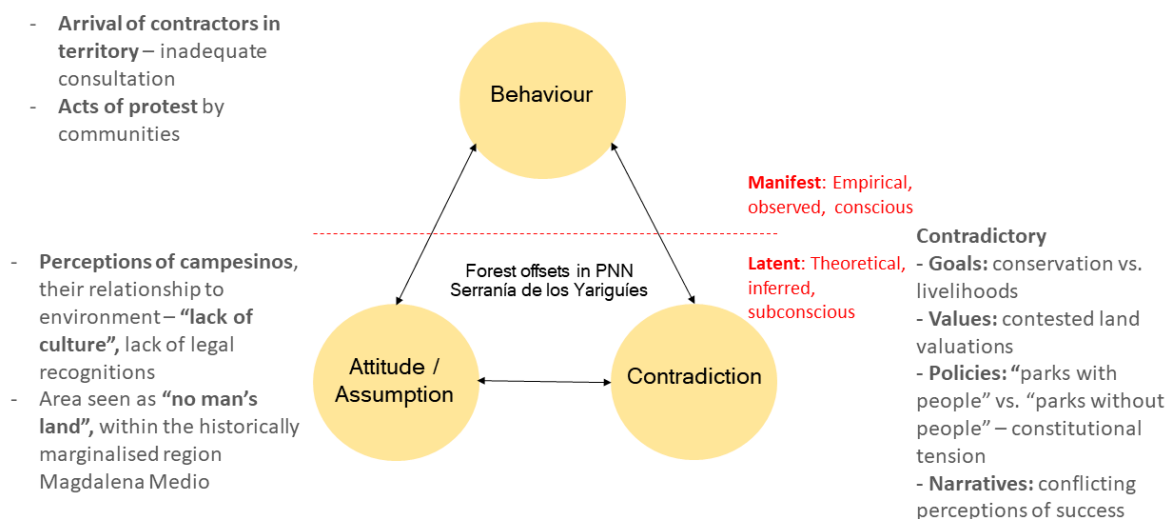
The park was created with all these people inside. Somebody, a very intelligent person, very smart, very knowledgeable, everything, decided on a map at his desk that this was the park. And it was, from the ecological point of view, well thought out, it was good. But, it's not practical. It couldn't be a park there because it was full of people, plus the guerrillas and all these problems ... The alternative that was predefined by the ministry to preserve the park, to maintain the park was to redefine the limits, so make it smaller. [laughs]. How can that be? I mean, if this is your house and it is under threat of being robbed or a fire or whatever and you say, "No, no, no, my house is only the kitchen and the living room. Nothing else, the rest can burn". And that's the way, when somebody threatens you, that's what you respond? That can't be. I mean, it's idiotic to say that. (Sergio, Ecologist/Consultant)

Thus, the declaration of PNN Serranía de los Yariguíes, while good news for Santander in terms of the recognition of and protection of its valuable biodiversity, did not get off to a very smooth start. This provides a backdrop to the existing tensions between landowners and occupiers and the parks authority, which the offsets brought to the fore.

### 9.3. Conflict analysis of forest offsets in PNN Serranía de los Yariguíes

In this section, the different dimensions of socio-ecological conflict surrounding the forest offsets in PNN Serranía de los Yariguíes are analysed, according to the three elements of Galtung’s conflict triangle: contradiction, behaviours, and attitudes/assumptions. The key findings are illustrated in Figure 27 and discussed below.

Figure 27: Conflict triangle: Forest offsets in PNN Serranía de los Yariguíes



#### 9.3.1. Contradictory goals, values, policies and narratives

According to Galtung, deep inside a conflict lies a contradiction, which he describes as ‘something standing in the way of something else’ (Galtung, 1996, p. 70). The Oxford English Dictionary (2020) defines a contradiction as ‘the action of speaking against or in opposition to’; ‘a statement that contradicts or denies the truth or correctness of another’; ‘a state or condition of opposition in things compared’. While the restoration project in the Yariguíes park was part of an agreement between ISAGEN, Parques Nacionales and

Patrimonio Natural, the more immediate conflict was between community members and those actors visible in the territory – Parques Nacionales and the contracted NGOs and professionals. Within this context appear many contradictions: the seemingly incompatible goals of different actors, contested valuations of land, contradictory policies regarding conservation approaches, and conflicting narratives about the success/failure of the restoration projects.

Campesinos living inside and near the park are seen by many in ISAGEN, Parques Nacionales and the contracted organisations as standing in the way of their conservation goals. The campesinos, meanwhile, see Parques Nacionales and the restrictions imposed on them as standing in the way of their livelihoods, wellbeing and freedoms. This conundrum is a familiar one around the world, as social conflicts have been long recognised as an inherent part of protected area establishment and management (García-Frapolli et al., 2018, Lewis, 1996). The second contradiction at the heart of this conflict is the contested valuation of land inside the park. Despite having important biodiversity values, the land has very low economic value. Since being declared a national park, any land within the boundaries cannot be sold to anyone but the Colombian State, and the price is set following a visit and commercial valuation by the Agustín Codazzi Geographic Institute (IGAC), with no space for negotiation. If the landowners accept the offer, they must downsize their farms as the money will not go far when purchasing property outside the park, with the consequential impact on their livelihoods. Alternatively, they can turn down the offer and choose to stay, as some have done. However, with the restrictions placed on land within a protected area (e.g., no crops, cattle, vehicles or hunting), they are left in limbo, unable to access credit or continue their livelihoods as before. Likewise, for those without land titles who have not received any offer for their land to be purchased, they are left in a very difficult situation. An academic interviewed explained the extent of these limitations and that in the majority of cases, protected areas are declared on top of people rather than land being purchased prior to the declaration:

The limitation of the domain of land use to which the campesinos are subjected when a national park is declared and their land is not purchased, is profound. You will not get agrarian credit for example at low rates, you will not be able to sell [the land] except to the state and if the state does not have money so that your property goes out to the real estate market, it will be at the price of the IGAC, it will not be at a commercial price. In any case, you will be very limited in your aspirations with the accreditation of the park and the cases in which protected areas have been declared where there were

people and [their land] was bought are exceptional. That is more exceptional than when it is simply declared on top of [them] with little information and so on. (Interview with Carlos, Researcher)

Because of the laws dictating the process for the sale of property within publicly protected areas, Parques Nacionales has no authority to enter into negotiations with the landowner over the price, as explained by the interviewee below:

In most cases, these appraisals are attractive, it serves people and they have accepted; in other cases, not. In other cases, people say “No, no, that price does not work for me.” And well, Parques cannot say, “Ah, well, then I’ll give you so much more”. No, because if it is more, it’s embezzlement and if it is less, it cannot be less, it would be a gross violation. (Diego, Biologist)

Forty private properties were purchased under the agreement between ISAGEN, Parques Nacionales and Patrimonio Natural, a total of 1,181.671 hectares which became part of the national park. The sizes of those properties ranged from 0.2 hectares to 93 hectares in size and the purchase cost ranged from COP 800,000 (approx. USD 399) to COP 267,982,700 (approx. USD 133,872), the average cost per hectare of land working out at approximately COP 4,500,000 or USD 2,248<sup>32</sup>. Community members with legal title to the land and with larger plots were able to sell and relocate to smaller plots outside the park boundaries. The families interviewed for this research that had come to an agreement with Parques Nacionales were grateful for their new farm, being closer to the town and amenities such as schools, and some were relieved to have been able to come to an agreement and move on with their lives after long negotiations. However, establishing a farm on significantly smaller plots of land with different conditions posed real challenges to their livelihoods. So, even those who were introduced to us by Parques Nacionales as ‘success stories’, while not ungrateful, felt worse off when it came to their livelihoods. The woman below explains how they went from a farm of 121 hectares to 11 hectares:

Well, here we bought this farm and everyone who comes says, “It’s a very beautiful farm”. We bought a very beautiful farm, but we didn’t buy the same as what we had. Because up there, [we had] 121 hectares, two farms, where all our children worked,

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<sup>32</sup> These calculations are based on the values of the forty properties listed in: PARQUES NACIONALES NATURALES DE COLOMBIA 2014. Parque Nacional Natural Serranía de Los Yariguies Dirección Territorial Andes Nororientales, Informe Final de Auditoría Interna. Bogotá, D.C. . The USD rate is based on the average COP/USD exchange rate for the year 2014, published on <https://data.oecd.org/conversion/exchange-rates.htm> (Accessed 13 August 2020).

there on the farm and they had more space. Because here it's only 11 hectares. Although we are giving [our children] work so they can help us with the cocoa, we give them as well the production of cocoa so they help us to manage it and they get their bit of money. But up there, as they had their cattle on the farm, each of them had their bit of money, they bought their cattle, their calves, they took them up there, fattened them up... to sell them and also the cows for the milk... And not now, right now we are left only with the farm here with no place to even tie a goat.  
(Maria, Farmer)

Another family, one of the first to have sold up and who had legal title to the land, moved from a farm of 11 hectares inside the park to a farm of 3 hectares outside the boundaries. The man explained, quoted below, how they appreciate being close to a road and school for their children but felt let down and violated because of the lack of support from Parques Nacionales to help them set up the new farm and house, which they had to build from scratch, and would also have appreciated psychological support and follow up:

I always hoped and I asked Parques to offer support and they told me, they even told me that they were going to get me a psychologist because, well, I lived all my life there since I was eight years old, and for me I always dreamt of inheriting the property when I was an adult... What's more, today I told him, "I don't know if you realise that today is the first time [in six years] a Parques official came to my house". Being surrounded by it all and I worked with the Temporary Union and no one ever came to say, "Man, how are you?"

So, I have felt violated and upset because there is inequality – some get and others don't - so I said, "Well, it is not that I need money but if you can at least support me to grow my plants, to get it producing and set up the little house". But for me to start producing a crop here is different. It is completely different because I came from very complete, good, fertile soils. And I arrived at some soils that are already exhausted... So, it was hard for me. With some life experience, you learn, so I demanded that, I demanded it from them. He told me "No, some projects will come, some programs". But so far, nothing has come. (Bruno, Restoration project staff / Farmer)

An NGO professional whose family also had land within the park discusses how the standardisation of prices and symbolic economic value fails to account for other values of the land held by the landowners, and how those with small plots of land lose out:

If a deal is negotiated with a large property, in economic terms that will be significant. But if the deal is with a person who has 3 or 4 or 5 hectares, but in those 3 or 4 or 5 hectares is his life, everything, if they offer him a million [pesos] that's nothing, it's not going to be representative and he is going to come out with nothing, effectively... A person who has 5 hectares and is paid 1 million pesos or 2 million pesos [per hectare], well that's 10 million [pesos] which does not equalate to even one hectare out here

[outside the park]. So, that is quite complicated. It's necessary to come to understand a social concept, an economic concept, unfortunately that has not been possible because the values of the farms are tacit and very rigid, they are standardised. "The land is worth 2 million pesos"... that is the symbolic value but behind all that, there are other values that must be taken into account and many things must be weighed up. (Eric, Coordinator, NGO)

These experiences highlight the contested valuations of the land - the economic valuation offered by the state versus other values bundled into a piece of earth: livelihood opportunities, connection to place, aesthetic values and memories. This highlights one of the key controversies with offsetting, the difficulty to account for societal values that are more difficult to quantify, resulting in inevitable trade-offs and social equity implications (Mandle, 2015, Maron et al., 2016b). The issue over the purchase of land caused conflicts within the community inside the park. Different families had different tenure arrangements, different sized plots of land, with some families selling up before the rest, others refusing, resisting and trying to organise the community via an association. But for some, the psychological stress meant that selling was a relief, despite not getting a good deal:

We lived stressed up there, because you would be thinking, "Oh my God, will we sell the farm?" And then this and then that, the same people telling us that we gave away the farm, that we got a bad deal. And every day, "Are you going to sell that farm, and so cheap? They're not paying you anything, and you over there with three pennies that they give you, what are you going to do somewhere else?" And then we sold, and it was like you shed that nightmare, that thinking, all the time thinking of this and of that, that if it goes ahead and if we get a bad deal. (Maria, Farmer)

The community members appeal simultaneously to different standards of valuation (Martinez-Alier, 2002) – a higher economic valuation of the land, but also non-monetary forms of compensation such as coaching and psychological support. They also demand respect, right to livelihoods, dignity, peace and self-sufficiency, as illustrated by one of the interviewees who still lived in the park at the time of the interviews:

We have rights, but we also have duties. But we cannot let our rights be violated, do you see? For example, as I said on Wednesday, "Look, if you take us out of there, you are forbidding us the right to work," and tell me it's not like that. Because with what they give us, the alms they give us, it is not enough, we begin to fly like birds, without a roof over our heads. So, I say this is a way of violating one's right to work, of violating one's right to live with dignity, in peace, in peace, which the constitution says very clearly. [...] Me, for example, I am here, it's my house, if I were a caretaker, I would have to ask the employer in order to receive you, while I do not, I do not. The owner of my time is my God and that is all. (Angela, Farmer)

A third form of contradiction is found in policy. Environmental policy in Colombia is replete with legal norms and territorial planning instruments, many of which are contradictory and lead to confusion. A key policy clash that has contributed to the emergence of socio-ecological conflict in this case study is between a 'parks with people' vs. 'parks without people' conservation model, arising from a constitutional conflict between the fundamental rights of individuals and collective rights to a healthy environment. Analyses of the legal framework affecting campesinos in protected areas highlight a tension between, on the one hand, the rights of campesinos to human dignity, access to land, basic services and food production, and on the other hand, the duty of the state to protect the environment, conserve areas of ecological importance and control environmental deterioration, where natural parks cannot be sold or seized (Betancourt Santiago et al., 2017, FAO, 2019).

Colombia's national parks, which cover approximately 10% of the territory, have been designed based on a vision of conservation that protects nature by excluding humans, following in the footsteps of international approaches such as the iconic Yellowstone National Park. Colombia's national parks system has come to represent the country's central conservation strategy, not because of a lack of other instruments, but due to the strength of its legal framework supported by the national constitution, as well as public finances being directed towards it (Andrade, 2009). National parks and protected areas have proven very important to conservation in Colombia, with studies highlighting their effectiveness in preventing deforestation and fires (Negret et al., 2020, Rodríguez et al., 2012). However, parks have also become sites of conflict over land use, occupation and tenancy in many parts of the country (Gutiérrez Antolínez, 2016, Montoya Dávila, 2019, Ramírez-Nates, 2006). There is no typical profile of the landowner or occupier within protected areas; depending on the location and particularities, there are diverse actors with different histories, intentions, needs and relationships with the environment. These include everything from rural campesinos escaping violence or poverty in search of a patch of land for their livelihoods, others who have lived in the area for decades but without land titles, to indigenous, black or Afro-Colombian communities defending their ancestral land, to narcotraffickers, illegal loggers or armed groups that control the territory and act as de facto environmental authorities, to large landowners, or those who engage in opportunistic land grabbing (Paredes Leguizamón, 2011). Following the peace agreement and the power vacuum left by the FARC in areas previously under their control, deforestation in



and around protected areas accelerated as a result of land grabs by large landowners and other illegal actors (Clerici et al., 2020).

According to the 2014 agricultural census, Colombia's national natural parks contain around 90% natural forest cover while nearly 10% is made up of agricultural land (DANE, 2016). Large plots of land of 1,000 hectares or more account for 90.6% of the total agricultural area and 3.2% of the total agricultural production units (UPAs) within national parks included in the census, while small properties of less than 5 hectares account for 0.1% of the total area and 40.9% of the total UPAs (DANE, 2016, p. 868). This illustrates that the vast majority of agricultural land within national parks is concentrated in the hands of few large landowners, consistent with the trend of extremely unequal land distribution at a national level (Oxfam, 2013). As of 2014, according to DANE, there were 22,371 people living within 56 of Colombia's national natural parks, 65% in situations of poverty (DANE, 2016). De Pourcq et al. (2017) put this number at 93,681 (35,695 indigenous, 8,325 Afro-Colombians and 47,376 subsistence farmers). Meanwhile, Parques Nacionales identifies 37 parks with use, occupation or tenancy conflicts, with a total of 10,726 peasant farmers resident within parks (Colombia, 2019, p. 25). Given the experiences seen in the Yariguíes case study where the true status of land use and occupation varied considerably from what was originally predicted, and considering the vastness of many of the national parks and the lack of management capabilities, this explains why it is so difficult to arrive at an exact figure of park inhabitants.

Over recent decades, there has been slow but increasing recognition of land use conflicts and the need to account for social actors in the planning and management of protected areas. In 2001, Parques Nacionales Naturales de Colombia published its *Policy for social participation in conservation*, commonly called the 'Parks with people policy'. The policy promotes the participation of different actors in protected area conservation, including residents and users of protected areas and neighbouring areas, such as indigenous groups, black communities and campesinos, and promotes sustainable alternatives to resolve conflicts (Parques Nacionales Naturales de Colombia, 2001). However, twenty years later, Colombia's national parks generally still follow a 'parks without people' model since this is built into the legal framework, overriding the 'parks with people' institutional policy (Laborde, 2007). The management plan for PNN Serranía de los Yariguíes (Díaz, 2008) makes direct reference to the parks with people policy but does not include campesino communities in its characterisation of actors, focusing only on institutional

actors. It includes objectives to work with communities in the adjacent areas surrounding the park, but when it comes to property within the park, the objective is simply to gain possession of the land. A local NGO professional explained that financing from offsets has benefited Parques Nacionales through property sanitation, but that the legislation makes it extremely difficult for people to live inside parks:

I think for the strategy of Parques, the offsets have served them a lot. Parques, the national system, has very few resources for operations and for investment in parks and improving the conditions, such as sanitation - what they call sanitation, I do not like that word, what they call property sanitation - which is the purchase of properties. That, for me, should not be parks without people, but we can define strategies *with* people, but the legislation of parks makes it super difficult for someone to stay inside the park, it absolutely inhibits them, so they cannot make any productive use of their property. (Diana, Project manager, NGO)

A fourth contradiction is seen in the conflicting narratives of different actors. An example of this is highlighted in the previous chapter, where perceptions of success of the offset project vary greatly among the stakeholders. There are contradicting reports about the survival rates of the planted trees and the success of the restoration, and these perceptions are shaped by the attitudes and assumptions of the actors, as will be discussed later in this chapter, and by their previous experiences and interactions. Below, an NGO coordinator criticises the property sanitation process as the deception and displacement of poor campesinos and the forest offsets as a box-ticking exercise that was later abandoned:

The other [money was] spent buying the land from the campesinos who were inside the park and taking them out, displacing them, stripping them of the land. Land worth 30 million pesos per hectare was purchased at 1.8 million pesos to 2 million, 3 million per hectare. So, that is not forest compensation, that is deceiving people... As they are very poor, very poor campesinos and they displaced them from there, they gave the contracts to the same ones they displaced. So, they planted the nurseries and they went and planted the [trees] there. But today, those trees are abandoned, abandoned, the path is abandoned, where the camps were, abandoned, everything is abandoned. So, those are projects that they do simply to spend the money, to take the photos and upload them and deliver the reports, but there is nothing left, compensated there is nothing left, nothing left. So, that is the truth of that situation. (Mateo, Coordinator, NGO)

On the other hand, the ISAGEN executives stated that the project had excellent results in terms of both plant survival and education programmes:

CRISTIAN: And we already have 3, 4 years of measurements and it has been, well...

RICARDO: Successful.

CRISTIAN: Excellent, successful, the process. Very low mortality rates, less than 3% in most of the plots, trees already in their most advanced stages beginning to be seen, that is, the procedure has given good results.

CRISTIAN: It has been successful. And that on account of having in the area two permanent nurseries that were linked...

PAULA: As part of the project...

CRISTIAN:...to educational centres. And, so, that has been wonderful, because Parques Nacionales with one nursery and we with another, in different areas, doing education and research programs for the same area.

(Group interview with ISAGEN executives: Benjamin, Social coordinator; Cristian, Environmental coordinator; Ricardo, Senior manager; Paula, Project manager)

### 9.3.2. Behaviours, participation and acts of protest

The observable behaviours as part of this conflict include the arrival in the territory on the part of the contractors implementing the offsets and acts of protest on the part of local people. While some of the locals were included in the restoration project from the beginning, others within the park boundaries were not invited to participate or even informed about the project, only coming to understand something was going on when they saw workers going back and forth past their farms. Some community members blocked the path on the restoration team in protest in order to be included in the project, while others took down a sign that PNN had erected in the park. These relatively small acts of protest were disruptive but also to some extent fruitful, as they led to negotiation. In the quote below, a couple with property inside the park explain their reasons for protesting:

RITA: They didn't consider training the people who were inside the park itself. So, I mean, you are the pillar, because you are the one inside the park and you are the one who knows the movements and the history, what is there.

ENRIQUE: ...if Parques Nacionales arrives today or any company wants to form a project up there, they have to make a call to the people there first...

RITA: Communicate it to you, "Well, we're going to do this, because so and so...". No, right off the bat, they started taking things out, materials, and everything, and you are the last to know what it is all about. [..]

RITA: Since they had to pass our farm to go up to another farm that had to be restored, which was above us. So, we closed the path on them, "No, you can't pass here until...". So that they could ...

ENRIQUE: Take us into account.

RITA: ... give us work, consider us or something. So, it was the way - because already at that time, they were going to start restoring that farm they had bought there. So, as a result, we said "No, we will not let you pass". We closed the path and that was how we entered [the project].

ENRIQUE: And the system has always been that way, since we know Parques Nacionales, it has always been that way. They have never considered the people at all. So, we have always had to do it the hard way to be able - to be heard, right?  
(Interview with Rita & Enrique, Farmers)

As a result, the couple got some work in the restoration project, but only during the last three months of the project that had gone on for three years. One of the other community members argued that they were the ones maintaining the paths, with no help from Parques Nacionales. At the time of the interviews, there had been a recent incident when people within the park took down a sign that had been erected by Parques Nacionales. According to one of the community members, they were offended by the sign, which includes a list of prohibited activities (hunting, logging, fires, etc.), the logos of Parques Nacionales, ISAGEN and Patrimonio Natural, but no recognition of them, some of whom have organised themselves in an association:

They just put "ISAGEN, Patrimonio Natural, Parques Nacionales" and "no, no, prohibited, prohibited and prohibited". But, not us, that's what makes you angry.  
(Angela, Farmer)

She explained that they did it out of frustration, feeling ignored and attacked by Parques Nacionales, and so it was their way of retaliation:

I said, "I'm going to give you an example. We in the countryside are like bees. Do you know what bees do? You arrive at a hive of bees, if you disturb them, what do they do? Do they stay still? They don't stand still - they attack". I told her, "That's us", I told her, "If you attack us, we attack." (Angela, Farmer)

Figure 28: Example of a sign at PNN Serranía de los Yariguíes



Photo: María Isabel Henao Vélez (<http://www.parquesnacionales.gov.co/portal/es/de-como-los-santandereanos-recuperan-un-tesoro-escondido-en-sus-montanas/>)

### 9.3.3. Attitudes and assumptions

An analysis of the narratives of the different actors in this case study reveals underlying attitudes and assumptions that have led to conflict. The park management plan states that, 'The problem of private land within the area has to do, not with the possession itself, since *it is clear to the community that they must sell*, but rather with the limitation to use since, until negotiated agreements are arrived at, the possessor will not be able to carry out any activity other than those proposed in the zoning and regulation of park use'. (Díaz, 2008, p. 59, emphasis added). This statement reveals the assumption that the sale of the land is inevitable and the only option. For ISAGEN, Parques Nacionales and their contractors, local communities can represent a barrier to conservation, both those who occupy areas designated for conservation and those who live nearby and cross the threshold into the conservation areas or let their cattle in. This was often put down to a lack of education and awareness of the importance of conservation, as illustrated in the below quote from one ISAGEN manager:

The worst for us is the lack of awareness of the people...When the whole process of [the park] legalisation begins, people continue with their culture because it is a no man's land. Although it was the state's, the state did not have a strong enough

presence... so the people kept coming in, doing all the human intervention that they used to normally do, because ancestrally that's what they had been doing. So, our lack of culture is what most affects a good development process. If we had the culture of understanding, "It is no longer mine, now I have to respect and protect", well, our processes would have been very simple. We lost three and four times plantations because the people brought in cattle and cars and that affected everything. So, that is the worst part. The challenge, the biggest challenge? To educate. The biggest challenge is to educate because you can do the assessments, you can do the methodological development, you can do the whole process of seed collection and processing. But if there is no culture that supports the process, you are not going anywhere. I mean, the biggest issue of ours is culture. We are still very uneducated in environmental issues. (Camilo, Environmental manager, ISAGEN)

In the above quote, where 'to educate' is used, the original term used by the interviewee is *culturizar*. The most common English translation of *culturizar* is 'to educate', however as opposed to *educar*, *culturizar* carries a cultural connotation meaning 'to enlighten', 'to bring culture to' or 'to incorporate into a culture'. The interviewee is talking about the lack of environmental awareness of the local people, but also in general about the country, 'we' - 'the biggest issue of ours is culture'. This was something that came up repeatedly in interviews and conversations, a negative sense of collective identity when it comes to environmental awareness and conservation practices. This is despite many of the interviewees, especially subsistence farmers, living many times more sustainably than the average European, for instance, and despite many of them expressing personal environmental consciousness. The environmental destruction caused by the company is seen as necessary for development and the forest offsets are promoted as 'delivering a total of 8,000 new hectares of forest to Santander' (ISAGEN, 2015a, p. 14), failing to mention the 7,000 hectares that were lost to the Hidrosogamoso reservoir. The quote above also refers to the area of the park, with the absence of state control, as a 'no man's land'. Colombia's national parks are mostly located in 'border territories', marginalised peripheries recognised as *baldíos* or wastelands ready to be colonised and appropriated, and as a result also hotspots for guerrillas and counter-guerrillas (Duran, 2009, Palacios, 2006). In many locations of the world, the narrative of 'wastelands' has been used to discriminate against places and the people living there, legitimising their appropriation in the name of development and modernity (Martinez-Alier, 2002, Swyngedouw, 1999). In Colombia, ideas of cultural superiority on the part of large landowners and elites have justified the use of violence to seize land and natural resources (Velasco, 2015). As Margarita Serje (2011) points out, what is considered the periphery in fact represents more than half of the country, and it is 'the centre' that is the exception, whether it is the centre at a local scale or global scale. She argues that the construction of imagined margins and

peripheries has been one of most important spatial strategies for the expansion of capitalism, transforming regions of the world into so-called 'no man's lands' (Serje, 2017). Offsets create new opportunities for such strategies by facilitating trade-offs, with the potential for legitimising land grabs of territories and resources that are deemed less valuable or are owned or occupied by people with less power (Spash, 2015).

Almost half, 47%, of the illicit coca plantations in the country are located in special management zones (forest reserves, national natural parks, indigenous reserves and territories of black communities) (UNODC-SIMCI, 2020). It is not surprising then that the government has opted for strict policies against land occupation in national parks, and illicit activity is a commonly cited threat to conservation. However, without social and economic programmes for local populations and effective governance, this approach simply moves the problem to other areas. Recent figures show that illicit crops have reduced inside national parks, but increased in the buffer areas surrounding parks (UNODC-SIMCI, 2020). By failing to address the root causes, these policies negatively impact the poorest campesinos, whether they grow illicit crops or not. For example, the use of glyphosate in the eradication of coca crops in the Yariguíes park has caused health problems in the local population (Díaz, 2008).

The complex panorama of actors in these regions leads to a negative image of those occupying protected areas as being lawless and having a negative impact on the environment, or on the other hand, of them not being seen at all. The official website of the PNN Serranía de los Yariguíes states that '[w]ithin the Park no communities exist' (Parques Nacionales Naturales de Colombia, 2019). Although there are no indigenous or Afro-Colombian communities inside the park, stating that within the park no communities exist denies the existence of those campesinos who are there. According to the 2014 agricultural census, 419 people, 242 men and 177 women, were at the time of the census resident within PNN Serranía de los Yariguíes (DANE, 2016). It is not clear if these numbers refer to before or after the 40 properties were purchased for the offset project, also in 2014. The web page also describes two sectors of the population in the area of influence of the park: agricultural settlers in the municipalities of El Carmen and San Vicente de Chucurí and the second group they mention were confined to this region for having a particular characteristic: belonging to family groups that carry Hansen's disease or leprosy. At the end of the 19<sup>th</sup> century, when international panic spread about leprosy, the government ordered the mandatory segregation of lepers in three designated locations

(one of them Contratación, Santander) to try to control the spread of the disease and as a result, leprosy patients became 'a social calamity and a danger to be fought' (Obregón, 2003, p. 180). The colonies were abolished in 1961 and patients regained their rights, since the segregation strategy was found to be ineffective, expensive and in light of new medical evidence about the disease (Botero Jaramillo et al., 2017), yet the villages remained isolated, and affected by decades of public stigma. That Parques Nacionales over half a century later, identifies Contratación with the singular characteristic of being a former leper colony, is evidence of the continued stigma surrounding this community who have suffered a history of exclusion, discrimination, family separation and trauma (Botero Jaramillo et al., 2015). This example depicts how, to this day, the image is created of rural people as either invisible ('no communities exist inside the park'), or as threats to nature or humans, drawing on fear and stigma.

While certain minorities in Colombia – indigenous, black and Afro-Colombian communities - have a more clearly defined cultural identity and legal protections (although these are far too often not effectively implemented), campesinos are more dispersed and heterogenous, with a history of marginalisation. The farmer below discusses his experience and frustration at the exploitation of campesinos:

The peasantry that has suffered so much, that lives suffering because in Colombia there are no organisational policies ... I left the countryside fleeing, seeing the disorganisation in the trade and I returned now after almost 30 years, almost 40, and I returned and it's worse, the exploitation of farmers in the countryside. I came back to the countryside because agriculture is in my blood, I am the son of farmers, but I see that in Colombia it is very disorganised, especially the commercial part. Here we are incentivised to produce, but the commercialisation is killing us ... I don't know why today we focus so much on capital; it is not everything in life. And unfortunately, it seems that human beings, humble beings, do not deserve any consideration. And the humble farmers, we are the engine, we who produce the food, we who work, and we should at least have some consideration. (Fernando, Farmer)

With the intent to bring unproductive land into the national economy and reduce pressure on more populated areas, the Colombian government, like other governments in the region during the mid-late 20th century, provided payments for 'improvements' (*mejoramientos*) of land by turning unused land into pasture or crops (Griffiths, 2004). Palacios (2006, p. 167) describes the plight of the campesino who has had to migrate towards the agrarian frontier: 'His labour in incorporating the frontier into the national economy is one of the most important hidden sources of capitalization, and his poverty is the hidden face of



Colombian progress'. The incentives to occupy land and expand agriculture clashes with conservation priorities, and without legislation that recognises and requires processes of prior consultation with campesino communities, they become 'invaders' or 'plagues' in the eyes of the environmental authorities (Duran, 2009). The level of consciousness about environmental issues varies widely among the campesino communities. While some interviewees said they grew up knowing the importance of preserving part of their land with forest, others had no conception of this and used to widely chop down trees and hunt. A number of interviewees talk of the change in mentality brought about through educational programmes, some of which were run by ISAGEN or other institutions such as the Instituto Humboldt and local NGO Corporación Compromiso, as well as through the restoration project for those involved. In the case of those living in the national park, they said education programmes came from a local NGO rather than through Parques Nacionales directly:

Before, it was, "Let's go and fix it and let's clear it and that's it." So, not anymore, now you are working, but with the idea that it is necessary to conserve, take care, not pollute, and all that. So, you have become a little aware as a result of perhaps things you have seen, workshops that we have attended, also, the support of [Corporación] Compromiso has also helped us in that. I mean, you can be in the place, but you can share with nature and conserve it and take care of it and help make it so that the environment is better for everyone. (Rita, Farmer)

Just as nature is diverse, well, the territory and its people are diverse and there are some who want to conserve more, we have people who conserve 80% of their territory, they have fifteen hectares and conserve thirteen and leave two. But, also, we have some who only have one, but that is important that they have one and are taking care of it, and in that hectare a dynamic is being generated for the fauna, regeneration. (Eric, Coordinator, NGO)

Clearly there are many benefits to environmental education programmes, if they are done in the right way, with training and true participation of communities, rather than giving orders and telling people what they have to do, as a female farmer explains below:

The thing that most outrages us campesinos is that little word "have to". The officials, many officials, they say "Look, you *have to*". "You know what, Doctor? I have to die, I have to do that, because that is a mandate from God, no problem"... Once you train someone, teach them and treat them like a human, well, they adapt, they adapt, and they can also take care. But, if you come in and run over them the hard way, nobody understands. The hard way, nobody understands. (Angela, Farmer)

At the same time, the irony of environmental programmes being implemented by a megaproject that caused great environmental harm and the different standards towards corporations and campesinos can cause resentment and anger among the communities:

I do not believe that the campesino is as they say. What happens is that the government washes its hands saying that. Why? Because, look at ISAGEN, how many hectares did those people destroy? 7,000, 7,000 hectares. How much will the mining destroy? 70,000 [hectares] that they have, and for them there is no ... because there is money. You know that things are like that in Colombia, corruption, where there is money... The CAS [Corporación Autónoma Regional de Santander], for example, if you need a tree, they give you so many problems, yes? For *one*. Instead, an entity like that arrives and they destroy 7,000, 8,000, 10,000 hectares, but as the license is worth so many millions, "Yes, here you are". There is always money to buy conscience. (Alberto, Farmer)

Meanwhile, for companies like ISAGEN, the lack of control of illegal activity causes a lot of frustration, as there are many regulations and a lot of bureaucracy when things are done legally, while illegal activity slips by unnoticed, as one manager pointed out:

We have a lot of regulation, a lot on paper. Incredible, and there is a lot of control, there are many entities watching if things - especially when you try to do things legally, because if you do them secretly, nobody notices, and nobody asks. But if you do them legally, in full view of the world, all the controls fall on you. (Ricardo, Senior manager, ISAGEN)

In summary, the socio-ecological conflict over the forest offsets in PNN Serranía de los Yariguíes is a result of contradictory policies, narratives, goals and values, centred around a dichotomy between a vision of conservation that excludes humans and the reality of territories that are inhabited by a diverse range of actors. This has been conditioned by attitudes and assumptions that paint campesinos as invaders, by a negative collective identity as environmentally unconscious and uncultured, attitudes that have been shaped by centuries of marginalisation of campesino communities, as well as the marginalisation of countries and regions. Behaviours, such as the unannounced arrival of contractors in the territory to implement offsets and unequal treatment of different members of the community, ignited already existing tensions and frustrations. The finance provided by ISAGEN offered the opportunity to purchase land but did not offer a solution for those that did not have legal title to land and even for those who did, it represented unjust compensation. Acts of protest disrupted the offset project but also resulted in negotiations

between communities and the institutions, which at the time of the interviews were ongoing.

In the following section, the socio-ecological conflict at the development site – the Hidrosogamoso dam - will be analysed, looking at the parallels in relation to the conflict at the offset site.

#### **9.4. Parallel conflicts: the dam and the offsets**

Many of the aspects discussed above by those impacted by the offsets are mirrored in the reports from those impacted directly by the Hidrosogamoso dam. One of the aspects discussed by both groups is the loss of independence and dignity; going from being self-sufficient to having to work for others, often in temporary jobs with little security. This is seen in the fishing community whose livelihoods have been greatly affected by the damming of the river and who take up short term work offered by the company. In the La Playa fishing community on the banks of Río Sogamoso, workers can be seen coming and going in boats on the river, hired by ISAGEN as 'river rangers' to clean the river of debris and carry out habitat recuperation. A similar project was launched by Ecopetrol (2018) following an oil spill that affected Río Sogamoso in 2018. As a result, the fishing community now find work cleaning up the environmental damage caused by dams and the oil industry to compensate for their reduced livelihoods from fishing. An NGO coordinator commented that once someone has been given a job, even if it is only a few months long, they are considered for the company's reporting purposes as 'compensated':

Many were hired for three months to take out dead fish from the river, or to clean the river or to drive the workers someplace. And then, with that, the one who signed that contract remains compensated. So, three months of work and a lifetime of abandonment. That's a scam, that's a scam. (Mateo, Coordinator, NGO)

There are also parallels in the disrespect felt by campesinos living in or near the park and the fishing community, who are looked down on by some as uneducated, lazy or opportunists:

"But the people from La Playa are cunning, lazy. We arrive and find them sleeping all day." But what would they know? We had already earned 200, 300, 100 thousand pesos at night and we were sleeping. That is what they do not understand, the life of a fisher, nobody understands it. Because we can work and if we feel like it, we sleep all

night and we go fishing at six in the morning and we stay there all day... That is the life, one's independence. (Monica, Fisher / Activist)

One contractor used the term '*buscar en río revuelto para pescar más fácil*', literally 'look in troubled waters to fish more easily', a saying used in Colombia to mean that in times of disorder, someone will always try to take advantage for their own benefit. The argument being that local people try to take advantage of the arrival of a megaproject for their own economic benefit. He argued that they are not being objective and that you cannot expect to please everyone, such as those who were not included in the census of affected communities:

There are dissatisfied people who blame the reservoir. But, really, they are not objective, they simply look from a selfish point of view of "I want ISAGEN to give me more". But they are not being objective, that is, evaluating all the possibilities that exist, but they simply do it to seek some economic benefit from ISAGEN. (Esteban, Forestry engineer, Environmental consultancy)

The Ríos Vivos Movement is a national movement in defence of territories and people affected by dams. Ríos Vivos Santander (the Social Movement in Defence of the Sogamoso River) was formed in 2008 in La Playa, in response to the impacts of Hidrosogamoso on the fishermen and women, fish sellers, campesinos with and without land, workers and artisanal miners, as well as resisting other extractive projects, such as mining and fracking (Ríos Vivos Colombia, 2011, Ríos Vivos Santander, 2018). These Colombian activist groups link with other Latin American movements such as the Movement of People Affected by Dams. Ríos Vivos Santander is made up of activists and social leaders from the local community, primarily women. They report and denounce impacts, campaign for rights and compensation and propose alternative livelihoods. Tensions run high between the Ríos Vivos activist group and ISAGEN and this is evident on both sides in the emotive language used. For instance, an ISAGEN manager referred to Ríos Vivos as 'our enemies'. On the other side, a woman from the movement told us that in the environmental license, citing by heart the number and date (Resolution 1497 of 31 July 2009), that their community was insulted, called illiterate, stupid Indians. She may have been referring to a passage that talks of affected communities being in a state of high vulnerability and those above 45 and 50 years of age having very low possibilities of taking on a new life project (Ministerio de Ambiente Vivienda y Desarrollo Territorial (MAVDT), 2009c, p. 50). Although the legal document does not include literal insults, her

interpretation of it reflects her feelings of being looked down upon by the company, and the cumulative effect of the tensions over the project.

At one point, ISAGEN requested to modify the environmental license from including in the census all fishers in the direct area of influence, whether occasional or temporary, to cover only 'professional' fishers. Their argument was that the mitigation projects would ensure that occasional and temporal fishers would not be affected and that these individuals would be very difficult to define in a census since all habitants of the region claim to have fished at one point in time (MAVDT, 2009b, p. 30). However, the concept of 'professional' fishers is absurd in this context, since the fishing communities have no professional qualifications and is an attempt to exclude the people whose livelihoods are most affected by the dam. The Ministry of Environment refused this modification, requesting the inclusion and categorisation of fishers according to FAO categories (occasional, part-time and full-time fishers) and noting the continued appeals to the Ministry by groups who felt excluded (ibid., p. 33-34).

Under the forest use permit, ISAGEN was required to get rid of the trees that had been logged from the area of the reservoir. ISAGEN requested to the Ministry to modify the license in order to only remove the logged trees that have commercial value, presumably to avoid the transport and disposal costs. However, the Ministry denied the request (ibid., p. 27). ISAGEN failed to fully comply with the removal of vegetation, resulting in complaints by local communities of bad odours, water contamination and illness as a result of the decomposing vegetation. Subsequently, the Administrative Tribunal of Santander ordered the company to clean and remove organic materials from the reservoir (El Tiempo, 2015). However, ISAGEN argue that foul odours are an unavoidable consequence of building a hydroelectric dam in a hot climate and that the issue was resolved in the early stages of the project yet remained in the imagination of the local people for years to come:

The filling of the reservoir was very slow. The temperatures here are very high and for a period of time a little bit of odour was generated below what is permitted by law. But then the people said, "We are dying here because we can't survive with the smell." Dying in quotes, that is, the smell is uncomfortable. That was a process of 15 or 20 days or maybe two months that the issue lasted. It is normal in every tropical reservoir in the world that kind of thing happens, but it is a short process. There are still people that talk and live from that illusion. Now, that should not happen and no longer happens. That was in the first three months of operation. We have been here three years now and that did not happen again, but people continue with that in their imaginary. So, those kinds of things are the ones that have not been easy, the people do not

understand that it doesn't happen anymore. But there is also the issue that people say there is no fish in the river, and you see people fishing in the river and they are still selling fish. (Camilo, Environmental manager, ISAGEN)

Over 1,000 people were relocated from the area flooded by the dam. Some had similar experiences to those who were relocated from inside the park, in terms of moving to smaller farms and struggling to establish farms from scratch, which had negative impacts on their livelihoods. One farmer told us that he was treated well by ISAGEN and was very happy with his house, although he does not have the same livelihood as before:

They built us some very nice comfortable houses with all the services a family requires. In this sense, it is positive. But a palace is no use where there is no liquidity, where there are needs, where there is not enough to meet the expenses of a family. [...] They brought seeds, they made us the stable for the cattle, very kind, yes. But after that, the small subsidy they gave us ran out. Not because us Chucureños are those parasites that want to be maintained, really, we don't... but you live without liquidity, you live without enough to support your family. In that sense, it is totally negative... For example, with 650,000 [pesos per month] to build a farm at the level of production of what I had is impossible, totally impossible, a blind man can see that. (Fernando, Farmer)

From the perspective of executives in ISAGEN, they attribute the unconformities among some groups, namely the fishers or informal fruit sellers, as having a different culture. From their perspective, these groups are unhappy because they lost their free time and do not adapt to a more disciplined, formalised way of life. The conversation below reveals a condescending attitude towards landless groups as opportunistic, suggesting this is out of choice ('they like motor homes better'). From the perspective of these executives, it is curious that some groups cannot see the opportunity of development offered by of the reservoir ('they look the other way'):

CRISTIAN: For one it is important to have a house, property, to have the possibility that the children go to study very close by, to have some things. But there are cultures, like the cultures of fishers, we did not have the issue with miners, but also with miners are issues that are sometimes not easy to handle, because, well, their own culture is very different, right?

PAULA: They like motor homes better [laughs] [...]

BENJAMIN: What is a good quality of life is not the same for everyone. So, for example, some who were not property owners, who lived day to day, those who were along the road, they took advantage of selling or occasional fishing or day labour. They were not property owners, but they sold, for example, lemons, citrus fruits, not from their properties, they took them from any farm, but they were like ... stolen, practically, but they were doing well. And what did they lose? What do they say? They lost their free

time because, now, they have to work more, they have to think in the long term, they have to pay property tax, they have to pay services.

RICARDO: The formalization.

BENJAMIN: Yes, the formalization of their life implies greater discipline and they no longer have as much free time as they had before. Because before they sold [things] and that was enough ... In fact, it is curious that those people who lived, for example, in El Tablazo.

CRISTIAN: Beside the river.

BENJAMIN: They don't look at the reservoir... as an opportunity, no. They walk away, they walk away from it. So, they look the other way, well, their vision of development. (Group interview with ISAGEN executives: Benjamin, Social coordinator; Cristian, Environmental coordinator; Ricardo, Senior manager; Paula, Project manager)

The name of the concrete structure of the dam itself reveals conflicting cosmologies. It was christened *Latora* by ISAGEN to mean '*sitio que domina el río*' ('place that dominates the river' (ISAGEN, 2015a). The exact location of the original area known as *Latora*, *La Tora*, *Latocca* or *La Tocca* is not clear, thought to be present-day Barrancabermeja or where the Opón and Magdalena rivers converge. It was said to be an important port where indigenous groups converged to exchange goods at fairs, the full name said to mean '*lugar de la fortaleza que domina el río*' (Otero Prada, 2015), which can be translated into English as 'place of the fortress that dominates the river' or 'place of strength that dominates the river', although the true meaning likely gets lost in translation. The model of development represented by Hidrosogamoso is entirely at odds with the resistance of this ethnic group to defend their territory and natural resources from external domination. Rather than honouring the original peoples of the area, this represents an appropriation of the indigenous language, more reminiscent of the extractive relationship of the conquistadors that landed in the zone in search for *El Dorado*. In interviews, some of the locals had their own name for the dam: '*el monstruo*' ('the monster'):

When I was young, when this village was beautiful, when that monster was not there. (Anya, Activist)

He said, "You are facing a monster. He is advancing and you are going backwards. There comes a time when there is a wall here, or there is a cliff, or they crash, or they go down. So, you have to do something because, if not, the project eats us." (Antonio, Community leader)

## 9.5. Lack of consultation, resistance and violence

There are reports of inadequate consultation with local communities in three instances: over the granting of the environmental license to Hidrosogamoso, the declaration of PNN Serranía de los Yariguíes as a protected area, and the implementation of the offset project within the park. As a result, once the impacts of these interventions began to be felt within the community, associations and activist movements were formed to protect the rights of local people. It was notable the central role of women in both the Ríos Vivos movement and in the community association in the Yariguíes park. Women often lead the struggles for defense of their territories, protesting against extractivist processes and the inequalities and violence resulting from them, and proposing alternatives, rooted in their specific social, economic and cultural locations (Harcourt and Escobar, 2002, Ulloa, 2016). Women are also playing a central role in the peace process (World Bank Group, 2019). However, as discussed throughout this thesis, community leaders and environmental defenders, and increasingly women, are frequently targets of threats and assassinations, a trend that is currently increasing in Colombia. In the case of Hidrosogamoso, there are reports of disappearances and assassinations of leaders that resisted the construction of the dam during the years when the socio-ecological conflict was at its height, between 2009 and 2015. In relation to the conflict in the park, the interviewees also report verbal and psychological threats, however not to the extreme of disappearances or killings as in the case of the conflict over the dam.

In the early days of the Hidrosogamoso project, many people in the region were in favour of the dam for the promised employment opportunities. Before the dam had been constructed and the impacts started to be felt, people from other communities affected by dams, such as the Urrá I dam in Córdoba, Colombia, had travelled to the community of La Playa to warn them of what was coming. However, as one interviewee tells us, at the time she discredited them, tending to put more faith in the well-spoken ISAGEN executives over fellow campesinos, which she later regretted:

People from other places started to come, where they had already built dams, and came to give us talks, social movements began to come in to tell us, "Look, don't let that project go ahead, it is going to destroy your life" ... But since the people, the majority, were excited about the work, and the companies give compliments, they have a speech, they speak well, and all that. And since those who came to tell us were campesinos like us, they didn't have that nice way of speaking, those compliments, the meeting in a nice meeting room, with air conditioning, with refreshments, with lunches, people did not get the message. Today, what do we do? We regret not paying attention



to those people who came to warn us of the destruction that was coming for our sources of life.

(Monica, Fisher / Activist)

Regardless, there was little that could have been done to prevent the arrival of the dam, since the project had received its environmental license in the year 2000. According to many of the interviewees, consultation prior to the license was either non-existent or at least inadequate. Early studies carried out by ISAGEN for the environmental impact assessment involved a socio-ecological assessment of the areas directly affected and a census of those living in the areas to be flooded. Nevertheless, in light of the complaints in subsequent years, several groups affected felt excluded and uninformed about the impacts. In 2009, when ISAGEN proposed modifications to the environmental license, incorporating a revised environmental impact assessment, a public hearing was carried out. One hundred attendees representing various interest groups attended. In the transcript of that event, obtained from the ANLA (MAVDT, 2009a), the lack of consultation is brought up various times. The Director of Licenses, Permits and Environmental Processes at MAVDT described the unique circumstances in her opening speech at the event:

As everyone knows, an important project for the country is going to be developed in this area, the Hidrosogamoso Project, which already has an environmental license. Normally public hearings are done to debate before the granting [of the license], however this case is very unique in that we already have a license that was granted since the year 2000, obviously all the assessments were carried out at that time.

(Director of Licenses, Permits and Environmental Processes at MAVDT) (MAVDT, 2009a, p. 3)

Although in the above quote it states that all the assessments were carried out at the time, the following speakers criticise the failure to carry out proper consultations with the community:

The request is that, since you were given the license without the required assessment, without taking into account the communities directly affected, now that a modification is going to be done, at least analyse all the situations that are going to be presented today, before making decisions to give the environmental license... Progress needs to happen and for progress to happen it is necessary to sacrifice certain situations, but progress should not violate the rights of the least advantaged people. (Mayor of Betulia) (ibid, p. 9)

The consultations are only being done now. If you are going to do negotiations, they should be before and not after; as they are set out, they do not incorporate community proposals. We do not have all the assessments of the entire process. We require information to be able to say “yes” or “no”. First, inform us properly to be able to communicate with the company. I request that the documents of the entire administrative part are handed over in order to make a decision. They were not consulted in 2000. (Constituent of Betulia) (ibid, p. 42-43)

What is clear is that the ‘socialisation’ processes are more about informing people what is going to happen, rather than asking people if they are for or against it. This is explained in a quote below by a coordinator at ISAGEN, who argues that the processes need to focus on project impacts rather than the wishes or dreams of the people:

We have an information program throughout the area telling what is going to be done, how it is planned to be done. That is part of the studies. How you plan to do it, and, in that interaction, people give their opinions on some issues, tell us what concerns they have, and the final document must also include those concerns... But you don’t arrive blind to a meeting like that. The whole process of prior information must have happened by then on the entire issue of project development... But it is very important to focus on the impacts caused by the project, not the wishes that people have, not the dreams people have. It has to be on what [impacts] I can really cause, and it is very important to be clear on that. I, for example, I would like to live in a penthouse on a tenth floor but the salary I have does not give me that. My dream is one thing, my reality is another. (Camilo, Environmental manager, ISAGEN)

Colombia’s Constitution, Art. 79 states that ‘Everyone has the right to enjoy a healthy environment. The law will guarantee community participation in decisions that may affect it.’ (ANLA, 2018b, p. 8). There are four mechanisms of environmental participation in Colombian law: the right to intervene in environmental administrative actions; the right of petition; environmental public hearing; and prior consultation with ethnic communities. Since Hidrosogamoso did not impact on an area with ethnic communities, they would not have been legally required to do prior consultation. A public hearing can be requested by the Attorney General or Delegate for Environmental and Agrarian Affairs, Ombudsman, Minister of Environment and Sustainable Development and General Directors of other environmental authorities, Governors, Mayors, or one hundred people or three non-profit entities (ANLA, 2018b). These first three mechanisms would have required communities to be proactive in requesting information, but according to some of the community members interviewed, the environmental license was approved ‘under the table’ before they even had a chance to dispute it (Antonio, Community leader).

Regarding the declaration of the PNN Serranía de los Yariguíes, communities living in or near the park boundaries first became aware something was happening when the park officials came by to measure their land and place flags in the ground. Then followed meetings informing people what was going to happen and that people who wanted to sell their property could sell. While there are policies in place for free, prior, informed consent for plans that impact indigenous groups, the legislation does not recognise any such process for campesinos.

We already knew very clearly, about the park, that they had declared it on May 4 or 5, 2005, they had made the declaration of the Serranía de los Yariguíes [national park]. So, we said "OK". Then, *much* later, those from Parques came, a certain person came, he is no longer there... and he said, "No, don't worry, you are privileged, because you are inside the park"... OK, right, but we didn't know that the privilege was that were going to be displaced. (Alberto, Farmer)

Every now and then you had to go to meetings and, well, OK, he who wanted to sell would sell, yes, he who wanted to sell would sell, they were not going to force anyone either... But well...for example, in our case, we had to sell because we had the farm with affectation. (Maria, Farmer)

Parques Nacionales told communities that if they didn't want to sell, they did not have to. But of course, they were extremely restricted if they stayed, and those that did stay report receiving psychological and verbal threats:

RITA: Yes, we pay rent here [outside the park]. One, for the girl's education and the other, because, well, it started to get complicated with Parques, so you always had like... that fear, right? ...the fear that, maybe, as they said they were going to expropriate, that they would expropriate us and if you weren't in agreement with the things they said or did, then you could go and leave. I mean, there was a lot of fear, there was a lot of fear and the family began to disintegrate a lot. [...]

ENRIQUE: I was doing maintenance on a crop, then they say, "No, you can go to jail for that", you can commit a crime for that, for cleaning a crop. They threaten you like that.

(Rita & Enrique, Farmers)

Prohibitions. "Do not work, this and that"... There are times when they arrive with letters, "Do me a favour and sign this for me". You look at it and it has no Parques Nacionales logo, so, these days, you can't sign almost anything. (Alberto, Farmer)

Another local man talked of the 'war' declared between them and the parks officials:

RAMON: We have formed - declared war, too, against them. But, of course, that has brought us consequences. There are people who point them out, investigate them. For example, I was threatened by a Parques official, because ...

INTERVIEWER: In what way?

RAMON: Eh, threatened with death! That if they saw me again, they would not answer for my life, that was told to me by a [park] official. Because they sealed a path for us, they fenced us off, a path - the Lengerke Path – which today is a historical heritage of humanity, of these nearby municipalities. And they appropriated even that. I removed those fences, and because of that, I got threats.

(Ramon, Farmer)

The independent audit by the Contraloría of Patrimonio Natural and the restoration project in PNN Serranía de los Yariguíes found that the project failed to properly involve communities. It reports a 'coercive approach towards the population settled in the perimeter of the park' and noted that the project opted for ineffective communication strategies such as radio announcements and distribution of leaflets, but with a 'conspicuous absence' of pilot activities, visits to farms, or participatory actions that promote communities as the main actors in the transformation of their social realities (Contraloría General de la República, 2019, p. 63).

A local professional acknowledged that there were reports that the social part of the restoration project had not been carried out well by Parques Nacionales:

I have sensed, perhaps, not a complaint but perhaps like a disappointment, perhaps. They say that the [restoration] project should have been consulted before setting it up, with the communities. So, possibly, having carried it out with a little more sensitivity towards them...I could not say with certainty, because since I was not there at the beginning but nevertheless, socially, I think that it was, well, it was not a success, it was not a success really, but I do think the execution was good (Gina, Social manager)

At the time of the interviews there were negotiations going on between Parques Nacionales and the people inside the park. One of the community members acknowledged that they were building a better relationship with Parques Nacionales, that they were, at least at that point in time, at 'peace' with them. This was thanks to the recognition by newer employees of Parques Nacionales of the errors that had been committed in the past:

Right now, through everything that has happened and everything that we've been doing, lately, we are in, like, a peace zone with them [laughs]... I mean, they became aware that the way they entered the area was not the best... If they had entered as they are right now, everything would have been very different, everything would have been very different. (Rita, Farmer)

Indeed, this reflects Galtung (1996, p. 265)'s description of peace as 'what we have when creative conflict transformation takes place nonviolently'. The people we spoke to are not opposed to leaving the park if necessary. They understand the importance of conservation, but they demand a fair deal, which they see as relocation or an offer for their land that will at least allow them to purchase land and set up their livelihoods elsewhere. But they are also open to working within the park on conservation, restoration or ecotourism projects.

Similarly, on the side of the fishing community, they wanted recognition of being affected by the dam, as a route towards justice and peace. Although one interviewee said that as long as the government approves the construction of dams and fracking, there will be no peace:

If ISAGEN recognises us as affected someday, that will be doing us justice, for what? So that there is more peace. For example, right now here in this community, we cannot speak of peace because, sadly, the fight is with the neighbours over a job. Well, so we don't see peace. Where is the peace that he [President of Colombia] talks about? "We are in times of peace". No. Because if he is going to continue making these dams, if he is going to continue fracking, there will be no peace anywhere, in no place will there be peace. (Anya, Activist)

It has been argued that the promotion of development projects like large-scale hydroelectric dams is a form of structural injustice or slow violence, where local social and environmental impacts are legitimised by a dominant narrative of sustainable hydropower development following best practice standards, and alternative human-nature worldviews are delegitimised (Blake and Barney, 2018, Duarte-Abadía et al., 2015). The key benefits of Hidrosogamoso promoted by ISAGEN and the government, aside from energy generation and security, are the employment and development opportunities brought to the region, with half of the contracting companies and 70% of the workers originating from Santander (ISAGEN, 2015b). Hidrosogamoso is also promoted as a 'clean energy' source, registered under the United Nation's Clean Development Mechanism (CDM). This is despite criticisms of large scale hydropower projects being included under this mechanism, owing to the environmental and social impacts of such projects, and for failing to meet additionality criteria (Cames et al., 2016, Haya and Parekh, 2011, Koo, 2017). The inadequate consultation in all three instances – over the construction of the dam, the declaration of the national park and the implementation of the restoration projects – represents a component of structural violence, where the power to decide over the distribution of resources is unevenly distributed (Galtung, 1969). In turn, many incidents of

direct violence were reported by interviewees and in grey literature in relation to the Hidrosogamoso project – threats, killings and forced disappearances. An NGO coordinator discussed the people who he claims were killed as a result of resisting against Hidrosogamoso and the threats to his own life:

People who protested, they went and killed them. They killed leaders. The president of the Association of Sand Miners, who removed sand from the river, they killed him. The president of the Community Action Board of Marta, Marta village. He was fighting because they were damaging the entrance road there, right? They killed him. Miguel Pabón Pabón<sup>33</sup>, too, who was helping organize the fishermen and everything, they killed him... [and] another sand miner. The president of the Fishermen's Association of El Llanito, they also killed him. So, they killed the leaders of the fishermen, the leaders of the sand miners, the leaders of the community action boards and the social leaders. [...]

Yes, yes, they tried to kill me, they tried to kill me. Two guys took me and beat me and they were going to put me into a truck and I wouldn't go and a lady appeared and, "Don't rob the man, don't rob the man!" and I got away and went quickly to the house, and the police arrived right away, but the minute the police arrived, they were all united there. And then, one night they shot at my house, yes, they shot at 11 at night, *tran*, they shot at my house, yes... That was in 2009, as soon as ISAGEN arrived, that happened, that happened to me. So, I have had escorts and I have precautionary measures of the Inter-American Commission on Human Rights. This office, the door is armoured and there are some cameras there and some cameras behind, that the Ministry of Interior has to protect us, yes. (Mateo, Coordinator, NGO)

Other interviewees discussed the same victims mentioned in the above quote. More recent assassinations of those attempting to resist extractivist development in the area include a woman called Fabiola Fajardo Ayala, an environmental leader and member of the Resistance to Mining Movement who was murdered in August 2018 in El Carmen de Chucurí (Somos Defensores Program, 2019). As far as I am aware, there have been no resolutions in terms of getting justice or clarity on the people behind the attacks on social leaders. According to the Somos Defensores Program (2019), in cases of killings of human rights defenders the vast majority of the alleged perpetrators are unidentified, followed by paramilitaries, unidentified armed groups, FARC dissidence, captured civilians belonging to unidentified groups, the National Army, the National Liberation Army (ELN), private security, National Police and the Popular Liberation Army (EPL). In addition, forest rangers that work for Parques Nacionales or other environmental institutions in many areas have

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<sup>33</sup> Miguel Pabón Pabón disappeared in 2012 but, as of writing, his fate is unknown. A dedication to him appears on the homepage of the Ríos Vivos Santander website: <http://veredasogamoso.blogspot.com/>

to deal with threats from armed groups. Twelve forest rangers were killed between 1994 and 2020 (Rojas Hernández, 2020).

## **9.6. Offsets: new tools of (neo)extractivism and the rise of green extractivism**

What is the significance of the forest offsets in the Yariguíes park in the context of wider socio-ecological and political trends in Colombia, Latin America, and the world? As discussed in chapter two, the socio-ecological conflicts that are occurring in Latin America are a consequence of worsening environmental degradation and widening social inequalities under successive generations of extractivism. Having examined the dimensions of conflict arising from the case study, this section concludes by arguing that the Hidrosogamoso project provides a window through which to observe (neo)extractivist processes linked to national neoliberal policies (in the case of Colombia, ‘armed neoliberalism’) and transnational capitalism. It also reveals trends of ‘green extractivism’ and the appropriation of nature through the rise of biodiversity offsets.

The Hidrosogamoso project contains elements of both a classic form of extractivism linked to a neoliberal strategy, as well as contemporary neoextractivism, following the typologies put forward by Gudynas (2018). The project was given the go-ahead when ISAGEN was still a majority state-owned company, justified on the grounds of employment opportunities it would bring to Santander and the energy security it would provide for Colombia. In this way, it was similar to the neoextractivist projects promoted under progressive Latin American governments that justify the extraction of natural resources for the sake of progress and social redistribution. However, the Hidrosogamoso dam had only been in operation for one year when ISAGEN was privatised, bought by Brookfield Asset Management, a global asset management company with headquarters in Canada. Over time, there has been a progressive simplification and increasing flexibility of environmental licensing procedures for extractive projects in Colombia, encouraging foreign investment (McNeish, 2017, Rodríguez, 2011). Throughout the elaboration of this research, Brookfield Asset Management remained an elusive figure in the Hidrosogamoso story<sup>34</sup>. A Financial Times article describes the group as highly secretive and ‘not so much a company as a giant, triangular jigsaw board that spreads across the world and covers assets worth

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<sup>34</sup> Interview requests sent to the Brookfield Asset Management Bogotá office and representatives from international branches were declined or met with no response.

\$500bn. The pieces are hundreds of corporate entities, all locked together by elaborate contracts, which give 40 people at the top the right to rule huge sections of the puzzle almost as if it were their own' (Vandeveld, 2020). The policy reforms to incentivise foreign investment and the privatisation of ISAGEN, one of the most important national energy companies, reflect the neoliberal strategy adopted by Colombia's right-wing government. The economic model that sustains Colombia's political system (and others such as Mexico and Chile) has been termed 'armed neoliberalism' (*neoliberalismo armado* or *neoliberalismo de guerra*). This refers to the commercialisation and transnationalisation of natural assets and resources under increasing control of corporations, and the use of military tactics and repressive policies oriented towards the criminalisation of protest (Seoane et al., 2010). These characteristics of armed neoliberalism are all too visible in different areas of the country, from the repression and assassination of indigenous and campesino leaders in rural areas, to the military and paramilitary deployment in response to popular protest in metropolitan centres. As described in chapter eight, in the Yariguíes forest offset project, following the privatisation of ISAGEN, funds were reallocated from ongoing monitoring of the offset sites to the hiring of private security to protect the national park, representing biodiversity conservation under armed neoliberalism.

As Acosta (2013) argues, extractivism in Latin America undermines democratic institutions, encourages corruption, dismantles societies and harms the environment. As can be seen in the Hidrosogamoso case, and in many other regions that suffer from state neglect, with the arrival of a megaproject, the developer steps in to fill some of the gaps left by government, providing schools, aqueducts, health centres and environmental programmes. When it comes to offsets, while the state is involved, the policy formulation and implementation is being led by international NGOs with business and biodiversity programmes. Although offsets aim to reduce the negative environmental impacts of particular development projects, by legitimising the continued extraction of resources, they risk becoming tools of (neo)extractivism. In addition, the transnational appropriation of biodiversity through schemes like REDD+ and biodiversity offsets can be seen as a form of 'green extractivism', where the intensive exploitation of resources is framed as not only compatible with, but also necessary for, biodiversity conservation (Dunlap and Brock, 2021). As Hidrosogamoso was marketed as an 'engine for development', offsets are now being promoted by the government as the 'engine for a new sustainable development model'. The parallels between the impacts and tensions at the development site and the offset site reveal similar tendencies arising from an extractive mindset that sacrifices areas



and creatures that are deemed less valuable, and that marginalises people who challenge this narrative or who simply adopt a way of living and being that is more independent and less reliant on the capitalist system.

## 9.7. Conclusion

A recurring point of tension in the socio-ecological conflict at the offset site, at the development site, and at a broader scale in the decades of armed conflict in Colombia, is the use, occupation and tenancy of land. Environmental offsets are being put forward as 'the engine for a new sustainable development model for Colombia' and a strategy for peace (MADS, 2017b). However, as this chapter reveals, environmental offsets bring up their own conflicts at offset sites, while risking the legitimisation of harm to nature and people at the development site, representing in this way, what Galtung (1990) refers to as cultural violence. Meanwhile, the lack of legal recognitions and resolutions of the situations of the residents of national parks, and the inadequate processes of consultation and community participation represents a form of structural violence. These experiences highlight the need for reform in the legislative framework around protected areas, to resolve tensions over the constitutional rights of peasants and the duty of the state to protect biodiversity, and there is increasing attention being brought to this issue (Betancourt Santiago et al., 2017, FAO, 2019, Gobierno de Colombia et al., 2018). Addressing policy contradictions and the social inequalities arising from them, as well as building legitimacy and trust among different groups, and between communities and institutions, is necessary to begin to resolve the cultural dimension of conflict. Actions and solutions proposed include the characterisation of the different actors, the creation of peasant reserves (*reservas campesinas*), establishing a definition of *campesino*, or even a redefinition of campesinos within parks, for example '*parquesinos*', who do not work the land as campesinos but are involved in conservation, restoration and education activities (Gobierno de Colombia et al., 2018). While there is a narrative about the destructive impacts of campesino farmers, looking at the statistics of land occupation within national parks, the area occupied by small holders and subsistence farmers is miniscule compared to the large landowners who own 90% of the agricultural land within parks, to whom greater attention needs to be directed.

This chapter has analysed the aspects of conflict and violence experienced in this offset project, and the parallels in relation to the Hidrosogamoso dam. This risks reinforcing the

tainted image of Colombia and its links to violence, perpetuating the stereotype that its citizens are trying hard to shed. However, this is not only about conflict and violence in Colombia. The bigger picture is of the extraction of resources behind the benign masks of responsible investment and sustainable development, and the historic global inequalities that have shaped the structures in place at the local level. The results of these initiatives are structural and cultural forms of violence that are much harder to see. The outcomes at the local level, as described by the interviewees, are the more visible forms of direct violence – displacement, kidnappings, threats, killings - which are often justified away in national and international media as local complexities, illegal groups, a 'lack of culture'. Developed countries offset their carbon emissions by financing the development of a 'clean energy' hydroelectric dam, the impacts of which are offset with local social and environmental compensation projects. But who will offset the offsets? Along the chain of compensation, multiple institutions become involved, responsibility is shifted, and accountability gets lost.

## 10. Conclusion

There is a saying in Colombia, '*Él que peca y reza, empata*' ('He who sins and prays, breaks even'). The practice of offsetting has been denounced as a modern-day form of religious indulgences, where companies and individuals can pay to absolve their environmental sins by compensating through carbon, forest or biodiversity offsets (Monbiot, 2006). Based on the polluter pays principle, offsets raise ethical controversies over the commodification of nature and the acceptance of the loss of biodiversity in one place for the promise of conserving or restoring an equivalent piece of biodiversity somewhere else. Yet environmental compensation forms an inherent part of the environmental impact assessment process to mitigate the impacts of development projects. In this way, it is argued that biodiversity offsets represent a sophistication and improvement of previous processes of environmental compensation, to better account for impacts beyond individual species to diversity at the ecosystem and landscape level. Following in the wake of the popularisation of biodiversity as a concept and the political action surrounding biodiversity conservation, 'biodiversity offsets' and the principles of no net loss, net gain and additionality have been eagerly adopted by governments. This is evidenced in the steep rise in the number of countries developing legislation on biodiversity offsets (Global Inventory on Biodiversity Offset Policies, 2019), as well as their adoption into industry standards and lender requirements (e.g. IFC, 2012a, IUCN, 2016). However, with the practice of biodiversity offsetting in higher-income countries largely failing to deliver on no net loss targets, this raises questions about what is driving the expansion of offsetting policy and discourse and how it will be implemented in different contexts.

This research set out to examine the significance and implications of the expansion of environmental offsetting in policy and in practice in Colombia. As the second most biodiverse country in the world, with progressive environmental policies and decades of experience with different environmental compensation instruments, Colombia was a fitting point of departure from which to explore this topic. With its own particular ecological and socio-political challenges, it allowed an exploration of offsetting across scales, from the local level in Santander, to the national and international level. Within this context, the research aimed to answer the following questions:

1. How is 'biodiversity' understood by different stakeholders involved in biodiversity conservation in Colombia?

2. How and why has environmental offsetting policy developed in Colombia?
3. How has environmental offsetting policy been implemented in practice in Colombia?

The key findings of each of these questions are summarised in the following three sections, followed by a discussion of the overall contributions of this thesis and opportunities for future research. Recommendations for policy makers and practitioners are included in section 10.4. The COVID-19 pandemic landed as this thesis was being written up, punctuating a 'before' and 'after' in global collective experience and memory. The final section of this thesis offers some reflections on biodiversity (and human) conservation amid global pandemics and climate change.

### **10.1. How is 'biodiversity' understood by stakeholders involved in biodiversity conservation in Colombia?**

The 1980s marked the beginning of a 'biodiversity revolution' (Tilman, 2012), spurring ecological research and political action around biodiversity conservation. Mainstream biodiversity conservation, promoted by international institutions and NGOs, has promoted a particular conception of biodiversity – as something that can be objectively measured and managed - as well as promoting how it should be managed and by whom (Brosius, 1999, Escobar, 1998, Martin et al., 2013). When translated to the local level, this conception transforms, collides or merges with the diverse conceptions of biodiversity held by different groups of people around the world. Identifying, acknowledging and respecting the diverse social constructs of nature and biodiversity is important for environmental management and decision making (Buijs et al., 2008, Hull et al., 2001, Varumo et al., 2020).

#### *Biodiversity, water and human life*

This research collected 40 personal definitions of 'biodiversity' across the following stakeholder groups: 14 community (small farmers and fishing communities), 3 academia, 5 government, 7 private sector, and 11 NGO. Emerging from these definitions are many recurring notions found in understandings of biodiversity in different locations (e.g. Buijs et al., 2008, Fischer and Young, 2007, Hunter and Joan, 2003, Lindemann-Matthies and Bose, 2008). Most similar studies to date focus on perceptions of biodiversity among the general public (mostly in Europe and North America), or among indigenous groups. Similar to Cerda and Bidegain (2018), who analyse biodiversity conceptions among local

stakeholders in a biodiversity hotspot in Chile, this research adds empirical evidence of the conceptions of biodiversity held by campesino communities, a group often seen to be in conflict with conservation goals, as well as by professionals involved in conservation at local, national and international level. Some universally understood concepts associated with biodiversity include 'life', the diversity of life across scales and a focus on species, their quantity and richness, as well as dynamic concepts such as the interaction and relationships of elements in an ecosystem. Unique to this study, compared with similar studies elsewhere, is the strong association of biodiversity with water - '*sin agua no hay vida*' ('without water there is no life') – and with human life. A third of the respondents from across different groups explicitly mention humans in their definitions of biodiversity, whether relating to humans being part of biodiversity or closely connected to and reliant on it. The social and cultural component of biodiversity, however, gets side-tracked when calculating biodiversity losses and gains when it comes to biodiversity offsetting. The divergent perspectives over whether people are actually *part of* biodiversity or *users* of it represents a challenge when these policies are put into practice.

#### Care, abundance and loss

The Santander-based interviewees, both local conservation professionals and community members, in general had much more elaborate and expansive definitions of biodiversity, compared to professionals at the national and international level, many of whom felt tied to the official definitions used by their institutions. Some respondents asked for clarification regarding which definition they should give e.g. 'Personally, technically or socially?', highlighting the subjective and dynamic nature of the term, which can be moulded to suit the context. For many community members, biodiversity takes on a personal meaning associated with the abundant nature surrounding them and care for the local environment. This focus on care and the mutual relations between locals and their natural environment (*campesino* and *campo*) has been highlighted by Lederach (2017) as central to building territorial peace, through everyday practices and a relational, dynamic approach that recognises the intimate relations between humans, biodiversity, crops, territories, violence and peace. For some participants, biodiversity takes on a temporal dimension as 'what we have' and 'what we have lost', with the arrival of development projects and climate change. The complexity and broadness of the concept of biodiversity is highlighted by some interviewees as a barrier to conservation when working with local communities. However, the findings of this research show high awareness and familiarity with the term 'biodiversity' among the local community members, with only one respondent having never heard of the

term. Although this can be attributed to the involvement of many of them in the restoration projects or other environmental education programmes, Colombia has been found to have a high public awareness of biodiversity in general (SINUS Institute, 2019).

### Biodiversity and identity

In Colombia, biodiversity has become an important attribute of national identity, employed to promote a different side to the country and move away from negative stereotypes. However, as epitomised by the box-office hit *Colombia: magia salvaje*, the type of biodiversity often promoted by the government is a biodiversity that is pristine and free of people, entirely at odds with the realities in the territories. Indigenous movements have found an ally in the biodiversity movement, as a way to recognise the important role these groups play in conserving biodiversity, and a strategy to defend their territories. When it comes to the nature-culture spectrum (Pretty et al., 2009), campesinos seem to be caught in the middle, neither seen as modern and industrialised nor living 'harmoniously' with nature. This research has shown that many small farmers have always had strong conservation values and sustainable practices, while others who used to hunt or fell trees unsustainably have spoken of their change in their mindset after being involved in conservation programmes. There are efforts to recognise the rich local ecological knowledge of campesinos, respect their territorial rights and ensure their active involvement in conservation efforts that aim for integrated biological, agricultural and cultural diversity (Betancourt Santiago et al., 2017, La Vía Campesina, 2010). It will not be an easy nor quick task to overcome the historical marginalisation and generations of direct and structural violence towards campesino communities so that local experts can be legitimately treated as such.

The concept of a balance in nature has largely been abandoned by scientists in recognition of the dynamic and fluctuating nature of ecosystems (Root, 2019). In the forty definitions of biodiversity, balance or equilibrium is mentioned only twice. However, it is a recurring theme in participants' discussions about biodiversity offsets, where the concept of a 'balance' between economic development and biodiversity protection is readily adopted, by scientists, policy makers, industry, international institutions, despite the lack of scientific evidence to support no net loss arguments.

## 10.2. How and why has environmental offsetting policy developed in Colombia?

Early forms of environmental compensation were introduced into legislation in Colombia in the 1970s, following the North American model of environmental regulations (Rodríguez, 2011). Around the same time, environmental impact assessments and the mitigation hierarchy were being adopted by the private sector, to meet the requirements of international lenders such as the World Bank. The 1990s represented an important decade in the history of environmental policy in Colombia, with a constitutional reform resulting in the 1991 Constitution, the creation of the General Environmental Law and the Ministry of Environment. This is when environmental protection and the concept of sustainable development became enshrined into policy, and coincides with the emergence of neoliberal forms of environmental policy and governance in many countries (Castree, 2008, MacDonald, 2010, Robertson, 2004).

### Scalar politics in offsetting

In 1996, legislation was passed requiring developers to compensate for impacts on forests through reforestation programmes. This research found that the Colombian biodiversity offset policy that was passed in 2012 emerged out of a need to address the shortcomings of existing environmental compensation policy. This had a political and scalar dimension. Previous compensations were decided on a case-by-case basis at the regional level, and often according to the whims of the civil servant who was responsible for issuing the environmental license. Therefore, with the introduction of biodiversity offsets, the aim was to create national oversight and more accountability and consistency, as well as to provide clarity for the private sector in terms of their compensation obligations. When it comes to biodiversity offsetting in the Colombian context, international NGOs play a leading role, particularly The Nature Conservancy, Conservation International, WWF, the Wildlife Conservation Society, and development agency GIZ. These organisations have been very influential in the formulation and implementation of public policy on offsetting and providing guidance to the government, as well as driving the REDD+ process (Aguilar-Støen, 2015). From the perspective of those involved in offsetting at the national level, the push from inside the country to move towards biodiversity offsetting came from the private sector, the government and scientific community, in order to meet the increasingly stringent environmental standards, again influenced by international environmental standards.

### Policy inertia and misappropriation

Implementation of the biodiversity offsetting policy has been stalled. A number of bottle necks were identified, including a lack of articulation between different offset obligations, institutional challenges, and lack of available areas for implementing offsets, among others. In 2018, a new offsetting manual was introduced, which incorporates three offset requirements under one roof: biodiversity offsets, forest offsets and compensation for extraction from forest reserves. The prospect of biodiversity offsetting is embraced by public authorities, research institutes like the Instituto Humboldt and by some international and national NGOs as it offers badly needed finance to fund environmental programs, invest in protected area management and meet national conservation and restoration targets. This risks an improper use of biodiversity offsets, since they should be additional and clearly linked to development impacts (Maron et al., 2015) and therefore risks creating a reliance on destructive development projects to the overall detriment of biodiversity. A major challenge is the roll-out of offsetting to the regional level, among the regional environmental authorities, and adapting to the realities in the territory. Concepts such as ‘no net loss’ and ‘ecological equivalence’ are seen as utopian ideals. Realising the difficulty of attaining these goals in practice, the rules were altered in the latest policy – no net loss is based on a set of actions as an approximation towards the goal, while the number of ecosystem units were reduced to facilitate their exchange.

The watering down of policies and moulding of targets to meet budgets without changing the narratives reflects how offsetting is based on an economic as opposed to an ecological ethics (Bond et al., 2021).

### **10.3. How has environmental offsetting policy been implemented in practice in Colombia?**

#### Challenges, successes and failures: Hidrosogamoso and forest offsets in PNN Serranía de los Yariquíes

Given the lack of projects implemented under the biodiversity offsetting policy, this research sought to uncover learnings from an existing experience with environmental compensation, namely the forest offset project of ISAGEN’s Hidrosogamoso dam. The research focused on the ecological restoration of 4,000 hectares in the national park PNN Serranía de los Yariquíes, carried out through an agreement between ISAGEN, Parques Nacionales Naturales de Colombia, and Patrimonio Natural. The approach and scale of the project made it a pioneer in the country in terms of environmental compensation and ecological restoration, presented at national forums and conferences. Perceptions of



success of the project vary widely depending on the stakeholder consulted and the dimension of success they are referring to – ecological, social, or economic/administrative. At one extreme, the company and some contractors claim the project was a great success, and it is promoted in the media as ‘handing over to the country a restored natural park’ (Arias, 2018). At the other extreme, some local people living near the restoration sites claim the sites and native trees planted were abandoned and they see the project as a money laundering or greenwashing scheme. In between, there are many different views on the project. The ecologists involved highlight the many uncertainties and the need for better planning, better baseline data and adopting an experimental approach that isolates and monitors different strategies in sites with different conditions. The learning experience for restorationists and discoveries of new species of the ‘molinillo’ tree (Aguilar-Cano et al., 2018) are examples of successes. Another clear success is the social benefits and environmental education that the project brought to local people hired as labourers, who spoke of a change of mindset after being involved in the project and communities expressed a desire for more environmental projects in their area. However, some express an internal conflict, with the realisation that the opportunity to be involved in positive conservation efforts comes at the cost of negative environmental impacts elsewhere, a dilemma familiar to activists and environmentalists navigating between ‘the contradictions of the colonial-modern world system and the resulting environmental crisis’ (Porto-Gonçalves and Leff, 2015, p. 82).

#### *Environmental offsets and socio-ecological conflict*

The purchase of properties within the park and the exclusion of the most marginalised campesinos from participating in the restoration project created a socio-ecological conflict, resulting in long negotiations, tensions between the parks authority and communities and among the community itself. The conflict was analysed using Galtung (1996)’s conflict triangle and typologies of violence as a guide, and informed and inspired by political ecology analyses of socio-ecological conflict, conservation conflicts and Latin American political ecology. First, many contradictions were uncovered, between the seemingly incompatible goals of different actors (conservation vs. livelihoods), contested valuations of land, and contradictory policies between a ‘parks with people’ vs. ‘parks without people’ conservation model, arising from a legal tension over rights and duties in the constitution. Second, the research reveals underlying attitudes and assumptions that have led to conflict, such as negative perceptions of campesinos, seen by some as invaders, with no consciousness for the environment, which is referred to as their ‘lack of culture’. They are

a heterogenous group with a lack of legal recognitions. The area is seen as a 'no man's land' within the wider region of the Magdalena Medio, which has been historically marginalised. Third, behaviours include the arrival in the territory on the part of the contractors, without proper consultation, and as a result excluded some local people from the restoration project. There were also acts of protest by the communities such as blocking the paths on the restoration teams, which succeeded to some extent in leading to negotiations. There are many parallels between the socio-ecological conflict at the impact site and at the compensation site – a lack of consultation, inadequate compensation to affected communities and their loss of autonomy, and different manifestations of both direct and structural violence. There are also similar calls among those affected for recognition as a route to conflict transformation, justice and peace.

#### **10.4. Contributions of this thesis and future research directions**

##### *Empirical contribution: Social impacts and conflicts over offsets and protected areas*

This research brings to light one of the major challenges worldwide when it comes to environmental offsets – they require vast amounts of land. This is one of the key factors attributed to the lack of success in no net loss policies, according to Sonter et al. (2020b). The same study found that prioritising compensation outside or near protected areas was more effective than within protected areas (ibid.). However, in Colombia and other countries with protected areas that are under-managed and being degraded, these are being put forward as potential offset sites, with the justification that they should involve less conflicts with communities compared with outside of protected areas. This research highlights an issue that has already been well established in the literature on protected areas and 'park-people' conflicts – forced displacements and conflicts over access and ownership of land and natural resources (Adams and Hutton, 2007, Brockington et al., 2006, Redpath et al., 2013). These conflicts will continue to surface in Colombia, since 'property sanitation' within parks is one of the mechanisms enabled under the biodiversity offset manual. The research highlights the social impacts of implementing compensations within a national park, which should be taken into consideration in future offset, conservation and restoration efforts. Similar social impacts are emerging from recent studies of biodiversity offsets and environmental compensation in low and middle-income countries (Anaya and Espirito-Santo, 2018, Bidaud et al., 2018, Bidaud et al., 2017, Brock, 2015). To resolve the situation of campesinos living in and adjacent to parks will require a

legal reform to address a constitutional tension between individual human rights and duties of the state to preserve protected areas (Betancourt Santiago et al., 2017, FAO, 2019). Future work on sustainable use models and community conservation areas in this context will be essential to progress in this area. It will be interesting to explore examples of community-based conservation that recognise the heterogeneity, varying interests, capabilities and power relations within 'communities' and that invests in building effective conservation institutions and organisations (Agrawal and Gibson, 1999). This research was limited to one case study project and one country; future analyses that compare different offset approaches could offer useful insights.

*Theoretical contribution: Socio-ecological conflict and the links between offsets and extractivism*

This research provides a novel theoretical contribution to the literature, by combining theories of conflict and violence from peace and conflict studies and political ecology, specifically, Galtung's conflict triangle and typologies of violence and analyses of socio-ecological conflict, conservation conflicts and Latin American political ecology. The conflict triangle provided a useful model to explore the different behaviours, contradictions and attitudes of the various actors in the conflict, while the work of political ecologists from the region offered insight into the historical patterns and recent trends that help to explain the bigger picture surrounding the case study. The research explores the nature of the relationship between extractivism and conflict in the context of the case study sites, and Colombia more broadly, and examines the links between extractivism and biodiversity offsetting, arguing that by facilitating continued extractive development, offsets risk becoming tools of (neo)extractivism or indeed a form of green extractivism.

*Data and land grabs*

The forest offset project in PNN Serranía de los Yariguíes highlights a limitation when relying on maps and remote sensing data to identify suitable offset sites. As seen in other contexts, the use of apparently objective ecological data that identifies lands as degraded 'wastelands' suitable for restoration risks obscuring other land uses or alternative narratives to explain land degradation (Basnett et al., 2017, Fairhead and Leach, 1996). Therefore, visits to the territory and a thorough survey of land uses should be an important aspect in any offset planning process, especially in countries such as Colombia lacking in data and with complex land use conflicts. While there is a degradation narrative that focuses on the environmental threat posed by campesinos, the much bigger issue is the

extreme concentration of land. Ten percent of the land within national parks is agricultural land and of that land, over 90% is comprised of huge plots of land of over 1,000 ha each, while smallholder peasant farmers make up a miniscule 0.1% (DANE, 2014). In this context, by facilitating trade-offs, there is a risk of offsets legitimising land grabs of territories and resources that are deemed less valuable or are owned or occupied by people with less power (Spash, 2015). Under the guise of a win-win solution that masks the true social and ecological impacts and complexities, offsets can therefore represent a form of cultural violence (Galtung, 1990). Greater transparency about the realities of what environmental offsetting involves might avoid both misleading promises and ethical conflicts.

### *Defining biodiversity and biodiversity offsets*

In much of the international scientific literature and offset guidelines, 'biodiversity offsets' are distinguished from other forms of environmental compensation on the basis of principles such as no net loss and ecological equivalence (Bull et al., 2016, BBOP, 2013). As argued in the introduction to this research, the inconsistencies in the definition and application of no net loss, as well as the failure to demonstrate it on the ground undermine to a large extent the practical relevance of the distinction between offsets and compensation. In Colombia, no net loss is widely seen as an 'unattainable goal, a utopia', to borrow the words of one interviewee. Meeting the principle of like-for-like ecological equivalence is likewise an arguably impossible task. To get around these bottlenecks, the second version of Colombia's biodiversity offsetting manual relaxed the rules, reducing the number of ecosystem units to make trade-offs possible. Incorporating greater flexibility of offset rules is a common occurrence, and is generally to appease developers while undermining ecological outcomes (Zu Ermgassen et al., 2020). Recent work by Vaissière et al. (2020, p. 2) acknowledges such classic definitions of biodiversity offsets as largely aspirational and proposes a broader definition as: '(1) the supply of an ecological gain (2) in response to an ecological loss (3) located in a compensation site distinct from the impacted site (4) following agreed-upon criteria for the ecological equivalence between gains and losses'. What this research has shown is that biodiversity and its conservation is inextricably tied to humans, whether as part of it or dependent on it. It has highlighted the complexities, failures and long-term uncertainties involved in environmental compensation, hidden behind idealistic promises that do not challenge the status quo of economic growth and extractivism. This underlines the need to go further, to challenge the

root causes of biodiversity loss and seek conservation measures that address social inequalities (Büscher et al., 2017).

#### *Opportunities for feminist and decolonial research*

One limitation of this research was the gender imbalance among the research participants, of whom two thirds were male and one third female. This was largely due to the gender imbalance among the staff involved in the ecological restoration projects at the local level. The interviews highlighted subconscious gender biases and contradictions whereby local women were simultaneously seen as tough and delicate, and it was taken for granted that manual restoration work was more suited to men. This highlights an important opportunity for future research to investigate the as yet under-researched gender dimension in ecological restoration and how to overcome barriers to women's participation in such projects (Broeckhoven and Cliquet, 2015). The central role of women in Ríos Vivos Santander and the local association in the Yariguíes park highlights the key role of women in environmental and resistance movements. Women are also playing a key role in the peace process but are also increasingly the targets and threatened as a result of their involvement in such activities (United Nations, 2020). This presents an opportunity for deeper research examining the relationships between geography, conflict, feminist movements and environmental movements (Ulloa, 2019), adopting decolonial feminist research methods, drawing inspiration from authors, activists and networks, for example, in the Latin American context, the Political Ecology from the South/Abya-Yala Working Group (CLACSO, 2020).

#### *Between harm and harmony*

As mentioned in the introduction to this thesis, the mitigation hierarchy is said to be based on the principle to 'do no harm'. However, compensation and offsets, as the final stage of the mitigation hierarchy are actually based on the premise that a project or activity *will* harm the environment, and to recompense for that harm. Therefore, offsets necessarily involve sacrifice, trade-offs and moral judgements. As this research has shown, a lack of baseline ecological information means the extent of the environmental harm of projects is often unknown. Biodiversity offsets, on the plus side, represent efforts to better assess and measure the impacts of projects. On the other hand, reducing biodiversity to quantitative ecological indicators means that some impacts will not be accounted for, including social impacts on local communities. Those working to protect biodiversity often find themselves in a Catch 22 situation whereby in order for biodiversity loss to be taken seriously by

industry and governments it must be given a material value, and in giving it that material value, other cultural, social and intrinsic values get left out.

In the area of peacebuilding, 'do no harm' is also an important guiding principle, such as *ahimsa*, central to Gandhi's concept of peace, which means no harm, including to the self or nature (Galtung, 1996). In peacebuilding it is advised that practitioners should proceed with programs only after careful consideration and widespread consultation, recognising that tensions will be created if careful attention is not given to how resources are distributed (Snodderly, 2011, p. 19). Galtung conceptualises violence as harm to the body, mind or spirit, and harmony as the absence of violence (Galtung, 1996). Peace, balance, harmony, stability, resilience, both social and ecological, are seen in contrast to harm, instability, violent conflict, ecocide and terracide. Wellbeing and the *buen vivir* concept is associated with harmony, living in harmony with nature (IPBES, 2015). The realities between harm and harmony are dynamic, messy socio-ecological systems filled with inequalities, where different groups 'coexist, not harmoniously, but in a fierce struggle to define human-nature relations' (Cárdenas, 2012, p. 318). By attempting to neutralise the conflict between economic growth and environmental protection, offsets simultaneously admit harm and detract attention from the extent of the losses incurred (Moreno-Mateos et al., 2015, Sullivan, 2017). Given the high level of uncertainty surrounding the manufacture of environmental gains to offset the losses, the first step towards doing no harm should be to properly acknowledge the known impacts and admit the unknowns.

## 10.5. Recommendations for policy makers and practitioners

Below are some key recommendations arising from this research, aimed at policy makers and practitioners in Colombia and globally that are involved in environmental offsetting and biodiversity conservation. These represent talking points rather than prescriptive measures, to open up discussions about how to move forward, not underestimating the local complexities, nuances and challenges to implementation.

### 1. Ensure that offsets do not compromise biodiversity

To ensure offsets do not weaken existing public environmental policy, biodiversity offsets should be *additional* and should not be seen as a source of finance to meet existing conservation commitments, such as protected area management and national ecological restoration targets. If not, they risk creating perverse incentives that exacerbate rather than mitigate the continued loss of biodiversity. Clear rules and compliance measures are needed to ensure the mitigation hierarchy is followed and environmental licensing processes are strengthened, with a focus on the early stages of avoidance and minimisation of impacts. Policy advice is currently vague when it comes to ‘non-offsettable’ impacts, requiring a more explicit determination of what no-go areas are when it comes to offsets and the actions to be taken in such cases, with meaningful evaluations of alternatives to proposed developments.

### 2. Maintenance and long-term monitoring of offsets is essential

Maintenance of reforestation and restoration sites and funding for long-term monitoring is essential to achieve positive outcomes for biodiversity and make sure resources and efforts do not go to waste. This must be incorporated into developer commitments for biodiversity compensation with independent oversight to ensure compliance. In offset projects around the world, compliance and enforcement is unfortunately often weak or absent, contributing to offset failure. Offset plans have to account for high levels of uncertainty when determining how long it will take to meet ecological objectives. Recommendations from stakeholders to improve outcomes include allocating funding for better baseline studies, adopting experimental approaches, adaptive management, and inter-institutional collaboration to share knowledge and data.

3. Address the social impacts of offsets and promote participatory and inclusive conservation and restoration

The social impacts of proposed offset projects must be assessed alongside impacts of the development project. Ensure access to information and that public consultation is carried out prior to the proposed development and offset projects, with follow up so that public concerns are adequately addressed. Local communities offer a wealth of expert knowledge and unique perspectives on ecosystems and sustainable practices. Collaborating with local communities from the earliest stage possible and offering fair compensation for their consultancy and participation should be a priority for any conservation and restoration project. Train and empower local leaders and community groups to exchange knowledge and sustainable practices through local and international networks. Seek solutions to overcome gender barriers and support women's participation in conservation, restoration and sustainable use projects at the local level.

4. Seek resolutions to the situation of campesinos in protected areas and address land grabs by large landowners

There is an urgent need to address legal tensions over the situation facing campesinos that own or occupy land inside protected areas so that they can either receive fair compensation for the sale of their land, or participate in alternative livelihood opportunities through community reserves, sustainable use or ecotourism projects. Directing resources towards collaborative protected area management can reduce the need for patrolling and security services. Plans and projects tailored to the particularities of the protected area and communities is important for long-term conservation of the area. While smallholder farmers account for only 0.1% of the total agricultural land within national parks in Colombia, the vast majority, 90.6%, is concentrated in the hands of few large landowners, according to the last agricultural census (DANE, 2016). Addressing land grabs within and around protected areas and the highly unequal concentration of land remains a priority through post-conflict land reform and restitution processes.

5. Protect community leaders and environmental defenders

Individuals and groups working to protect the rights of communities, territories and the environment are at risk. Environmental defenders are essential in the fight against corruption and in the pursuit of transparency, by defending constitutional rights to a healthy



environment and demanding accountability. How can they be protected? There need to be better mechanisms in place to tackle the root causes of conflict, safeguard defender rights and ensure accountability when attacks and threats occur (Global Witness, 2020). The transnational corporations and international financiers of projects that cause environmental harm and ultimately put environmental defenders at risk must also be held legally accountable.

#### 6. *Greater transparency and disrupting the narrative*

There needs to be much greater transparency regarding the uncertainties, challenges and knowledge gaps in biodiversity conservation and ecological restoration when these are used in offsetting. Universal concepts such as no net loss and ecological equivalency mean very different things depending on how they are applied in context. For example, in the space of six years, the calculation of ecological equivalency in the Colombian offset policy changed from being based on a set of 1,700 biodiversity units to 399 units. Offsetting requires a trade-off between complex metrics that can more accurately measure biodiversity and the need for simplicity to facilitate exchange of biodiversity units. However, the sustained use of the same narratives, while the rules are changed to facilitate the process, is problematic and should be questioned.

#### 7. *Moving beyond offsets: Support just transitions across scales*

One of the main barriers to offsetting is the lack of available areas to implement offsets. Therefore, while there are an immense number of projects that need to compensate for their environmental impacts, the land to carry out conservation or restoration is finite. International institutions, governments and the private sector should support policy and grassroots initiatives to develop and implement solutions that will limit dependence on economic growth and extractivism in favour of societal wellbeing and reductions in carbon emissions and biodiversity loss. Perhaps offsets in the short-term could contribute to this aim, through the exploration of alternatives and carrying out pilot projects that will facilitate the transition towards a more sustainable future.

## **10.6. Final reflections: Biodiversity (and human) conservation amid global pandemics and climate change**

The year 2020 was a target milestone for the international community to act on biodiversity loss, with the Strategic Plan for Biodiversity 2011-2020. While there were some successes, overall, it is far off course, having failed to meet any of the Aichi Biodiversity Targets (Secretariat of the Convention on Biological Diversity, 2020). Now, the world is facing a whole new panorama brought along by the COVID-19 pandemic, which forces a rethink about nature-society relations. It has been established that the loss of biodiversity as a result of human encroachment on natural habitat is a key driver of emerging infectious diseases, including coronaviruses (Loh et al., 2015); the COVID-19 pandemic has been described as ‘the tip of the iceberg’ (Vidal, 2020). This crisis has made even more evident the interconnectedness between human societies across the world and between humans and the rest of the natural world. But it also illustrates the deep inequalities that exist, with some sections of society suffering the consequences much more than others. Likewise, some sections of biodiversity will suffer more than others. While in some places, lockdowns have resulted in a reduction in air and car travel, which has allowed space for wildlife to thrive, in other places, groups have taken advantage of the distraction of COVID-19 to deforest large areas, notably in the Brazilian Amazon. This loss of forest and natural habitat in turns leads to greater vulnerability to future pandemics, creating a vicious cycle (Tollefson, 2020). Meanwhile, climate change poses an even greater and more permanent threat. Noam Chomsky diagnoses the real issue facing society and the planet as ‘the neoliberal plague’ (DiEM25, 2020). Those who stand to do well out of the crisis include companies like Brookfield Asset Management, the owner of Hidrosogamoso, who ended the year 2020 with their best quarter on record (Brookfield, 2021). In an interview with Bloomberg, Bruce Flatt, CEO of Brookfield Asset Management, explained that governments have two options to recoup the money spent and borrowed as a result of the pandemic: tax more or sell assets; and that Brookfield will probably double their assets to one trillion USD in five years (Flatt, 2020, 06:05).

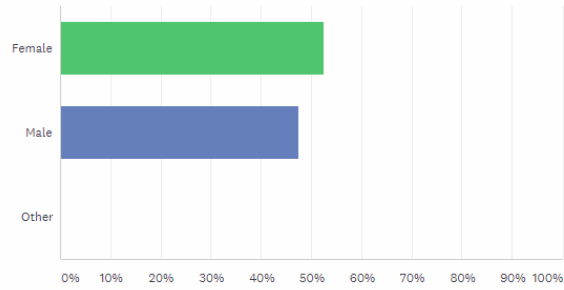
While the mitigation hierarchy is an essential tool in minimising environmental impacts, and offsets as part of it, effective action to actually reduce the loss of biodiversity must go beyond neoliberal conservation approaches that maintain an illusion that no net loss of biodiversity under green growth is possible. But beyond this – to examine the structural factors that allow some groups to dominate and suppress others (Martin et al., 2013). IPBES (2019) tells us that we need ‘transformative change’ – ‘a fundamental, system-wide

reorganization across technological, economic and social factors, including paradigms, goals and values.’ Here is where ideas around degrowth (Kallis et al., 2020) offer intriguing arguments for reconfiguring societies in a way that puts life at the centre of our economic systems, and not the other way around.

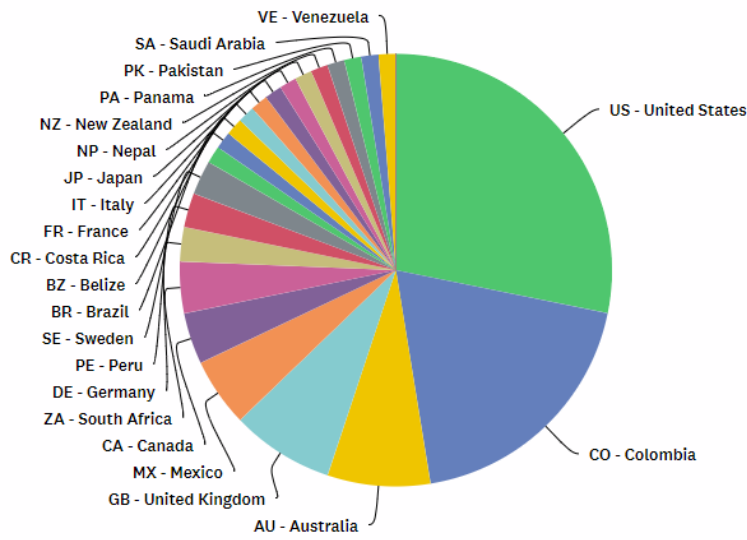
## Appendices

# Appendix A: ICCB 2017 Survey Results

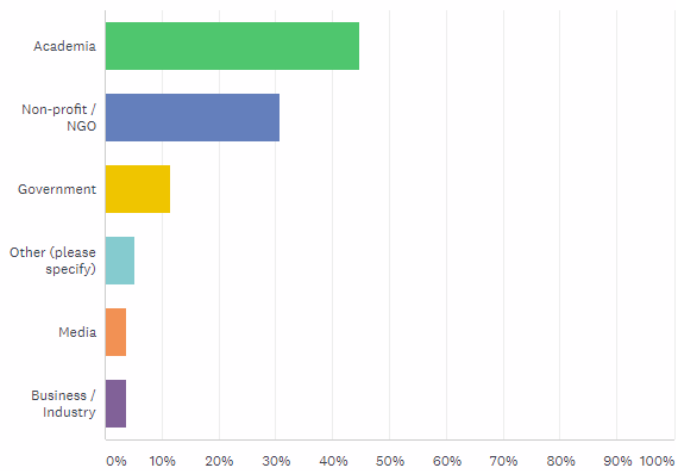
## \* 1. What is your gender?



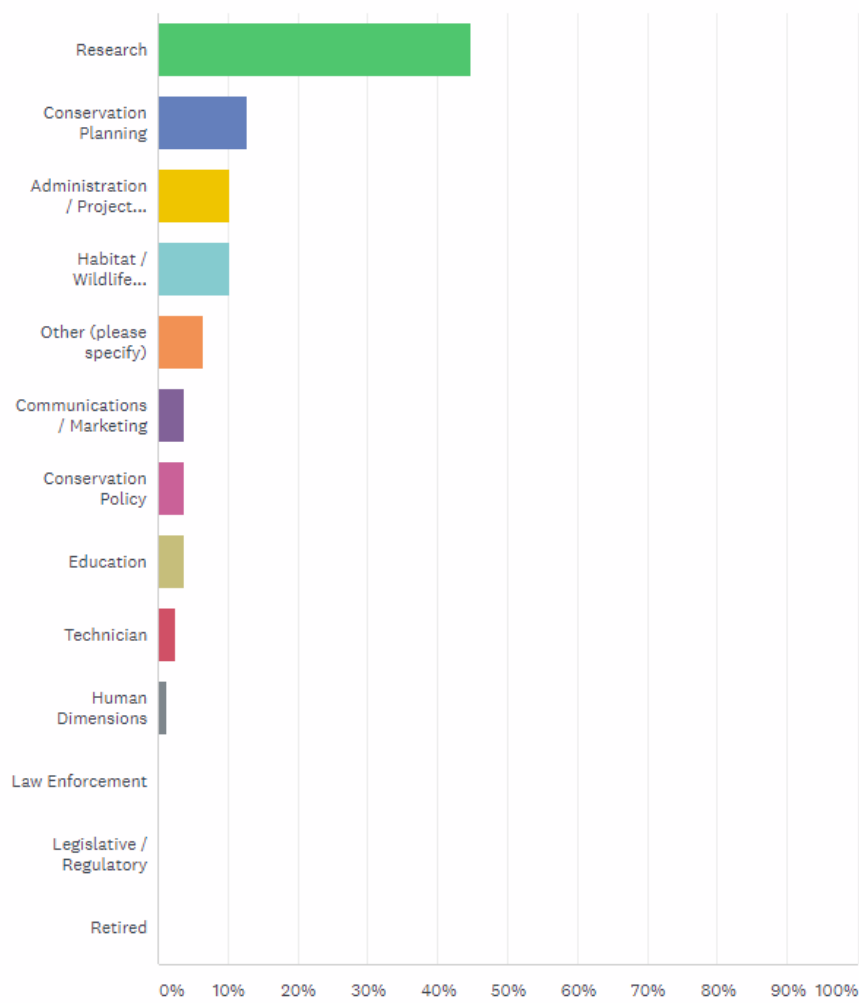
## \* 2. Which country do you currently live in?



## \* 3. Which sector do you work in?



**\* 4. Which of the following best describes your main area of work? (Select only one)**



**5. What is your job title?**

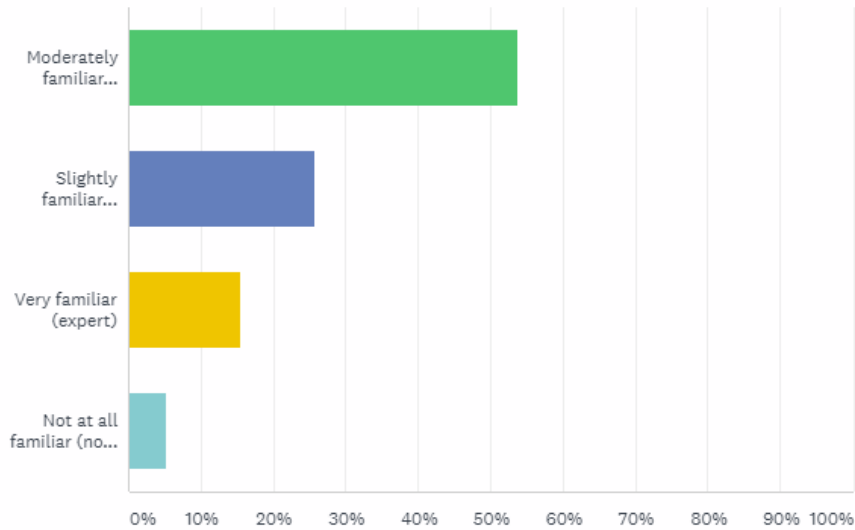
PhD Student / Doctoral Researcher	17
Freelance Writer and Editor	1
Student	2
GIS Analyst	1
Environment Specialist	1
Freshwater Ecologist	1
CEO	3
Professor	4
Graduate Student	1
Program Coordinator	1
Executive Director	3
Academic Program Manager	1
Professor of Environmental Science	1
Biologist of New World Succulents (Plant Systematist)	1
Reporter	1
Veterinarian Technician / Graduate Researcher	1
Research Associate	1
Researcher	2
Senior Program Officer	1

Senior Director Program and Explorer Development, Latin America	1
Dir, Strategic Communications	1
Assistant Director / Ichthyologist	1
Senior Research Scientist	1
Project Officer	1
Associate Researcher	1
Watershed Sustainability Specialist	1
Chief Scientist	1
Wildlife Management Department Director	1
Redlist Scientist	1
Lead Scientist: National Biodiversity Assessment	1
Director of Project Development	1
Program Director	1
Conservation Logistics Specialist	1
Program / Communications Officer	1
Consultant for Adaptive Conservation Planning	1
Professor - Researcher	2
Director	1
Forest Technician	1
Assistant Professor of Parks & Conservation	1
Cofounder, Wildlife Biologist	1
Fauna Specialist	1
Senior Correspondent	1
Young Scientist	1
Anthropologist	1
Conservation Planner	1
Advisor	1
Associate Professor and Researcher	2
Principal	1
Plant conservation officer	1
TOTAL	76

**\* 6. How familiar are you with the concept of "biodiversity offsetting"?** (also referred to as "compensatory mitigation", "habitat banking", "compensation for biodiversity loss")

*Note: Biodiversity offsets are measurable conservation outcomes of actions designed to compensate for residual impacts of development projects after appropriate prevention and mitigation measures. The goal is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity.*

*For example, if a development project (e.g. mining, energy, infrastructure development) still damages biodiversity after impacts have first been avoided, minimised and restored, a developer can offset this damage by conserving or restoring biodiversity of greater or equal value, ideally located as close as possible to the impacted site.*

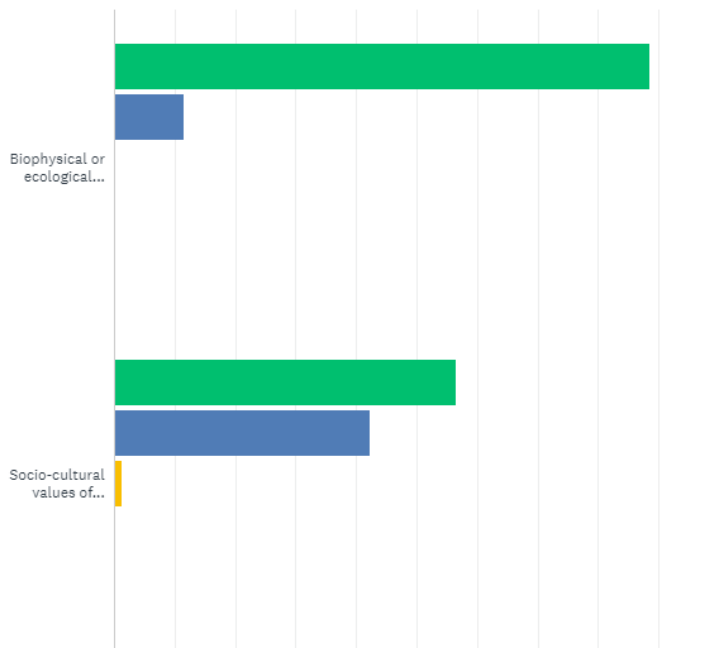


**7. If you have ever been directly involved in biodiversity offsetting, please explain your involvement:**

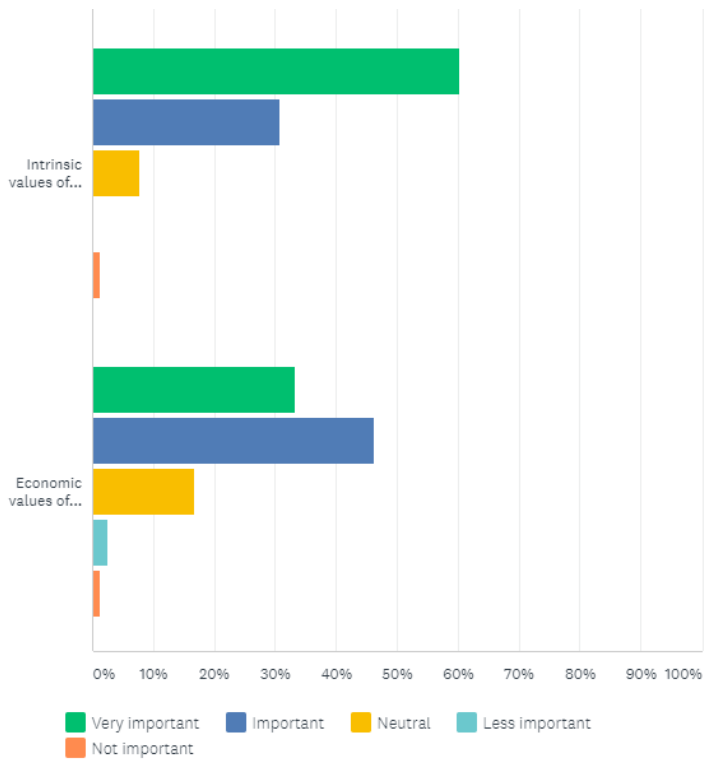
[answers to this question removed for confidentiality purposes to protect participant information]

**\* 8. When thinking about compensating for biodiversity loss, what importance would you attach to each of the following values of biodiversity?**

Please rank on a scale from 'very important' to 'not important'







**\* 9. The following are 10 principles to be followed when designing and implementing biodiversity offsets, developed by the Business and Biodiversity Offsets Programme (BBOP):**

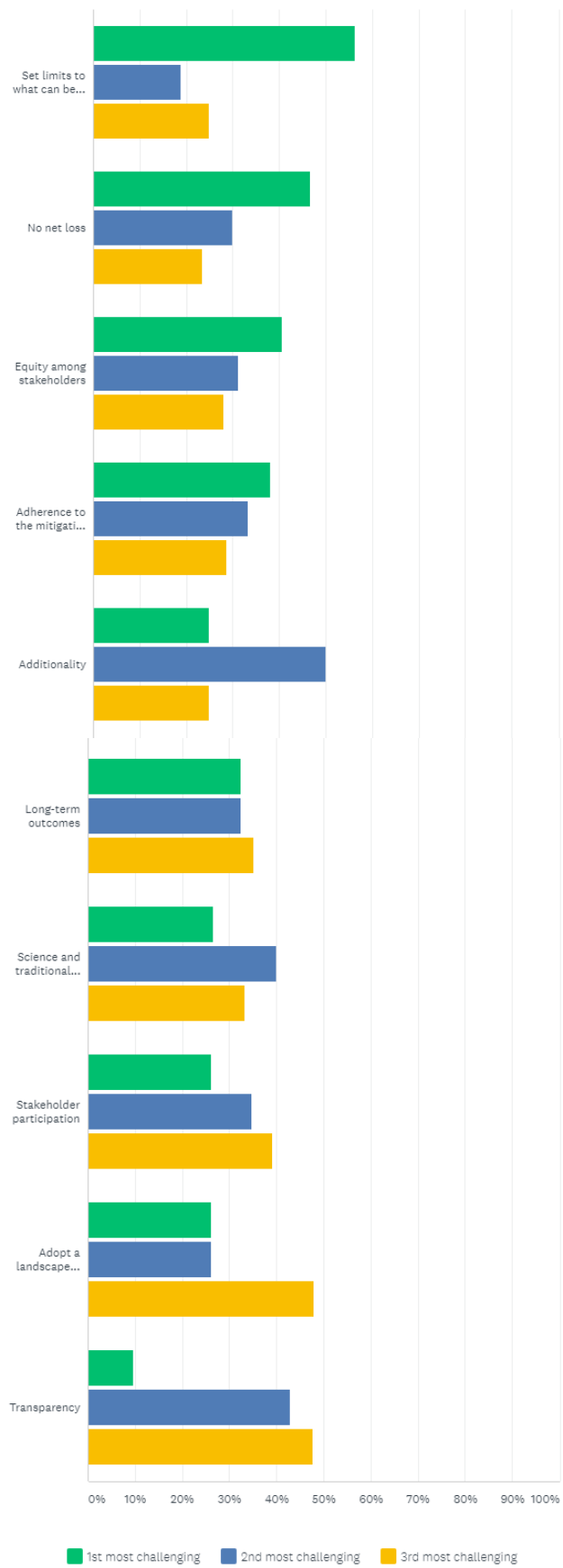
- 1. Adherence to the mitigation hierarchy:** first avoid, minimise and restore any environmental damage; an offset should be a last resort.
- 2. Limits to what can be offset:** identify any impacts than can't be offset due to the irreplaceability or vulnerability of the biodiversity affected.
- 3. Adopt a landscape context,** taking into account available information on the full range of biological, social and cultural values of biodiversity and supporting an ecosystem approach.
- 4. No net loss:** achieve no net loss and preferably a net gain of biodiversity.
- 5. Additionality:** achieve additional conservation outcomes above and beyond results that would have occurred if the offset had not taken place; avoid displacing harmful activities to other locations.
- 6. Stakeholder participation** in decision-making about biodiversity offsets, including their evaluation, selection, design, implementation and monitoring.
- 7. Equity:** sharing the rights and responsibilities, risks and rewards associated with a project and offset among stakeholders in a fair and balanced way.
- 8. Long-term outcomes** that last at least as long as the project's impacts and preferably in perpetuity.
- 9. Transparency** in the design and implementation of a biodiversity offset, and communication of its results to the public.
- 10. Science and traditional knowledge** inform the design and implementation of a biodiversity offset.

**Which do you think are the 3 most challenging principles to attain in practice?**

Please select the 3 most challenging principles, 1 being the most challenging. (Select only 3 from the list).

	1ST MOST CHALLENGING	2ND MOST CHALLENGING	3RD MOST CHALLENGING	TOTAL	WEIGHTED AVERAGE
Set limits to what can be offset	56.25% 9	18.75% 3	25.00% 4	16	2.31
No net loss	46.67% 14	30.00% 9	23.33% 7	30	2.23
Equity among stakeholders	40.63% 13	31.25% 10	28.13% 9	32	2.13
Adherence to the mitigation hierarchy	38.10% 8	33.33% 7	28.57% 6	21	2.10
Additionality	25.00% 4	50.00% 8	25.00% 4	16	2.00
Long-term outcomes	32.43% 12	32.43% 12	35.14% 13	37	1.97
Science and traditional knowledge	26.67% 4	40.00% 6	33.33% 5	15	1.93
Stakeholder participation	26.09% 6	34.78% 8	39.13% 9	23	1.87
Adopt a landscape context	26.09% 6	26.09% 6	47.83% 11	23	1.78
Transparency	9.52% 2	42.86% 9	47.62% 10	21	1.62

Comments (1)



**10. Please elaborate on why you chose the 3 challenges in the previous question or add any general comments.**

1. I think it is relatively easy to conceptualise offsets and ensure that are scientifically-based and robust from a conservation perspective, but companies have such a poor track record of stakeholder engagement and transparency, that these will be challenges to do well. Related to this, equity among stakeholders may be a big challenge in places where stakeholders have insecure land / tenure rights, where resources and land are contested and where governments marginalise and do not recognise groups such as forest-dependent people and indigenous peoples.
2. "Long term outcomes" and "no net loss" are linked, as the temporal period over which loss or gain is measured will determine whether there is loss or gain. I do not believe that there can be no loss of biodiversity, as any development will result in introduction of species which will change the system. I selected long-term outcomes as the most significant because it depends on many of the other named factors as well as other unknown (available funding, cultural values of the time).
3. Long-term outcomes usually require monitoring and a significant amount of budget, which can be quite difficult. Secondly, several developing countries unfortunately have significant corruption, thus, transparency is very difficult to achieve. Finally, organize different stakeholders is also a very difficult task.
4. I think infrastructure project managers still don't understand that mitigation hierarchy can result in faster economics outcomes, because they think they can compensate with money easily and in a cheaper way, as they are used to, because since the impacts assessments the impacts are under-estimated. For the same reason (bad impacts assessments), plus the tropics complexity, we really don't know accurately the biodiversity loss that we would face with each individual project, nor the cumulative impacts of several projects in the same area/system, that can cause extra, non calculated, biodiversity losses.
5. I think it can be very hard to get everyone (stakeholders) involved and on-board biodiversity offsets, as well as to get people/companies to AVOID rather than taking a "do first ask for forgiveness later" sort of mentality. I also think having no net loss would be very challenging as how do measure that? e.g. a project could affect a river system but use a forest as an offset - the river system is still heavily affected and would have biodiversity loss. Unless of course it is specified that offsets must be relevant & local to how the project is affecting the region it takes place. (I just noticed you have indicated that in your description to that's good) Regardless sometimes effects of projects I think could have lasting damage. I do also think that perhaps attitudes are changing & perhaps it is easier to get stakeholder participation now than historically.
6. In Colombia it is complex to evaluate, there is a lot of cultural heritage, different languages.
7. Often long-term outcomes are difficult to obtain due to restrictions in funding or changing technologies that make an initial effort redundant. Equity is difficult, but obtainable with collaboration, flexibility and transparency - being willing to meet people where they're at socially, economically, etc. No net loss: looking at the literature and global trends, biodiversity is declining, and more work is required to ensure no net loss.
8. It is challenging to guarantee long-term outcomes and continually monitor these. I also think ensuring equity across stakeholders can be challenging as well as understanding all aspects of a given landscape.
9. With an ever-growing human population, avoidance of ecosystem deterioration is becoming increasingly difficult (impossible in many instances). Further, given the socio-economic disparities is such biodiversity rich regions, equity is realized on a very small scale.
10. Not ideal, all efforts should be made not to have to compensate, although it can be better than nothing but far from ideal.
11. Offsets are often corrupted in their application. It is difficult to measure their value and often impossible to guarantee their longevity because many are on private land
12. It seems to be very difficult to be able to restore original habitat to its previous state, especially with no net loss of biodiversity.
13. 1: Hard to conserve whole landscapes with people involved. 2: In US, backlash against science. 3: People are entitled
14. #4-#5 Reliable information it's hard to obtain. #3. It demands big economic inversion and commitment
15. Implementation and economic issues.
16. I think sharing rights, responsibilities and benefits always will be very difficult. Everyone wants a piece, who decides how to distribute is key
17. Lack of transparency is one of the most important issues in Mexico and Latin America. Limits = identify and communicate what does limits are to take decisions.
18. I deal mostly in communications, and adequately communicating to disparate audiences is incredibly challenging as is gaining buy-in from all the relevant stakeholders and ensuring they feel heard.
19. The 3 challenges chosen vary greatly from project to project and really depend on the regional / country reality. But overall, it has been more common than desired to have resistance from stakeholders to fully embrace the compensation scheme at least some level. It is even more difficult, in my personal experience,

to equally satisfy all the parts involved, and lack of appropriate (or close to) equity makes the stakeholder engagement even more complicated at times. With all that is very challenging to overcome these 2 issues and still be able to provide additional benefits.

20. Set limits to what can be offset - In practice this is not observed, either because there is not enough research to identify potential impacts (e.g. if endangered species are present - if no research therefore no spp found then no problem developing the area) or because the perceived value of the development is seen as greater than the perceived loss to biodiversity, especially from business and industry perspective. 2. Adherence to the hierarchy - businesses do not like being told that they can't develop an area/use a resource after they have decided they want to. Where there are protected areas, businesses generally do not consider action, but in non-protected areas businesses may have developed a full case and plan (invested time and money) to then be told no. They will fight back and lobby for access. 3. Use of scientific and traditional knowledge. Similar to (1) in that if the science and traditional knowledge is not pre-existing, business will likely minimise the effort/cost/time to properly investigate the value of an area and therefore cost (to themselves) of offsetting it. An envelope-calculation may be all they use to present minimal offset to the government, and the government, being pleased they have suggested any offset at all, will not push for full investigation.
21. Politically driven application
22. I wonder why the focus is on protecting biodiversity and not ecosystems. Perhaps it's a matter of "equivalent" units, but if one is developing mangroves, they should be replacing those mangroves they've impacted for instance. It is easier to measure how much mangrove you've restored or planted than biodiversity I imagine and if you create or allow the natural structure that support biodiversity to 'thrive' (where you mitigate\offset) then biodiversity will fill that opening. Perhaps a simpler way to frame offsetting??
23. Difficult to force participation. More people interested in the immediate fix of issues rather than long term or big picture outcomes. Landscape effects also harder to predict and difficulty to explain to lay person. Creates difficulty with buy in.
24. It is incredibly difficult to ensure that stakeholders are represented equitably
25. My knowledge of mitigation when Seagrass, corals, or mangroves are removed is that trying to 'create' new such ecosystems in locations where they have not existed before very frequently ends in failure.
26. Very difficult to conduct development without substantial and irreversible impacts
27. Hard to find stakeholders in Colombia, if you find them one will want to take the best deal, transparency hard to find since some entities don't share information
28. Difficult to rank because interconnected.
29. In a large number of cases offsets are agreed upon but in the long-term the agreements are not upheld. In other cases, if other attractive low impact options is not given, avoids is not practice and offsets becomes the first option. Many organizations refuse to be transparent even if it is stated by law, as there is a lack of policing.
30. I have not any knowledge to choose ethically the 3 challenges. I put those for which I was inspired.
31. Stakeholder participation on offsets is often linked to polarized viewpoints & consensus is difficult to achieve without a very structured and well managed process. Additionality is difficult to achieve because it is difficult to overcome the inherent uncertainty in our knowledge of national ecosystems and species distributions. Traditional knowledge is difficult to include in that it takes a long process to extract and interpret it meaningfully.
32. Achieving no net loss of zero or a gain seems difficult. It seems long-term involves a lot of funding and people power. It seems to mean going into all the (...) which can take a lot of time.
33. Multiple stakeholders, across global scales often v difficult / nearly impossible to address.
34. Biodiversity offsets rely on supportive community government frameworks in place to ensure fair, equitable, transparent systems. Many systems we work in at the moment are still far from the basic infrastructure which needs to be addressed whilst moving forward with biodiversity offsets.
35. The most challenging thing is humans and trying to include them in being part of offsetting.
36. Preference for #1 is absolute. Most of the others represent secondary approaches used when the primacy of #1 is not respected.
37. The idea of maintaining long-term outcomes seems difficult in any conservation context (i.e. sustainability) but certainly unachievable without equity
38. Additionality because in biocultural spaces it is never easy not to cause a conflict out of an offset initiative. Long-term outcomes because in landscapes affected by big projects from resourceful stakeholders there are many hidden ecological effects on the long-term. (ex. mining industry who might engage in biodiversity offsets). Stakeholder participation, because in the subtropics continuity and assessment is a big challenge.
39. I think in any development initiative some impact and some loss of biodiversity is going to happen since there's an alteration of normal ecological processes. Attempting to achieve "no net loss" or "additionality" I think is very difficult.

40. From my experience the main problem is to ensure developers do a comprehensive EIA including all impacts and the need for compensation. From there, being able to compensate the way it should be done is a challenge per se.
41. No net loss - impossible!
42. Stakeholder participation - it is difficult to get people to work together, especially on "wicked" problems. Additionality - we are degrading the earth beyond repair. Long-term outcomes - not sure if we'll last long enough
43. I study evaluation / outcomes of conservation education and collaborative conservation and I know how difficult it is to measure long term outcomes.
44. Lack of understanding in non-scientific community of irreplaceability of many ecosystems... Cannot be easily 'offset' by equivalent area elsewhere
45. As a consultant, I have seen the difficulty in making these things happen
46. Transparency and stakeholders participation are imperative because these make interventions open to scrutiny and constructive criticism.
47. Some stakeholders have more power than others and tend to receive the benefits while weaker stakeholders receive the risks; 2. Western science usually or almost always trumps traditional knowledge. These are at times complementing but also competing; 3. Projects have defined timetables that are usually short-term
48. No net loss implies not impacting what you can replace and achieve an offset that really contributes to biodiversity in a place that was really under threat and not a place no one wanted to transform. In that sense, achieving no net loss and making it a long-term outcome is extremely important. The equity is important because you could have no net loss of biodiversity but you could be offending the livelihoods of communities.
49. Because in Mexico the rural-local people and their traditional ecological knowledge are not involved in decision-making of any kind.
50. Restoration must be a priority despite any other strategy and that must be done from a landscape scale.
51. It's very difficult to work in ecosystem without no ecological baseline
52. I cannot make a rank. But landscape context is usually neglected in my country.
53. I find no net loss to be tough because we are constantly finding new spp. Equity among stakeholders is rare by nature. Expanding to a landscape scale is difficult when working on multiple land use types.
54. I would view equity, participation, transparency and science/traditional knowledge as a set of strongly interdependent principles. These are principles that developers are unlikely to adhere to, unless obliged by law and held accountable by a regulatory agency. Principles of the ecosystem (landscape approach) incorporates the first four principles that I selected and based on what I have seen, remains an ideal rather than something that is routinely achieved. No net loss is hard to measure as we are unable to measure what was there in the first place and once a system has been disturbed we don't have the ability to know whether it will lose or accumulate species.
55. Na
56. Being in LA has led me to believe that one of the main challenges in giving biodiversity its value (or some kind of value) lies in our governance systems. Unless there is equity among stakeholders in the way we look at, assign and manage responsibilities and benefits regarding biodiversity, we will not be able to achieve sustainable development or any kind of harmonious state with nature.
57. In my experience business interests and lack of government demand drive project scope. A landscape context is challenging due to higher cost (at some point boundaries are required). Confidential business information is used to limit amount of data sharing with public and even among stakeholders. And the capacity for industrial developers to provide additionality is reduced when publicly traded companies.

**Appendix B: List and classification of interviewees (NB: all individuals' names are pseudonyms)**

	<b>Pseudonym</b>	<b>Gender</b>	<b>Organisation type</b>	<b>Position</b>	<b>Level</b>	<b>Stakeholder group</b>	<b>Sector</b>	<b>Sub-unit</b>
1	Carlos	M	Research Institute	Researcher	National	Offsets advisor	Academia	1
2	Sergio	M	NGO / Consultancy	Ecologist	National	Offsets advisor	Academia	1
3	Marian	F	Trade Association	Coordinator	National	Offsets advisor	Business / Industry	1
4	Harry	M	Trade Association	Sustainability Specialist	International	Offsets advisor	Business / Industry	1
5	Henry	M	Ministry of Environment and Sustainable Development	Consultant	National	Offsets advisor	Government	1
6	Cecilia	F	Ministry of Environment and Sustainable Development	Environmental Professional	National	Offsets advisor	Government	1
7	Gonzalo	M	INGO	Researcher	National / International	Offsets advisor	NGO / Non-profit	1
8	Veronica	F	NGO	Project Manager	National	Offsets advisor	NGO / Non-profit	1
9	Victoria	F	INGO	Specialist	National / International	Offsets advisor	NGO / Non-profit	1
10	Alan	M	INGO	Programme manager	International	Offsets advisor	NGO / Non-profit	1

11	Luis	M	NGO / Research Institute	Ecologist	Local / National / International	Offset project staff	Academia	2
12	Ricardo	M	ISAGEN	Senior manager	National	ISAGEN	Business / Industry	2
13	Cristian	M	ISAGEN	Environmental coordinator	National	ISAGEN	Business / Industry	2
14	Benjamin	M	ISAGEN	Social coordinator	National	ISAGEN	Business / Industry	2
15	Paula	F	ISAGEN	Project manager	National	ISAGEN	Business / Industry	2
16	Leonardo	M	ISAGEN	Environmental professional	National	ISAGEN	Business / Industry	2
17	Camilo	M	ISAGEN	Environmental manager	Local	ISAGEN	Business / Industry	2
18	Edgar	M	ISAGEN	Social manager	Local	ISAGEN	Business / Industry	2
19	Borja	M	Environmental Consultancy	Consultant	Local	Offset project staff	Business / Industry	2
20	Javier	M	Environmental Consultancy	Consultant	Local	Offset project staff	Business / Industry	2
21	Juan	M	Environmental Consultancy	Project manager	Local	Offset project staff	Business / Industry	2
22	Esteban	M	Environmental Consultancy	Forestry engineer	Local	Offset project staff	Business / Industry	2
23	Pablo	M	NGO / Self-employed	Project staff / Farmer	Local	Offset project staff	Community	2
24	Martin	M	NGO / Self-employed	Project staff / Farmer	Local	Offset project staff	Community	2
25	Pedro	M	Self-employed / Informal	Farmer	Local	Community affected by dam	Community	2



26	Fernando	M	Self-employed / Informal	Farmer	Local	Community affected by dam	Community	2
27	David	M	NGO / Self-employed / Informal	Project staff / Farmer	Local	Offset project staff	Community	2
28	Manuel	M	Self-employed / Informal	Farmer	Local	Community affected by park	Community	2
29	Maria	F	Self-employed / Informal	Farmer	Local	Community affected by park	Community	2
30	Antonio	M	Retired	Community leader	Local	Community leader	Community	2
31	Bruno	M	NGO / Self-employed / Informal	Project staff / Farmer	Local	Offset project staff	Community	2
32	Ana	F	Self-employed / Informal	Farmer	Local	Community affected by park	Community	2
33	Monica	F	Self-employed / Informal	Fisher	Local	Community affected by dam	Community	2
34	Anya	F	Self-employed / Informal	Fisher	Local	Community affected by dam	Community	2
35	Tobias	M	Self-employed / Informal	Community leader	Local	Community leader	Community	2
36	Alberto	M	Self-employed / Informal	Farmer	Local	Community affected by park	Community	2
37	Ramon	M	Self-employed / Informal	Farmer	Local	Community affected by park	Community	2
38	Rita	F	Self-employed / Informal	Farmer	Local	Community affected by park	Community	2
39	Enrique	M	Self-employed / Informal	Farmer	Local	Community affected by park	Community	2
40	Angela	F	Self-employed / Informal	Farmer	Local	Community affected by park	Community	2

41	Patricia	F	Self-employed / Informal	Farmer	Local	Offset project staff	Community	2
42	Diego	M	Public authority	Biologist	Local	Offset project staff	Government	2
43	Adrian	M	Regional Environmental Authority	Public servant	Local	Offsets advisor	Government	2
44	Gina	F	Public authority	Social manager	Local	Offset project staff	Government	2
45	Carolina	F	NGO	Technical coordinator	Local	Offset project staff	NGO / Non-profit	2
46	Gabriel	M	Environmental Foundation	Coordinator	National	Offset project staff	NGO / Non-profit	2
47	Gustavo	M	Environmental Foundation	Director	National	Offset project staff	NGO / Non-profit	2
48	Mateo	M	NGO	Coordinator	Local	Community leader	NGO / Non-profit	2
49	Diana	F	NGO	Project manager	Local	Offset project staff	NGO / Non-profit	2
50	Betina	F	NGO	Coordinator	Local	Offset project staff	NGO / Non-profit	2
51	Eric	M	NGO	Coordinator	Local	Offset project staff	NGO / Non-profit	2
52	Sara	F	National Environmental Licensing Authority	Biologist	National	Offsets advisor	Government	1 + 2

## Appendix C: Interview guide & questions

### Sample - National level

Topic / Research Question	Interview Questions
Role, actors, institutions	<ol style="list-style-type: none"> <li>1. What is your role at [organisation]?</li> <li>2. How has [organisation] been involved in biodiversity offsetting?</li> <li>3. Can you describe your personal involvement in that process?</li> <li>4. What do you think has driven the adoption of offsetting legislation in Colombia?</li> <li>5. What actors and institutions do you think have been influential in the formation of biodiversity policy in Colombia?</li> </ol>
Meanings, definitions, what values, whose values	<ol style="list-style-type: none"> <li>6. What is your personal understanding or definition of 'biodiversity'?</li> <li>7. What is the definition of 'biodiversity' used in your organisation's offset policy/program?</li> <li>8. How are biodiversity values measured under this policy/project?</li> <li>9. What metrics are used and how are these decided on?</li> <li>10. Who is involved in this process?</li> <li>11. What tools or methods are used to uncover these values?</li> </ol>
Offsetting in practice	<ol style="list-style-type: none"> <li>12. What is the aim of biodiversity offsetting, according to your policy/project?</li> <li>13. In your opinion, do you think this aim is achievable in practice?</li> <li>14. What are the challenges to achieving this aim?</li> <li>15. What conditions help to achieve successful outcomes?</li> <li>16. What are the monitoring requirements under your policy/project?</li> <li>17. Who is responsible for monitoring?</li> <li>18. Can you give me some examples of specific targets?</li> <li>19. What happens if targets are not met?</li> </ol>
Stakeholder consultation, pros/cons and for whom	<ol style="list-style-type: none"> <li>20. What are the procedures for stakeholder consultations relating to environmental impacts of development projects?</li> <li>21. Where do biodiversity offsets fit into this?</li> <li>22. Do you feel all stakeholder groups that should be involved in this process are?</li> <li>23. Are there groups that are left out?</li> <li>24. In your opinion, what are the benefits of biodiversity offsetting? Who benefits?</li> <li>25. What are the downsides? Who loses out or is disadvantaged?</li> </ol>
Future considerations	<ol style="list-style-type: none"> <li>26. What do you think the key considerations are for this approach in Colombia?</li> <li>27. How do you think offsetting will evolve in the future?</li> <li>28. How would you like offsetting to evolve?</li> <li>29. Do you have anything else to add?</li> </ol>

## Sample - Local level (community members involved in offsetting project)

Topic / Research Question	Interview Questions
Role, actors, institutions	[Opening questions to uncover background and ease into the conversation - Ask about family, community, environment, employment, food, how long they have lived here..]
Meanings, definitions, what values, whose values	<ol style="list-style-type: none"> <li>1. Have you heard of the term 'biodiversity'?</li> <li>2. What does it mean to you?</li> <li>3. Is the environment, nature, important to you?</li> <li>4. Which aspects of your local environment are most important to you?</li> </ol>
Offsetting in practice	<ol style="list-style-type: none"> <li>5. Can you talk about your involvement in the restoration project?</li> <li>6. How did you come to be involved?</li> <li>7. How exactly did you contribute?</li> <li>8. What did you receive in return for your contribution?</li> <li>9. What challenges did you face?</li> <li>10. How do you think the process could have been improved?</li> <li>11. Was the overall experience positive or negative?</li> </ol>
Stakeholder consultation, pros/cons and for whom	<ol style="list-style-type: none"> <li>12. Have you participated in any other public meetings or consultations regarding Hidrosogamoso and its social and environmental impacts?</li> <li>13. <b>If so</b> – When? What were the issues addressed? Who organised the meeting and who else participated? What was the outcome?</li> <li>14. <b>If not</b> – Were you aware of any public consultations? Were you invited to any or did you hear of anyone else attending any?</li> <li>15. <b>Thinking about the overall Hidrosogamoso hydroelectric project</b>, in your opinion, what are the benefits of this project? Who benefits?</li> <li>16. What are the downsides? Who loses out or is disadvantaged?</li> <li>17. <b>Thinking about the restoration offsets</b>, in your opinion, what are the benefits of this project? Who benefits?</li> <li>18. What are the downsides? Who loses out or is disadvantaged?</li> </ol>
	<ol style="list-style-type: none"> <li>19. Has the Hidrosogamoso plant has impacted your life?</li> <li>20. How has your lifestyle changed since the construction of the dam?</li> <li>21. Have you seen or experienced environmental impacts which you believe are a direct result of Hidrosogamoso? Explain.</li> <li>22. Has your relationship with your environment changed since the dam was built or since your involvement with the restoration project?</li> </ol>
Future considerations	<ol style="list-style-type: none"> <li>23. What are your hopes and fears for the future? (in relation to your locality and environment)</li> <li>24. Do you have anything else to add?</li> </ol>

## Appendix D: List of documents collected

Unit of analysis	Document type	Details
<b>Sub-unit 1: Offsetting in policy</b>	Policy documents	Legislation and official policy documents under Colombian law related to forest and biodiversity offsets and environmental law, in particular the 1991 Constitution of Colombia, Law 99 of 1993 (General Environmental Law), Policy for the Integrated Management of Biodiversity and its Ecosystem Services (PNGIBSE), Decree 1791 of 1996 (Establishment of forest use regime), Resolution 1517 de 2012 and the 'Manual for the allocation of compensation for biodiversity loss', Resolution 256 of 2018 and the 'Compensation manual for the biotic component'.
	Institutional reports	Key reports on offsetting in Colombia from public institutions, NGOs and private organisations, such as the Alexander von Humboldt Biological Resources Research Institute, the National Environmental Licenses Authority (ANLA), National Business Association of Colombia (ANDI), World Bank, the Ombudsman's Office of Colombia (Defensoría del Pueblo), the Fund for Environmental Action and Childhood (Fondo Acción), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Terrasos, Foundation for the Defense of Public Interest (Fundepúblico), The Nature Conservancy, Conservation International, Wildlife Conservation Society (WCS), Center for International Forestry Research (CIFOR), United Nations Development Programme (UNDP).
<b>Sub-unit 2: Offsetting in practice</b>	Project documentation on Hidrosogamoso and forest offsets	Reports, presentations, videos and website articles from ISAGEN, NGOs, the national parks authority, both publicly available information as well as documentation supplied directly by research participants. Key documents include the environmental impact assessment report and project reports on the forest offsets projects in the Yariguíes national park.
	Documentation on Hidrosogamoso from ANLA files	1,566 pdf documents collected in person from the ANLA citizens information office in Bogotá: letters, dated between 1993 and 2016, between the various environment ministries, ISAGEN, ANLA, and regional environment authorities regarding the Hidrosogamoso environmental license and legal modifications, as well as communications from NGOs, civil society associations and members of the public regarding social and environmental impacts of the dam.

	Freedom of information requests	Written answers to freedom of information requests were received from ANLA, the Ministry of Mining and Energy (MinMinas), and regional environment authorities <i>Corporación Autónoma Regional de Santander (CAS)</i> and <i>Corporación Autónoma Regional para la Defensa de la Meseta de Bucaramanga (CDBM)</i> .
	Newspapers and online news websites	Articles from local (e.g. El Yariguí, Vanguardia), national (e.g. El Espectador, El Tiempo, Semana) and international (The Guardian, BBC) news websites and some copies of archival newspapers.
	Regional planning documents	Regional plans ( <i>planes de ordenamiento territorial</i> ) for the Department of Santander and the Serranía de los Yariguíes national natural park.
	Peer-reviewed articles	Academic articles on Hidrosogamoso and Yariguíes national park.
	Maps	Aerial maps of project area obtained from Google Earth.
	Civil society documentation	Reports, letters, articles, social media publications, videos from activist groups, NGOs and associations.
<b>Context</b>	International offsetting policy documents	Biodiversity offsetting policies and guidance documentation from the Business and Biodiversity Offsets Programme (BBOP), the International Union for Conservation of Nature (IUCN), the Organisation for Economic Cooperation and Development (OECD), World Bank, United Nations Environment Programme (UNEP)
	Geographical, socio-economic and political context in Colombia and Latin America	Books, peer-reviewed articles, news and website articles.

## Appendix E: Ethics approval – School of Natural Sciences, Trinity College Dublin

SNS REC Project Reference Number (to be completed by REC): 2016-32

### Appendix 1

#### Research Ethics Application School of Natural Sciences, Trinity College Dublin

##### Section 1: Applicant Details

<b>Name (Student/lead researcher)</b>	Jane Feeney
<b>Staff/Student Number</b>	12322345
<b>Applicant E-mail Address</b>	feeneyj1@tcd.ie
<b>Name(s) of Additional Researcher(s)</b>	N/A
<b>Name of Supervisor (for students)</b>	Prof. Anna Davies
<b>Supervisor E-mail Address</b>	DAVIESA@tcd.ie
<b>What School/Discipline are you affiliated to?</b>	School of Natural Sciences / Geography Department
<b>Title of Project</b>	<i>Valuable biodiversity: Examining the values and impacts of biodiversity offsetting initiatives in Colombia.</i>
<b>Brief description of the project (max 200 words)</b>	<p>Biodiversity offsetting is a market-based approach to conservation that aims to compensate for biodiversity loss by conserving or restoring biodiversity of equivalent value elsewhere. As the practice expands globally, there is a need to critically evaluate its form, governance and impacts in territories beyond the Global North. My research will focus on Colombia, which has had legislation requiring biodiversity offsetting since 2012.</p> <p>Using interviews and discourse analysis, I will examine how biodiversity is valued by different groups of actors, which values are included in biodiversity offsetting projects, and the impacts of applying offsetting in particular contexts within Colombia.</p> <p>I will conduct approximately 25 interviews with key stakeholders:</p> <ul style="list-style-type: none"> <li>- 5 international (e.g. staff of international organisations such as the United Nations, IUCN and global experts);</li> <li>- 10 national within Colombia (policy makers, environmental consultants/industry</li> </ul>

	<p>representatives and NGOs);</p> <ul style="list-style-type: none"> <li>- 10 local actors involved in, or affected by, offsetting projects (e.g. project managers, people living near development/offset sites).</li> </ul> <p>All participants selected will be over the age of 18, and will be selected in a manner that avoids bias. All participants in the research will be provided with a participant information form prior to involvement and will be asked to sign an informed consent form.</p>
<b>Highlight the category that best describes the research</b>	Full-time postgraduate research project
<b>Has this application been submitted to another TCD Ethics Committee for approval?<sup>1</sup></b>	No
<b>Has ethical approval for this project been sought from outside TCD? What was the outcome?</b>	No

<sup>1</sup> All research involving animals (vertebrates) must ultimately be approved by the Animal Research Ethics Committee (AREC); research involving vertebrates in their natural habitats will be assessed by the SNS REC initially and then the decisions will be overseen by the AREC, but any research involving vertebrates in a laboratory setting needs to be submitted directly to the AREC.



## Section 2: Initial Research Ethics Checklist

DOES YOUR RESEARCH PROJECT FALL CLEARLY UNDER ANY OF THE FOLLOWING CATEGORIES?

	YES	NO
1. Quality assurance study (e.g. assessment of teaching practice) <sup>2</sup>		X
2. Audits of standard practice (not involving identifiable records)		X
3. Research on existing publically available information, documents or data (i.e. already gathered and in the public domain)		X

**If you have answered YES to one or more of the above questions**, your research project can proceed without the need for ethical approval from the School Research Ethics Committee (REC). Please be aware that all researchers have a responsibility to follow TCD's Policy on Good Research Practice, (available [here](#)) as well as any academic or professional code of practice or guidelines relevant to the specific research project. Even if you answer YES to one of the above question, **please return a signed (Section 5) copy of this form to the Chair of the SNS REC** as a record must be kept of all projects.

**If you have answered NO to all of the above questions**, proceed to Section 3 to determine whether your application is suitable for consideration for the School REC or if the application needs to be evaluated by a Level 2 committee.

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<sup>2</sup> Quality assurance and audit studies do not routinely require ethical approval. However, if following the study there is scope to publish the findings of a study, an REC may grant a letter of approval if required.

### Section 3: Checklist for School REC suitability

This checklist needs to be completed in order to determine whether your application is considered “low risk” and is therefore suitable for consideration by the School REC<sup>3</sup>.

Please indicate if your application falls into any of the categories below (categories from TCD “Criteria for Research Ethics Committees” document, Jan 2014). Answer “NO” if your work does not involve the scenario. Answer “YES” if it does and ethical risks cannot be mitigated. Answer “YES but see...” if ethical risks can be mitigated by appropriate actions such as designing the study to minimize the chances of potentially endangering people, populations of study organisms and/or the environment (and list these in Section 4).

	NO	YES	YES but see mitigation strategy in Section 4
1. Surveys asking questions of a sensitive or private nature			X
2. Questionnaires or observational studies involving children or vulnerable adults.	X		
3. Research where there is a risk of a participant feeling undue pressure to participate by virtue of his/her relationship with the researcher (e.g. student/supervisor; patient/clinician). <sup>4</sup>	X		
4. Projects involving a justifiable degree of deception.	X		
5. Analysis of archival irrevocably anonymised human tissue samples for which consent for research was not originally given, and was not acquired in the course of clinical treatment. (Archived samples taken for a previous research study must always get new ethical approval).	X		
6. Research involving invasive procedures on humans (other than those listed above).	X		
7. Research other questionnaires or observational studies involving vulnerable persons <sup>4</sup> .	X		
8. Research where identifiable information obtained may have legal, economic or social consequences for research subjects.			X
9. Research that may identify illegal activity on the part of the participant.			X
10. Projects where each subject is paid (over and above token gestures).	X		

<sup>3</sup> In situations where research ethics approval has been granted by an appropriate body outside TCD, approval must also be sought from an appropriate TCD REC, although, at the discretion of the REC chair, the submission may qualify for fast-tracked approval.

<sup>4</sup> Vulnerable persons: Certain individuals who face excessive risk of being enrolled in research include those with limitations in their ability to provide informed consent to research because of factors such as immaturity or cognitive impairment. Vulnerability can also stem from individuals’ relationships with others, and it is imperative that coercive situations are avoided. Such cases may occur when an employee/student/dependent is asked to participate in research being conducted by a supervisor/mentor. Additional social factors, such as poverty and lack of access to health care, can also make individuals vulnerable to coercion, exploitation or other risks and need to be considered and appropriately mitigated for.

<b>11.</b> Research that may potentially cause irrevocable damage to <sup>5</sup> the population of subjects, and/or researchers, and/or 3 <sup>rd</sup> parties, and/or the environment. <b>See note below.</b>	X		
<b>12.</b> Research involving the collection of human tissue.	X		
<b>13.</b> Research that may have a direct military application.	X		
<b>14.</b> Potentially harmful research involving humans conducted outside Ireland <sup>6</sup> .	X		
<b>15.</b> Research involving psychological intervention.	X		

*Official Approval/licensed research:* Research involving elements that may cause harm to the environment, to invertebrate animals or plants; or deal with endangered fauna and/or flora and/or protected areas; or involve the use of elements that may cause harm to humans, including research staff; may need formal approval/licensing by outside body, and such approval for the research (e.g. from the relevant Government Department) must be attached to this application. If formal approval for the work has been granted please give details in the box below:

Approval for work granted by:	<i>Give Government Department or relevant authority who has granted approval</i>
Licences held relating to research activities	<i>Give Government Department or relevant authority who has granted licence</i>
Details of approval:	<i>Describe how work may potentially endanger environment and how this will be minimised, and what the formal approval covers</i>

**If you have answered YES to any of the above questions and cannot mitigate ethical risks**, then the application is deemed to be of moderate or high risk (*i.e. risk or discomfort is greater than that usually encountered during normal daily life*) and should be submitted to the appropriate Level 2 Ethics Committee. The applicant should download the application and procedures for the appropriate Level 2 REC (the Faculty of Engineering, Mathematics and Science REC, or the Animal REC for vertebrate research).

**If you have not answered YES** to any question in Section 3, your application can be submitted for consideration by the SNS REC after completion of Section 4.

<sup>5</sup> Relevant Health and Safety Risk Assessment forms must be completed before work can be undertaken.

<sup>6</sup> Does not apply to material publically available in another jurisdiction. Note that the same ethical standards will apply to research carried out by SNS researchers within and outside of Ireland. Work must comply with legal requirements of the State in which it is carried out.

## Section 4: Ethical Approval Application Form for School of Natural Sciences Level 1 REC

All student applications should be reviewed and approved by the project supervisor prior to submission.

### Project Description

<b>Title of research project</b>	<i>Valuable biodiversity: Examining the values and impacts of biodiversity offsetting initiatives in Colombia.</i>
<b>Start date of research project</b>	01/10/2016
<b>End date of research project</b>	30/09/2020
<b>Potential ethical issues</b>	
<p><i>Are there ethical issues or problems which may arise with the proposed study, and what steps will be taken to address these? Are there potentially adverse outcomes to the environment (e.g. destruction of individuals, populations, habitats, physical structures)? Will the environment be altered by the experiment (e.g. through alteration of biological, geological or chemical systems)?</i></p> <p>My work will be focused on pilot conservation/restoration projects being carried out in Colombia to offset development projects such as mining and infrastructure. Colombia has a long history of internal conflict, corruption and political violence. Mining companies in Colombia have been accused of evicting people from land and accused of human rights violations. There are also cases of death threats towards environmental activists in Latin America. I propose to interview local actors and communities affected by development and conservation projects, workers involved in the projects, staff from environmental NGOs, policy makers and consultants. Given this context, there may be ethical issues for participants disclosing information on the topic of this research.</p> <p>The potential risks I foresee arising from participation as an interviewee in this project are social stigma (e.g. local actors and community members discussing their experiences and opinions on projects within their community), cultural effects (e.g. participants sharing their personal beliefs and values of nature, which may be at odds with cultural norms), political effects (e.g. information which may disturb the power relations between actors at a local, national and international level), and economic repercussions (e.g. risk of loss of employment for workers who may criticise their employers or provide confidential information).</p> <p>There are no potentially adverse outcomes or alterations to the environment as a result of this research.</p>	
<b>Ethical considerations, reducing potential risks and mitigating impacts</b>	
<p><i>Where potential risks to participants or the environment may be present, explain any steps that will be taken to mitigate against and minimize these and any additional support services that might be used should the need arise.</i></p> <p>To reduce the potential social, cultural, political and economic risks associated with this project, it is crucial to ensure the safety of all participants and the researcher. Precautions will be taken in preparation and during fieldwork not to put interviewees or myself as researcher at risk.</p>	

When requesting participation, I will provide a written document (available in English and Spanish), clearly outlining the risks, benefits and implications of participation in the project and allowing participants to make an independent and informed decision on whether or not to participate. I will ensure the confidentiality of all interview participants in my research whose identities will remain anonymous, except in situations where the participant has given written consent to the disclosure of information to third parties. Participants will sign a consent form to agree to take part in the research. Participants will be made aware of their right to withdraw from the research without penalty at any time, including the withdrawal of their data after participation (this will be explained to them in person/over the phone and in writing on the consent form). Participants will be formally notified that they are also free to access their own data at any time under the Freedom of Information Act. When selecting participants I will evaluate the potential risks and considerations of involving each individual in the project. All participants will be over 18 years of age and non vulnerable individuals, i.e. not belonging to a particularly vulnerable group (for example, children, prisoners, terminally ill, mentally disabled persons). Participants may well be economically or educationally disadvantaged in global terms, but perhaps not in relative terms for the Colombian context. The socio-demographics of interviewees is not known at this time, but the selection of participants is driven by their relationship to the project rather than by their particular socio-economic demographics. When conducting the interviews, they will be one-on-one semi-structured interviews held either in a private location or over the telephone/Skype, to further ensure confidentiality.

#### **Data storage**

*Provide an explanation of any measures that will be put in place to preserve confidentiality and anonymity of human participants, including an explicit explanation of secure data storage and disposal plans. Provide details of where data will be stored at the end of the project. Note that there may be a need to store data for a period after completion of the project.*

Data collection from interviews will be anonymous and participants will be made aware of this at the start of the research. Participant names will not be recorded on files, rather a code identifying the type of participant group they belong to (policy maker/NGO/consultant). All data will be anonymised and stored as a password protected file. Data will be inputted into an electronic database and stored on two encrypted devices that require a username and password to be opened.

In accordance with TCD's Policy on Good Research Practice, data will be stored in its original format and on an electronic database for a period of 10 years. Electronic data will be backed up regularly to ensure its safety and accessibility. After the advised 10 year period, hardcopy data will be shredded and recycled, and electronic databases will be wiped.

#### **Published ethical guidelines to be followed**

*Identify professional code(s) of practice and/or ethical guidelines relevant to the research.*

My research will follow the European Code of Conduct for Research Integrity, adhering to the principles of honesty, reliability, objectivity, impartiality and independence, open communication, duty of care, fairness and responsibility for future science generations.

My research will be carried out in accordance with Trinity College Dublin's School of Natural Science Research Ethics Policy, developed in 2014. In addition to this, the Trinity College Policy on Good Research Practice, revised in 2009, has been consulted to ensure the project is carried out to the highest standard. Every effort will be made in the project planning, implementation and dissemination to ensure the three



principles of ethical research at TCD are maintained (respect for the individual subject or population, beneficence and absence of maleficence, and justice).

Additionally, I will adhere to principles of the Academy of Social Sciences – the UK’s national academy of academic and practitioners in social science including the Development Studies Association and the Royal Geographical Society. In March 2015 the Academy’s Council formally adopted five guiding ethics principles for social science research and commended them to its member Learned Societies and the community of social science researchers.

The Five Principles are:

1. Social science is fundamental to a democratic society and should be inclusive of different interests, values, funders, methods and perspectives.
2. All social science should respect the privacy, autonomy, diversity, values, and dignity of individuals, groups and communities.
3. All social science should be conducted with integrity throughout, employing the most appropriate methods for the research purpose.
4. All social scientists should act with regard to their social responsibilities in conducting and disseminating their research.
5. All social science should aim to maximise benefit and minimise harm.

**Section 5: Declaration**

<p><b>Signature of applicant</b>  <i>I declare that the information given herein is accurate. I have read the TCD Ethics Policy and will follow the guidelines therein. I have read and understood the <u>TCD Data Protection Policy</u>.</i></p>	<p><b>Signature:</b> </p> <p><b>Date:</b> 08/11/2016.</p>
<p><b>Signature of Supervisor (in case of students)</b>  <i>I declare that the information given herein is accurate. I have read the Ethics Policy and will follow the guidelines therein.</i></p>	<p><b>Signature:</b> </p> <p><b>Date:</b> 13/10/2016</p>

To be completed following REC review:

<p><b>Approval by the School's Ethics Committee</b>  <i>Based on the information available on this form, the SNS REC believes the ethical risks in this project are negligible and will be appropriately mitigated during the course of the research<sup>7</sup>.</i></p>	<p><b>Sign/Stamp:</b></p>  <p><b>Trinity College Dublin</b>          The University of Dublin          School of Natural Sciences          Research Ethics Committee</p> <p><b>Date:</b> 07.11.16</p>
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<sup>7</sup> Primary responsibility for ensuring ethical conduct in research rests with the Principal Investigator(s).

## Appendix F: Participant information and informed consent form (English)



Coláiste na Tríonóide, Baile Átha Cliath  
Trinity College Dublin  
Ollscoil Átha Cliath | The University of Dublin

### Participant Information Form School of Natural Sciences, Trinity College Dublin

1. **Title of study:** A political ecology analysis of forest and biodiversity offsetting in Colombia.

2. **Details:** Researcher: Jane Feeney, PhD Candidate, Geography Department, Trinity College Dublin, funded by the Irish Research Council Government of Ireland Postgraduate Scholarship Project ID GOIPG/2016/510.

3. **Introduction:** Biodiversity offsetting is an approach to conservation that aims to compensate for biodiversity loss by conserving or restoring biodiversity of equivalent value elsewhere. As the practice expands globally, there is a need to critically evaluate its form, governance and impacts in territories beyond the Global North. This research focuses on Colombia, which has had legislation requiring environmental compensation, including a forest offset scheme, since the 1990s and legislation specific to biodiversity offsetting since 2012. Using interviews, a case study and policy and document analysis, the researcher will examine:

- a) how forest and biodiversity offsetting policy has developed in Colombia, the drivers and actors involved;
- b) how forest offsetting has been implemented in practice in Colombia (through a case study of the Sogamoso hydroelectric dam and its forest offsets);
- c) the implications and future considerations for policy development and implementation of forest and biodiversity offsetting in Colombia and Latin America.

#### 4. Procedures:

Criteria for selection for participation in the study:

- Stakeholders involved in policy formulation, planning or implementation of forest/biodiversity offsetting projects or other related schemes: selected according to their role and level of involvement
- Stakeholders impacted by such projects: selected according to the nature and level of impacts
- Age (all participants must be over 18)
- Gender (I will aim for an equal gender balance between participants)

The participation will involve one interview of approximately 1 hour, carried out either in person, over the telephone or Skype, depending on the location and preference of the interviewee. The interview will be recorded and transcribed.

#### 5. Benefits:

The key benefit to participating in the study is taking part in the provision of new and insightful research on the impacts of biodiversity offsetting, to guide environmental policy development and conservation practice.





**6. Risks:**

In recognition of the potential ethical considerations associated with expressing personal experiences, opinions and value judgements related to biodiversity offsetting projects (social stigma, cultural effects, political effects and economic repercussions), the data will be anonymised and the identities of all participants will not be disclosed unless otherwise agreed by the participant in writing.

**7. Exclusion from participation:** Any individual with the following criteria will be excluded from the study:

- Children or minors under 18 years of age
- Individuals from particularly vulnerable groups (prisoners, terminally ill, mentally disabled persons, or economically or educationally disadvantaged persons)

**8. Confidentiality:** Your identity will remain confidential. Your name will not be published and will not be disclosed to anyone outside the study.

**9. Voluntary participation:** You have volunteered to participate in this study. You may quit at any time. If you decide not to participate, or if you quit, you will not be penalised and will not give up any benefits which you had before entering the study.

**10. Reimbursements:** There are no reimbursements to participants of this study, unless otherwise agreed.

**11. Stopping the study:** You understand that the researcher may stop your participation in the study at any time without your consent.

**12. Permission:** The study has approval from Trinity College Dublin's School of Natural Sciences Research Ethics Committee.

**13. Access to data:** All participants can access their own data at any time under [the Freedom of Information Act 2014](#).

**14. Further information:** You can get more information or answers to your questions about the study, your participation in the study, and your rights, from Ms. Jane Feeney who can be contacted by email at [feenevj1@tcd.ie](mailto:feenevj1@tcd.ie) or by telephone at +353 897046388 / +57 3228962022.



## Informed Consent Form

School of Natural Sciences, Trinity College Dublin

Title of research study: *A political ecology analysis of forest and biodiversity offsetting in Colombia.*

This study and this consent form have been explained to me. I understand what will happen if I agree to be part of this study.

I have read, or had read to me, this consent form. I have had the opportunity to ask questions and all my questions have been answered to my satisfaction. I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights. I have received a copy of this agreement and I understand that, if there is a sponsoring company, a signed copy will be sent to that sponsor.

Participant's Full Name: \_\_\_\_\_

Gender: Male  Female  Other

Participant's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

E-mail: (optional – if you wish to receive information about the results of this research)

\_\_\_\_\_

Statement of investigator's responsibility: I have explained the nature, purpose, procedures, benefits, risks of, or alternatives to, this research study. I have offered to answer any questions and fully answered such questions. I believe that the participant understands my explanation and has freely given informed consent.

Researcher's signature:

Date:

## Appendix G: Participant information and informed consent form (Spanish)



Coláiste na Tríonóide, Baile Átha Cliath  
Trinity College Dublin  
Ollscoil Átha Cliath | The University of Dublin

### Formulario De Información Del Participante

Escuela de Ciencias Naturales, Trinity College Dublin

**1. Título del estudio:** Un análisis de la ecología política en Colombia sobre las iniciativas de compensación forestal y de biodiversidad.

**2. Detalles:** Investigadora: Jane Feeney, Candidata a doctorado, Departamento de Geografía, Trinity College Dublin, financiado por el Irish Research Council, Proyecto de Beca de Posgrado del Gobierno de Irlanda GOIPG / 2016/510.

**3. Introducción:** La compensación de la biodiversidad es un enfoque de la conservación que tiene como objetivo compensar la pérdida de biodiversidad, mediante la conservación o restauración de la misma de valor equivalente en otros lugares. A medida que la práctica se expande a nivel mundial, existe la necesidad de evaluar críticamente su forma, gobernanza e impactos en otros territorios, incluyendo América Latina. Esta investigación se centra en Colombia, que cuenta con una legislación que promueve y exige la compensación forestal desde los años noventa y la compensación de la biodiversidad desde el 2012. Usando las entrevistas, un caso de estudio, el análisis de política y documentos, la investigadora examinará:

- a) ¿Cómo se ha desarrollado la política de compensación forestal y de biodiversidad en Colombia?, ¿Cuáles son los factores que han promovido el desarrollo de las políticas de compensaciones y quienes son los actores involucrados?;
- b) ¿Cómo se ha implementado la compensación forestal en la práctica en Colombia? (a través de un estudio de caso del proyecto hidroeléctrico Sogamoso y sus compensaciones forestales);
- c) ¿Cuáles son las implicaciones y consideraciones para el desarrollo de políticas y la implementación de compensaciones forestales y de biodiversidad en Colombia y América Latina en el futuro?

#### 4. Procedimientos:

Criterios para la selección de la participación en el estudio:

- Actores involucrados en la formulación de políticas, planificación o implementación de proyectos de compensación ambiental u otros esquemas relacionados: seleccionados de acuerdo a su rol y nivel de involucramiento.
- Actores afectados por tales proyectos: seleccionados de acuerdo con la naturaleza y el nivel de los impactos.
- Edad (todos los participantes deben ser mayores de 18 años).
- Género (apuntaré a un equilibrio de género igual entre los participantes).

La participación implicará una entrevista de aproximadamente 1 hora, realizada en persona, por teléfono o por Skype, dependiendo de la ubicación y la preferencia del entrevistado. La entrevista será grabada y transcrita.



**5. Beneficios:**

El beneficio clave para participar en el estudio es colaborar en la provisión de una investigación nueva y substancial, sobre los impactos de la compensación ambiental, para orientar al desarrollo de políticas ambientales y prácticas de conservación.

**6. Riesgos:**

En reconocimiento de las posibles consideraciones éticas asociadas con la expresión de experiencias personales, opiniones y juicios de valor relacionados con proyectos de compensación ambiental, los datos serán anónimos y las identidades de todos los participantes no serán divulgados a menos que el participante acuerde lo contrario por escrito.

**7. Exclusión de la participación:** Cualquier persona con los siguientes criterios será excluida del estudio, por motivos éticos y legales:

- Niños o menores de 18 años de edad.
- Individuos de grupos particularmente vulnerables (presos, enfermos terminales, personas mentalmente discapacitadas).

**8. Confidencialidad:** Su identidad será confidencial. Su nombre no será publicado y no será revelado a nadie fuera del estudio.

**9. Participación voluntaria:** Si se ha ofrecido voluntario para participar en este estudio, puede suspender la participación en cualquier momento. Si decide no participar o si renuncia, no será penalizado y no renunciará a los beneficios que tenía antes de ingresar al estudio.

**10. Reembolsos:** No hay reembolsos a los participantes de este estudio, a menos que se acuerde formalmente lo contrario.

**11. Suspensión del estudio:** Usted comprende que la investigadora puede suspender su participación en el estudio en cualquier momento sin su consentimiento.

**12. Permiso:** El estudio cuenta con la aprobación del Comité de Ética en Investigación de la Facultad de Ciencias Naturales de Trinity College Dublin y el Consejo de Investigación Irlandés (Irish Research Council).

**13. Acceso a los datos:** Todos los participantes pueden acceder a sus propios datos en cualquier momento en virtud de la Ley de Libertad de Información de 2014 del Gobierno de Irlanda.

**14. Más información:** Puede obtener más información o respuestas a sus preguntas sobre el estudio, su participación en el estudio y sus derechos, de la Investigadora Jane Feeney, que puede contactarse por correo electrónico a [feeneyj1@tcd.ie](mailto:feeneyj1@tcd.ie) o por teléfono al número +353 897046388 o +57 322 8962022.



## Formulario De Consentimiento Del Participante

Escuela de Ciencias Naturales, Trinity College Dublin

**Título del estudio de investigación:** Un análisis de la ecología política en Colombia sobre las iniciativas de compensación forestal y de biodiversidad.

Este estudio y este formulario de consentimiento me han sido explicados. Entiendo lo que sucederá si acepto ser parte de este estudio.

He leído o me han leído este formulario de consentimiento. He tenido la oportunidad de hacer preguntas y todas mis preguntas han sido respondidas a mi satisfacción. Libre y voluntariamente acepto ser parte de este estudio de investigación, sin perjuicio de mis derechos legales y éticos. He recibido una copia de este acuerdo.

Nombre y Apellido del Participante:

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Género: Masculino  Femenino  Otro

Firma del Participante: \_\_\_\_\_

Fecha:

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Correo electrónico (Opcional - Si desea recibir información sobre los resultados de esta investigación):

---

**Declaración de la responsabilidad de la investigadora:** He explicado la naturaleza, el propósito, los procedimientos, los beneficios, los riesgos, o las alternativas de este estudio de investigación. Me he ofrecido a responder cualquier pregunta y respondí estas preguntas por completo. Confío que el participante entiende mi explicación y ha dado libremente su consentimiento.

Firma de la Investigadora:

Fecha:

**Appendix H: Activities of the ecological restoration project in the North Sector of PNN Serranía de los Yariguíes, San Vicente de Chucurí**

Activity	Original target	Amended target	Activities	Outcomes / Notes
<p><b>Diagnostic or baseline of the project</b></p>	<p>Technical document that identifies the following characteristics of the study area: i. Verification of the types of coverage, ii. Identification of the need for ecological restoration, iii. Characterisation of the physical, biological (flora and fauna) and socio-cultural components.</p>	<p>N/A</p>	<p>Verification of types and extensions of plant cover</p> <ul style="list-style-type: none"> <li>- Identification of the need for ecological restoration and the causes of degradation.</li> <li>- Establishment of basic conditions prior to restoration design.</li> <li>- Analysis of physical conditions of the area that need to be recovered.</li> <li>- Analysis of factors that limit growth.</li> <li>- Characterization of communities, ecosystems and landscapes to intervene through restoration actions and ecological references.</li> <li>- Soil (Physical - chemical analysis, Biotic analysis (MICROBIOLOGICAL AND MACROFAUNA).</li> <li>- Fauna (Birds, micromammals and at least two groups of insects).</li> <li>- Vegetation (Group functional composition analysis, Field verification of the state of coverage and spatialization).</li> <li>- Microclimate (Temperature, humidity, radiation, wind speed and direction, others).</li> </ul>	<p>A document edited and delivered and approved No. 20165700000461 November 10, 2016.</p>

<b>Ecological restoration plan</b>	Definition of ecological restoration strategies according to the scenarios subject to ecological restoration and the diagnosis performed.	N/A	<ul style="list-style-type: none"> <li>- Identify the succession models of the ecosystems present in the northern sector of the PNN - SYA.</li> <li>- Determine the potential species for ecological restoration based on the vegetation units established in the diagnostic.</li> <li>- Define the ecological restoration actions to be carried out in accordance with the limitations and stressors present in each unit of vegetation identified.</li> <li>- Perform floristic arrangements according to the different ecological restoration scenarios.</li> <li>- Determine the extension and density per hectare of the ecological restoration actions established during the execution of the project.</li> </ul>	A document finalized and approved of the ecological restoration strategies defining floristic arrangements established.
<b>Plant nursery</b>	Design, construction and operation of 1 permanent and 6 temporary nurseries. Production of the 182,000 seedlings. Implementation of nursery management through the formulation and execution of a production plan, a nursery management plan, and the respective propagation protocols of at least 5 native, forest and threatened species used in the ecological restoration process.	Design, construction and operation of 1 permanent and 9 temporary nurseries.		1 permanent plant nursery and 12,007 seedlings. 9 temporary plant nurseries and the production of 183,078 seedlings from seeds or seedlings collected in native forests.
<b>Bioengineering</b>	Design and construction of access and / or adjustments to the areas under restoration that facilitate the optimal execution of the project with the construction of infiltration trenches, drainage ditches, contour grooves, loan	Design and construction of access and / or adjustments to the areas under restoration that facilitate the optimal execution of the project with the		74,083 linear metres intervened with bioengineering actions.

	<p>material, lateral expansion in grooves, spraying and cleaning, wood bridges and bank extension.</p> <p>Development of a maintenance plan for access and / or adjustments made during the term of the contract that guarantees its proper operation.</p>	<p>construction of infiltration trenches, drainage ditches, contour grooves, loan material, lateral expansion in grooves, spraying and cleaning, bank extension, slope stabilization, stabilization of bank with wooden trenches.</p>		
<b>Isolation (Fencing)</b>	<p>Carry out the isolation of the areas to be restored by establishing 7,000 meters of fencing. Ongoing maintenance plan.</p>	<p>Carry out the isolation of the areas to be restored by implementing 3,968.23 linear meters of perimeter fence. Ongoing maintenance plan.</p>	<p>Purchase of materials by consortium Jaguar Norandino, April 2014. Isolation carried out in sectors identified by PNN of 3,968.23 linear metres. Maintenance carried out at end of 2016 and in the first semester of 2017.</p>	<p>The initial goal was not feasible due to the presence of areas where, due to physical and environmental characteristics, there were natural barriers to human access or intervention and therefore the installation of the fences would be unfeasible due to the conditions of access.</p>
<b>Active restoration (Planting)</b>	<p>Plantations in 570 ha of park with a density of 100 individuals per ha of native late successional species.</p> <p>Plantations in 180 ha of park with a density of 600 individuals per ha – 100 of late successional species and 500 pioneer species.</p>	<p>Area in active ecological restoration modified from 750 to 877 ha with the planting of 165,000 plants in the sectors of Chanchón Alto, Chanchón Bajo, Los Medios, Lengerke, Cantagallos Bajo, Cantagallos Alto and Varsobia and developing the Assisted Natural Regeneration strategy. Plantation area modified</p>		<p>Establishment of 165,000 individuals in the different vegetation units corresponding to 641.7 hectares</p>



		from 877 to 641.7 ha with the planting or establishment of 165,000 plants distributed in 7 vegetation units with different planting densities implemented in the Chanchón Alto, Chanchón Bajo, Los Media, Lengerke, Cantagallos Bajo, Cantagallos Alto and Varsobia. The goal of establishing Assisted Natural Regeneration actions was also reduced.		
<b>Maintenance of native species plantations</b>	Perform 73,050 maintenance on 53,100 seedlings established in grassland and fern vegetation units.	N/A	Maintenance was carried out on 53,100 seedlings, of which some obtained two or three maintenance after planting, for a total of 73,050 maintenance performed.	
<b>Fauna</b>	Establish 406 perches in vegetation units of grasses and ferns and associated with the ecological restoration nuclei.		406 perches were established.	
<b>Monitoring</b>	Formulation and execution of a monitoring plan for restoration (active and passive)	N/A	<ul style="list-style-type: none"> <li>- Create the monitoring program based on the restoration strategies implemented, in order to evaluate the effectiveness of the restoration treatments implemented.</li> <li>- Establish the monitoring plan for the establishment of the monitoring baseline based on the units of vegetation intervened and the floristic arrangements established.</li> <li>- Implement the monitoring baseline, based on the establishment of the</li> </ul>	The monitoring program was created and the monitoring plan was determined, the monitoring baseline was created from the initial data captured during the installation of the monitoring plots.

			<p>monitoring and control plots on the defined restoration strategies and on the vegetation units involved.</p> <ul style="list-style-type: none"> <li>- Generate the technical baseline monitoring document and standardize the data captured in the field to keep track of ecological restoration actions.</li> </ul>	
<b>Environmental education</b>	<p>Participate in the implementation of the environmental education and communication strategy. Integrate local knowledge into the ecological restoration process.</p>	N/A	<ul style="list-style-type: none"> <li>- Perform a historical cultural analysis of the northern sector of the PNA SYA, identify the main threats to the ecosystem.</li> <li>- Accompany the environmental education campaigns developed by the technical team of the PNA SYA.</li> <li>- Include the local community in the training or execution of ecological restoration activities.</li> </ul>	<p>The cultural historical document was created, identifying the fundamental processes that determined the current state of intervention in the region and ongoing follow ups were carried out to the technical team of national parks during the environmental education actions.</p>
<b>Contingencies</b>	<p>Formulation and implementation of action measures to address forest fires; mass wasting; and landslides on access roads.</p>	N/A	<ul style="list-style-type: none"> <li>- Identification of prevention and care measures in relation to potential forest fires.</li> <li>- Identification and analysis of sites with high risk due to mass wasting processes.</li> <li>- Train the technical field team in the prevention and action against forest fires.</li> <li>- Create documents related to the contingency plan on risks of forest fires and mass wasting processes.</li> </ul>	<p>Two technical documents were developed, which are in accordance with the contingency plans of national parks in Colombia. The first document is based on the control and prevention of forest fires and the second in relation to mass wasting or landslide processes.</p>
<b>Assisted Natural</b>	<p>Not defined.</p>	<p>Diagnostic and evaluation of 109.3 ha necessary for the initial active restoration</p>		<p>The ANR diagnostic for the 237 hectares was developed and the</p>

<b>Regeneration (ANR)</b>		target of 750 ha, evaluating the potential ANR actions in 127 additional ha of the centre west sector. Target related to the ANR strategy was eliminated, where it was determined by PNN not to execute the actions presented in the RNA diagnostic, arguing that the proposed strategies are viable, however, not feasible to meet a goal of 237 restored hectares.		technical document was presented with all the supporting and technical arguments of the treatments to be performed.
<b>Geographic Information System (GIS) for the Project</b>	Goals not defined but cartographic information generated by the project was requested.		Creation of GIS to plan and validate the restoration actions.	Creation of GIS to plan and validate the restoration actions.

Source: Adapted from *Implementation of Ecological Restoration Actions in the Northern Sector of the Serranía De Los Yarigués National Natural Park. Final Technical Report. Contract No V - Cat - 001 - 2015 San Vicente* (UT Jaguar Corredor Norandino, 2018a)

## Appendix I: Activities of the ecological restoration project in the Centre West Sector of PNN Serranía de los Yariguíes, El Carmen de Chucurí

Activity	Original target	Amended target	Activities	Outcomes / Notes
<b>Active restoration</b>	Plant native tree species in 450 ha of the park. 2 x maintenance.	323,34 ha.	323.34 ha in the areas of Delicias Alto and Palo Blanco. 102,865 individual trees were planted. Maintenance (up to four times between 2015 and 2016, depending on site).	Delicias Alto: 94.68% survival rate Palo Blanco: 95% survival rate.
<b>Fauna</b> (artificial perches to attract seed dispersing animals i.e. bats)	Install perches to encourage return of fauna in 260 ha.	Treatments were established in 20 ha of pastureland since in the other coverage there were natural perches.	A total of 40 perches were installed to attract bats in Delicias Alto and Palo Blanco.	Not successful, due to the availability of natural perches.
<b>Plant nursery</b>	Design, construction and operation of 1 permanent and 3 temporary nurseries.	Design, construction and operation of 1 permanent and 2 temporary nurseries.	1 permanent nurseries (Cañaverales) 2 temporary nurseries (La Roña, Palo Blanco)	The nursery located in Cañaverales was affected by a landslide on the 6th of June 2016, destroying plant materials and affecting the foundations, making it too risky to continue as a permanent nursery.
<b>Passive restoration</b> (Fencing)	13,000 m fencing	12,017.8 m fencing	12,017.8 m, passively restoring approx. 2,872 ha. Two maintenance service: May 2015, March 2016.	
<b>Bioengineering</b>	Design and build belts and fascines in 10 ha of the park (should not exceed 3 km).	7,028 m of vegetation cleared, 160.44 m temporary wood bridges, 118.2 m	7,028 m of vegetation cleared, construction of 160.44 m of temporary wood bridges, 118.2 m of terracing, 6 linear meters of drainage, 103.7 m of fencing and a gabion wall of 30.6 m3.	

		terracing, 6 linear meters of drainage, 103.7 m of fencing and a gabion wall of 30.6 m <sup>3</sup> .		
<b>Monitoring</b>	Design and implement the specific monitoring and follow-up plan that determines the effects caused by the project on the abiotic, biotic and socioeconomic environment. The program must include a system of indicators to measure its effectiveness and compliance and environmental quality trends.	Design the monitoring and follow up plan to measure the impact of the active and passive restoration activities, taking into account the evaluation of targets in short, medium and long term (2, 10, 20 years) in three biological hierarchies: landscape, community/ecosystem and population.	Fundaset-Conif delivered 10 forms to PNNC, each representing an indicator to measure composition, structure and function at the community/ecosystem and population scale. Delivered final report with measures of indicators related to soils, bird, small and medium mammals, vegetation. PVC tubes were used to mark the nuclei in pastureland. In other coverage the tubes were located every 5 lines and were georeferenced.	It was decided to reduce the requirement only to the design and not the implementation of monitoring. The report highlights the challenge this poses to the effective evaluation of the project.
<b>Contingency</b>	Design and implement action measures to address forest fires; mass wasting; and landslides on access roads.	N/A	3 documents of contingency actions were developed in the case of emergency for forest fires, mass wasting or landslides in the areas of ecological restoration. Purchase of materials and equipment. First aid training.	
<b>Education and Communication</b>	Include the restoration project in the local and regional environmental strategy and communication.	N/A	Social-economic characterisation of 70 families in the surrounding area of the park via semi-structured interviews. Environmental education, payment for seed collection, workshops in schools. Participation of 249 adults in ecological restoration. Participation of 33 children and 130 adults in environmental education and local communication projects.	

Source: Translated from *Final Technical Report: Serranía de los Yarigués National Natural Park, El Carmen de Chucurí, Centre West Sector* (FUNDASET-CONIF, 2016)

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