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Cristian Lorenzo *Editor*

# Latin America in Times of Global Environmental Change

 Springer

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Editor

# Latin America in Times of Global Environmental Change

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*Editor*

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# Preface

This book was inspired by the results of a research project on the global environmental change in Latin America. It was based in Ushuaia, Argentina, at the Centro Austral de Investigaciones Científicas – Consejo Nacional de Investigaciones Científicas y Técnicas. The members of this project work in different fields related to the Environment, such as International Relations and Political Sciences, History, Economy, Forest Sciences, and Environmental Sciences. I had the pleasure to work with them as the Principal Investigator in the project “Approaches to the global Environmental problems from the Province of Tierra del Fuego” and was conducted in the term 2016–2018. It was funded by the Agencia Nacional de Investigaciones Científicas. Participated in this project (in alphabetic order): Ana Mirka Seitz, Fernando Estenssoro Saavedra, Guillermo Martínez Pastur, José Marcelino Alonso, Julián Kelly, María del Pilar Bueno, María Vanessa Lencinas, Patricio Yamin, and Rosina Soler.

In August 2017, we had the first meeting in Buenos Aires. We discussed our preliminary findings in the discussion panel “Global Environmental Change: Latin America in the World Politics”, into the XIII National Congress of Political Science. Some months later, we continued our discussions in Ushuaia by organising the international seminar “The Global Environmental Change: the strategic challenges of Latin America in World Politics” in November. On the following day, we held two Conferences, framed in the event “Latin American Talks: Natural Resources in the World Politics”. All of them meant a fantastic opportunity to enrich our comprehension about the global environmental change in Latin America. We invited to join our discussions to the community in Ushuaia and the main governmental authorities in the Province of Tierra del Fuego at the Centro Austral de Investigaciones Científicas, in matters of International Relations, Environment, and Science and Technology. With regards to the activities in Ushuaia, I would like to thank the support of the Government of Tierra del Fuego. In particular, to María Cecilia Fiocchi (Subsecretary of International Relations), Mauro Pérez Toscani (Secretary of Environment, Sustainable Development and Climate Change), and Daniel Martinioni (Minister of Science and Technology).

In this book, we break down the broader topic of global environmental change into different issues related to climate change and biodiversity. The different chapters address the international relations of Latin America and the Caribbean (LAC) countries, the past and present of regional integration in South America on natural resources, the profile of the scientific knowledge production in natural resources, and different and relevant themes related to the climate change and the loss of biodiversity. The authors enable us to think the challenges of this region in the world politics in times of global environmental change.

This book also includes the contributions of others LAC scholars. I also thank them because they enable us to have more and new insights into the comprehension of the global environmental change. I am pleased to share our results and hope to stimulate to our readers to go deeper in the amazing studies in Latin America, and in particular, into a topic of global importance that challenges us as human beings.

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# Introduction

Our planet is experiencing drastic changes. We live in a world where droughts, tropical storms, hurricanes, cold outbreaks and several weather events are increasing their frequency. Even most critical ecosystems in the planet are under critical risk. Global warming is affecting Antarctica and surrounding oceans. What happens in the most remote region of the world can affect the Earth. Because of that, actions to reduce the risk of the consequences in Antarctica is urgently needed. The decisions taken today will affect the future of the Earth (Rintoul et al. 2018). Looking backwards, the efforts to explain the global environmental change has been multidisciplinary. Different drivers were identified such as energy use, food security, land use changes, natural disturbances, pollution, loss of biodiversity, population growth, and the indiscriminate consumption of natural resources (Camil 2010). However, it is still insufficient to achieve a safe situation for the humankind.

Several institutions in the world are currently working on global environmental change. In the United States, the Joint Program on the Science and Policy of Global Change at the Massachusetts Institute of Technology. We can also find the Environmental Change Institute at the University of Oxford in the United Kingdom. In South Africa, the Global Change Institute at the University of Witwatersrand. In Latin America and the Caribbean, the Inter-American Institute for Global Change conducts activities in Montevideo (Uruguay). However, the inceptions of the institutional framework on global environmental change are related to the interests of developing countries. Arizpe et al. (2016) noted initiatives since the 1980s from the National Aeronautics and Space Administration (also known as NASA), the United States National Research Council, and the International Council of Scientific Unions. Moreover, Jacobson and Price (1990) stated that some meetings took place by the end of the 1980s and the so-called developed countries such as Canada, France, Germany, the United States (US), Norway, Sweden, and the United Kingdom supported some initiatives.

The Global Environmental Change is still challenging the current global system. In 2014, the United Nations Educational, Scientific and Cultural Organization (also



known as UNESCO) and the International Social Science Council showed a negative perspective on the future of the environment, alerting the worldwide community on the potential consequences of the global environmental change (UNESCO & ISSC 2014). This document was released in the same year that the International Human Dimensions of Global Environmental Change Programme closed its headquarters and offices. The International Human Dimensions of Global Environmental Change Programme worked from 1996 until 2014. Then, it became part of the Future Earth, an international research Initiative about global environmental change and global sustainability. Moreover, the most polluting states in the world at present have not achieved a legal binding within the framework of the United Nations to reduce the carbon dioxide emissions. Donald Trump decided to withdraw the United States from the Paris climate agreement. We did not still achieve the ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC), and this situation challenges the role of each state in the global system and its interrelationships. Also, it alerts us about the way of living and consuming at the individual level, mainly of the so-called developed countries.

As it was mentioned before, the global challenge has been mainly addressed in developing countries. However, it is possible to work on the relations between the global environmental change and environmental policies in LAC countries (Günther and Gutiérrez 2017). This book explores the human dimension of the global environmental change in those countries. Each chapter attempts to see how this phenomenon is place-based in different contexts. All of them fit in the same big picture that let us recognising the dynamic of each factor and their interrelationships. In order to do so, two assumptions are necessary to make explicit. The first is that LAC is considered here as a sub-system, composed by states and constellations of factors (history, economy, politics and society) that shape the situation of each of them within the international system. And the second assumption refers to the importance of the categories of time and space in the comprehension of social matters. Although each of them is presented here separately for analytical purpose, they are intimately connected. The time refers to the interactions between the past, present and future into the same historical situation. Furthermore, each analysis is grounded in the study of a reality delimited in a specific space.

The selection of the attributes for the categories of time and space depends on each author, influenced by their backgrounds, perspectives and the scope of this book. Those considerations will contribute to gain an understanding of the big picture. The global environmental change is a phenomenon that happens in that region, in different ways and requires considering its particularities and interconnections. Essentially, this book is a collective effort to contribute to the awareness of this phenomenon of global importance in LAC countries.

Cristian Lorenzo

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# Chapter 1

## The Global Environment Facility and Latin American Countries



Cristian Lorenzo and Joel H. González

**Abstract** The Global Environmental Facility (GEF) is the current financial mechanism for several conventions on the environment. This chapter explores the ongoing relationships between this multilateral organism and Latin America and Caribbean (LAC) countries. We argue that LAC countries within the GEF have a peripheral role, based on the dominant position of interests of industrialised countries. We explored the following aspects: the inception of the GEF at the end of the 1980s and the early 1990s, the dynamic and the underlying elements of the current governance, the priority allocation of the budget, and the underpinning of the environmental discourse. This chapter will provide insights into the comprehension of environmental funding in LAC countries in times of global change.

**Keywords** Environmental governance · World bank · Environmental finance · Global change

## 1 Introduction

In March 1992, George Bush delivered a message to the Congress of the United States. In his speech, he expressed his intention to merge economics with environmental goals in national policies. In that context, he made an explicit reference to the Global Environmental Facility (GEF), an organisation that had started a pilot programme they previous year: “The GEF should become the principal vehicle for assisting developing nations with the incremental costs of gaining global environ-

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mental benefits under new international agreements” (Bush 1992). Years later, in April 2018, the GEF announced that 30 countries had pledged US\$4.1 billion to the GEF, for the four-year investment cycle (known as the GEF-7) (GEF 2018a). In comparison with the previous years the GEF maintained the level of funding (GEF 2018b). The countries with the highest contribution are the USA, Japan, Germany, the UK, and France (World Bank 2018).

Latin America and the Caribbean (LAC) economies have a historical commodity dependence driven by extra-regional demands (UNEP 2017a), and this economic dependence has caused several environmental impacts and socio-environmental mobilisations. Within this framework, the GEF looks like a catalyst of international funds for governments in Latin American and Caribbean countries. If so, it is essential to understand the relations between the GEF and the LAC countries.

This chapter presents the results of qualitative research. We collected information about the GEF and selected “relevant” data into our observations. The next step was to conduct a detailed description and later to identify similarities and differences. As a consequence, the reader will find that this chapter has two levels of abstraction. It is because we tried to get the higher analytical level possible based on the data collected and to be precise in the historical singularity of each description.

This section provides a detailed description about the following aspects of the GEF: (1) its inceptions as an organisation; (2) influences and the dominant position within the GEF; (3) budget and allocations; and (4) the environmental discourse about the situation of the Earth. The data collected served us to support the following argument: the peripheral role of LAC countries within the GEF is based on the dominant position of interests of industrialised countries. We explored the inception of the GEF, the dynamic and underlying aspects of the current governance, the priority allocation of the budget, and the underpinning of the environmental discourse.

The first section considers the general profile of the GEF, focusing on its inceptions. Then, it analyses the representation of interests into its governing structure, and examine the priorities of the allocation of resources between LAC countries. Finally, this chapter revise the concepts of global commons and planetary boundaries within the environmental discourse of the GEF.

## 2 The GEF: General Profile

This section addresses the characteristics of the GEF as an international organisation. First, we explore the network of interests about the GEF in the 1990s. Second, we present an analysis of the evolution of the GEF’s budget. And third, we focus on the relationships between industrialised and developing countries. Concerning the network of interests above-mentioned, we found that in 1989, a World Resource Institute (WRI) report recommended the creation of one or more international environmental facilities within the framework of the World Bank. In this view, the GEF should be international, and the GEF will help the existing institutions on the administrative side of environment funds. In the same year, there was a meeting of the



World Bank, in which donors (e.g. France and Germany) expressed their interests to fund the initiative. They committed to donating \$100 million to support the effort. In this context, the World Bank developed a fund, along with the UNEP and the UNDP. The reaction to this initiative varied. European countries maintained meetings with the World Bank, while the USA was not keen to support the effort because of the pressures from the Congress (Young 2002). The WRI suggests that the creation of the GEF was the outcome of one of its recommendations.

The international expansion of WRI's mission also was reflected in growing partnerships with UN agencies and the World Bank. In 1989, for example, WRI completed a UN-commissioned study urging the bank to create a new fund for projects that produce environmental benefits. The bank not only followed the advice but also recruited El-Ashry, who subsequently was named the chairman of the fund, called the Global Environment Facility (WRI 2012).

In March 1991, the GEF was born, and a pilot process began for three years (Streck 2001). The purpose was to develop a green financial mechanism. The WRI, the World Bank, and the GEF worked together. Mohammed El-Ashry worked at the World Bank, as Chief Environmental Adviser. He distinguished the role of the three institutions recently mentioned. He noted that UNDP was in charge of the technical assistance, capacity building, and project preparation. The UNEP played a central role in strategic planning and provides environmental advice. Moreover, the World Bank acted as the trustee for GEF funds (El-Ashry 1993). We found that LAC countries did not participate in this process.

Since the 1990s, the GEF has been incorporating LAC countries, including: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panamá, Paraguay, Perú, Saint Lucia, Saint Vincent and the Grenadines, St. Kitts and Nevis, Trinidad and Tobago, Uruguay, and Venezuela (GEF 2018c).

What about the budget of the GEF? The GEF Pilot Phase needed 1 billion, and the GEF-1 2.75 billion. However, what does it mean? To address this question, we should frame the evolution of the budget in a long-term process. The GEF-2 had 3 billion; the GEF 3, 3.13 billion; the GEF-4 3.13 billion; the GEF-5, 4.34 billion; and the GEF-6, 4.43 billion (GEF 2016a). The GEF supports a set of themes, such as: protected areas, forest, land and water resource management, and adaptation to climate change, among other (GEF 2018d). So, the GEF has been consolidating as an alternative to international environmental funding. Despite this, it does not mean that there is no conflict of interests within it.

Until now, we saw the increasing budget of the GEF and the growing presence of LAC countries as members. Now, we address the relationships between developed and developing countries. We argue that these relationships were contentious. According to Jordan (1995), industrialised and developing countries had a conflict of interests in the 1990s. While industrialised countries pushed environmental problems in the global agenda, developing countries dealt with other priorities, such as inequality, malnutrition, and poverty. This different interests and preferences were at the 1992 Earth Summit. Jordan said: "The clear message from developing states

during the UNCED proceedings was that if the North wanted the meaningful cooperation of the South in Environmental problem-solving, it would have to provide to appropriate wherewithal, in the words finance accelerated technology transfer, in addition to structural adjustments to the operation of the world economy such as debt relief, increases in aid and reformulation of the world trade system” (Jordan 1995: 304–305).

It is interesting to note who worked for whom. Young provides detailed information about biographies linked to the GEF. Mohamed El-Ashry was Chairman of the GEF since 1991 and CEO of the Secretariat since 1994. El-Ashry was also Chief Environmental Advisor to the Environment Department at the World Bank (1991–1994) (Young 2002: 232). Before that, El-Ashry had served as Senior Vice-President of the WRI (UNEP 2006).

### 3 Current Governance

In this section, we characterise the organisation of the GEF. For such, we address the GEF’s CEO and Chairperson, the Assembly, the Council, and the Scientific and Technical Advisory Panel (STAP). It will provide us with an understanding of the representation of interests within the GEF. With regard to the first, the GEF’s CEO is the visible face of the organisation. The Council appoints the position of the GEF’s CEO and Chairperson for a four-year term. One of its duties is the implementations of decisions taken by the Council and the Assembly. Also, the GEF’s CEO should coordinate with Secretariats of the Conventions and the GEF agencies (GEF 2018e). Since 2012, Naoko Ishii has a tenure, extended in 2014 until 2020. The appointment is only renewable for one term. Ishii had worked as Vice Minister of Finance of Japan. She also accounts for international working experience. The current GEF’s CEO had worked for the World Bank and the International Monetary Fund. The current GEF’s CEO has a PhD from the University of Tokyo, Japan (GEF 2018f). The data presented suggested us that Japan is one of the major contributors to the GEF budget and the nationality of the GEF’s CEO and Chairperson.

The GEF Assembly brings together members of 183 countries. Those countries meet every three or four years at the ministerial level (GEF 2018e). Within this framework, Latin American countries are participating in the GEF Assembly. The list of countries is Argentina, Bolivia, Brazil, Chile, Colombia, Cuba, Dominica, Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Paraguay, Peru, Trinidad and Tobago, Uruguay, and Venezuela. This description suggests us the presence of LAC countries within the organisation of the GEF although we could not identify their level of influence. Constituencies structure the Council. At the same time, each constituency has a council member and its alternate (GEF 2018g), and it can represent one or more countries.

The GEF Council Meetings used to happen twice a year. We found that the interests of significant contributors are represented in a specific constituency, without sharing it with another country (Table 1.1) (e.g. the USA, the UK, Japan, France, and Germany).

The case for LAC countries is different. Latin American and Caribbean countries have three constituencies in the GEF Council. The Council membership belongs to Peru, Colombia, and Mexico. For instance, Argentina shares the constituency with Bolivia, Chile, Peru, and Paraguay. The reader may ask: why do we think that the constituencies are essential? According to Ballesteros et al. (2010: 19): “Typically, the struggle for power in the design of a financial mechanism begins with the design of its governing body and the distribution of seats and votes across different geographical regions and development groupings”.

When we talk about the GEF, we also refer to power. DeSombre (2007) points out the existence of a power asymmetry inside the structure of the GEF. The interests of developing and developed countries are in permanent confrontation. There is a story provided by Gupta (1995) that helps to understand how the relation between North and South works. “During the 1993 December meeting on the restructuring of the GEF at Cartagena, the distribution of power between developed and developing countries within the GEF’s Governing Council was an agenda item. The OECD proposal was that there should be 14 representatives of developed countries, two from countries in transition and 14 from developing countries, with the Chief Executive Officer of GEF (probably from the OECD) as chairman. Developing countries wished for more (17) seats to reflect their greater numbers. Although a compromise proposal was made by the OECD, France, followed by Germany, insisted that there should be a return to the original proposal or they would reduce their financial support to the GEF. Since then a compromise on this issue has been reached. Nevertheless, the nature of the financial mechanism regime has been heavily influenced by the hegemonic interests of the major donors” (Gupta 1995: 33).

Agencies composed the GEF. These agencies are responsible for the establishment of project proposals and the management of them on the ground. They also coordinate activities with governments and non-governmental organisations (NGOs). The agencies belong to banks, international organisations, and NGOs (Table 1.2). The Development Bank of Latin America (CAF) is in Venezuela, and the Brazilian Biodiversity Fund (Funbio) (GEF 2018h) in Brazil. The others are not based in LAC countries.

The GEF also serves as a financial mechanism of environmental conventions. The GEF recognises their importance for developing countries. The GEF announced in 2012: “Today the GEF constitutes the single multilateral organization serving as the financial mechanism to multiple U.N. Conventions” (GEF 2012). The mentioned Conventions are: (1) the Convention on Biological Diversity (CBD), (2) the United Nations Framework Convention on Climate Change (UNFCCC), (3) the Stockholm Convention on Persistent Organic Pollutants (POPs), (4) the UN Convention to Combat Desertification (UNCCD), (5) the Minamata Convention on Mercury, and (6) the Montreal Protocol on Substances that Deplete the Ozone Layer (the Montreal Protocol). With regards to developing countries, the GEF (2012) considered that: “Access to financial resources is a fundamental prerogative for the engagement of developing countries and countries in transition in the implementation and execution of environmental projects (GEF 2012). The GEF also works with the Green Climate Fund and the UN Forum on Forests (GEF 2017).

**Table 1.1** GEF constituencies

Afghanistan, Jordan, Iraq, Lebanon, Pakistan, Syria, Yemen
Albania, Bulgaria, Bosnia–Herzegovina, Croatia, Georgia, Macedonia, Moldova, Montenegro, Poland, Romania, Serbia, Ukraine
Algeria, Egypt, Libya, Morocco, Tunisia
Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zimbabwe
Antigua and Barbuda, Bahamas, Barbados, Belize, Cuba, Dominica, Dominican Republic, Grenada, Guyana, Haiti, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and Grenadines, Suriname, Trinidad and Tobago
Argentina, Bolivia, Chile, Paraguay, Peru, Uruguay
Armenia, Belarus, Russian Federation
Australia, New Zealand, Republic of Korea
Austria, Belgium, Czech Republic, Hungary, Luxembourg, Slovak Republic, Slovenia, Turkey
Azerbaijan, Kazakhstan, Kyrgyz Republic, Switzerland, Tajikistan, Turkmenistan, Uzbekistan
Bangladesh, Bhutan, India, Maldives, Nepal, Sri Lanka
Benin, Cote d’Ivoire, Ghana, Guinea, Liberia, Nigeria, Sierra Leone, Togo
Brazil, Colombia, Ecuador
Burkina Faso, Cape Verde, Chad, Guinea-Bissau, Mali, Mauritania, Niger, Senegal, The Gambia
Burundi, Cameroon, Central African Republic, Congo, Congo DR, Equatorial Guinea, Gabon, Sao Tome and Principe
Cambodia, Korea DPR, Lao PDR, Malaysia, Mongolia, Myanmar, Thailand, Vietnam
Canada
China
Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Mauritius, Rwanda, Seychelles, Somalia, South Sudan, Sudan, Tanzania, Uganda
Cook Islands, Fiji, Indonesia, Kiribati, Marshall Islands, Micronesia, Nauru, Niue, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu, Vanuatu
Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Venezuela
Denmark, Latvia, Lithuania, Norway
Estonia, Finland, the Netherlands
France
Germany
Greece, Ireland, Portugal
Spain
Iran
Italy
Japan
Sweden
UK
USA

*Source* Own elaboration based on GEF (2018g)

**Table 1.2** GEF agencies

Asian Development Bank (ADB)
African Development Bank (AfDB)
European Bank for Reconstruction and Development (EBRD)
Food and Agriculture Organization (FAO) of the United Nations
Inter-American Development Bank (IDB)
International Fund for Agricultural Development (IFAD)
United Nations Development Programme (UNDP)
United Nations Environment Programme (UNEP)
United Nations Industrial Development Organization (UNIDO)
The World Bank Group (WBG)
Conservation International (CI)
Development Bank of Latin America (CAF)
Development Bank of Southern Africa (DBSA)
Foreign Economic Cooperation Office (FECO), Ministry of Environmental Protection of China
Brazilian Biodiversity Fund (Funbio)
International Union for Conservation of Nature (IUCN)
West African Development Bank (BOAD)
World Wildlife Fund (WWF USA)

*Source* Own elaboration based on GEF (2018h)

The Scientific and Technical Advisory Panel (STAP) is an advisory body to the GEF. Its role includes advisory covers: GEF policies, thematic areas of work, projects, and programmes (STAP GEF 2018). The STAP's office is located at the UN Environment North America Office. The UNEP is in Washington, in a short walking distance to the GEF offices. The structure of the STAP is simple: it is composed of experts on different topics. The STAP advises to the GEF Council, and the GEF Assembly. The overall structure is the STAP Chair and its advisors, and advisors in (in general no more than two experts per theme): climate change mitigation, chemical and waste, biodiversity, land degradation, international waters, and adaptation. This composition reveals that only a Latin American country has an expert in the list (Dr Barra). This expert from a LAC country has a Ph.D. from a European country (Italy), while he is working in a university in Chile. The inclusion of a professional from a LAC country involves the participation in the previous academic world of industrialised countries, while he continues working in a LAC university.

## 4 Budget

The GEF-6 covers a four-year term, from 1 July 2014 to 30 June 2018, with a budget of USD 4,433 million. According to Table 1.3, biodiversity and climate change represent almost sixty per cent. This point is essential to consider because of the concentration of biodiversity in the region (e.g. the Amazon) and the effects of climate change.

In the list of GEF donors, only two Latin American countries are on the list: Argentina and Brazil. The rest belongs to Africa, Asia, Europe, North America, and Oceania (GEF 2018i). Besides, the priorities in the allocation are in Asia (32,6%), Africa (27%), and Latin America and the Caribbean (22%). In Latin America and the Caribbean, the countries that received the most quantity of funds are Brazil, México, Peru, Colombia, and Argentina. Moreover, three of them are also GEF donors (Argentina, Brazil, and Mexico) (GEF 2018j). Based on this data, it is possible to state that (1) Latin America and the Caribbean is the region that does not receive the major funds, and (2) Brazil and Argentina are donors and recipient countries of GEF funds.

After describing the role of LAC countries in the allocation of GEF's funds, we focus on Argentina, Brazil, Colombia, Mexico, and Peru as recipient countries. We present a description of the following aspects: projects approved for implementation, themes prioritised in the funding received, the implementation agencies entailed, and the identification of the major contributors to the GEF. The results of this description will provide us new insights into the comprehension of the relations between the GEF and the LAC countries.

Argentina participates in seven projects (approved), funded by the GEF. It covers biodiversity, chemical and waste, climate change, international waters, and land degradation. The implementation agencies are the Development Bank of Latin America, the Inter-American Development Bank, the United Nations Development Pro-

**Table 1.3** GEF-6 programming targets

Focal areas/themes	GEF 6 programming targets (\$ million)
Biodiversity	1296
Climate change	1260
Chemical and waste	554
International waters	456
Land degradation	431
Non-grant instrument pilot	115
Corporate programmes	197
Corporate budget: secretariat, STAP, and trustee	106
Independent evaluation office	19
Total GEF replenishment	4433

Source Based on GEF (2016a)

gramme, and the United Nations Industrial Development Organization. The most major GEF's contribution is in the project "GEF SGP Sixth Operational Phase-Strategic Implementation Using STAR Resources Tranche 1, Mainly in LDCs and SIDs (Part III)". The total cost of the project was 35,368,500.00 USD.

Brazil participates in thirteen projects. The areas entailed are biodiversity, climate change, chemical and waste, land degradation, and international waters. The implementing agencies are the Brazilian Biodiversity Fund, the Development Bank of Latin America, the Inter-American Development Bank, the United Nations Environment Programme, the United Nations Industrial Development Organization, and the World Bank. Some of them cover only Brazil, and the other has a broader scope, including more than one country. It is worthy to note that the most significant GEF funds were in the project "Amazon Sustainable Landscapes Project", which received a total amount of 434,114,646 USD.

Colombia participates in fourteen projects. It covers the following areas: biodiversity, chemicals and waste, climate change, international waters, and land degradation. The implementation agencies are the Inter-American Development Bank, the World Bank, the United Nations Environment Programme, the United Nations Development Programme, and the United Nations Industrial Development Organization. The significant funding was for the project "Colombia: Connectivity and Biodiversity Conservation in the Colombian Amazon". This project has a total cost of 128,209,924 USD.

Mexico is involved in thirteen projects (approved). The areas funded are biodiversity, climate change, international waters, and land degradation. The implementing agencies are the Conservation International, the Food and Agriculture Organization, the Inter-American Development Bank, the United Nations Environment Programme, the United Nations Development Programme, the United Nations Industrial Development Organization, and the World Bank. The major contribution was for the project Sustainable Productive Landscapes, with a total cost of 76,433,214.00 USD.

Peru participates in 16 projects (approved), in five focal areas: biodiversity, chemicals and waste, climate change, international waters, and land degradation. The implementation agencies are international organisations, such as the Food and Agriculture Organization, the Inter-American Development Bank, the World Bank, the United Nations Development Programme, the United Nations Environment Programme, the United Nations Industrial Development Organization, and also the World Wildlife Fund USA. The major contribution was for the project "Sustainable Productive Landscapes in the Peruvian Amazon, which has a total cost of 147,577,982.00 USD.

## 5 Environmental Discourse

In this section, we provide evidence to support the idea that the GEF's CEO perception about the critical situation of the environment can be seen repeatedly as a part of the GEF environmental narrative. The underlying idea is that the environmental situation

may be improved, but it requires several efforts. To examine this, we will explore the concepts of global commons and planetary boundaries through different cases.

## 5.1 *Global Commons and Planet Boundaries*

Some concepts persist in the way that the GEF frames the situation of the environment. Those concepts may influence the GEF funding priorities. We are referring to the ideas of the global commons and planetary boundaries. The GEF and the International Union for Conservation of Nature (IUCN) hosted the International Dialogue on the Global Commons at the National Academy of Sciences, in Washington (USA) (GEF 2018I), from 12 to 13 October 2016. This event was supported by the International Institute for Applied Systems Analysis, the Stockholm Resilience Centre, the World Economic Forum, and the World Resources Institute (IISD 2016). Experts in different domains (science, academia, and economy) discussed how to go beyond the critical situation of the environment (IIASA 2016). Within this framework, Johan Rockström, Executive Director of the Stockholm Resilience Centre, called for a “coalition for change”. He alerted about the critical environmental situation: the world is out of the “safe space” (IUCN 2016). Naoko Ishii, the GEF’s Chairperson and CEO, said: “Business, as usual, is a guarantee of disaster. We needed a course correction”. She added that “we must take ourselves out of our comfort zones”, and called for a “disruptive transformation” (IUCN 2016). As a reflection of this critical situation, the previous day to this International Dialogue, the GEF published a press release, which considered that the environment and economy are closely connected. In other words, there is an economic motivation for going beyond the critical environmental situation: “Our world is reaching the limits of what it can provide sustainably. All life on Earth depends on clean air and water, biodiversity and a stable climate. These global commons are the very foundation of our global economy and are facing an all-too-familiar tragedy of over-exploitation and rapid degradation” (GEF 2016b).

Another case that reveals the use of the “global commons”: in October 2016, the GEF celebrated its 25 years. Naoko Ishii referred to the GEF 2020 strategy and pointed out the challenges that humanity will face:

These drivers of global environmental degradation primarily rise from three global megatrends: a growing population, which will exceed 9 billion by 2050; a rapidly rising global middle class resulting in a tectonic shift in consumption and diet patterns; and rapid urbanisation which is expected to add 1 billion new residents to the world’s cities. To “de-couple” the impact of these megatrends on the global environment we must fundamentally transform our key economic systems—our energy system, food production system, our cities, and our goods manufacturing system. (GEF 2016c)

The concept of planet boundaries complements the concept of global commons. In September 2017, the United Nations Environment Programme released the magazine “Our Planet”. In that magazine, Naoko Ishii published the article “Defining Moment”. Although it is a short article, it reflects the concept of global commons, which entails the atmosphere, the land, and the seas. Ishii also points out that the humankind



transgressed the planetary boundaries. She presents a close relationship between the concept of global commons and the planetary boundaries. Ishii talks about planet boundaries because it considers the existence of global commons. She identified some major drivers of the projections: the growing population, the rise of a global middle class, the consequences of it on the consumption; and the increment of people in cities. Business, as usual, will have a disaster, and the situation will be out of control. Ishii thinks that the system should change, in other words, we should rethink “how we live, how we eat, how we move, and how we produce and consume” (UNEP 2017b).

Anthropocene is a concept to be also considered. In the mentioned magazine, Johan Rockström proposes “to change our worldview, our goals and our rules”. However, what does it mean for us? It entails another way of thinking about the use of natural resources. According to Rockström, the challenge is going beyond the Anthropocene. It means having a different perception of the Earth with infinite resources “with endless horizons”. All about is a shift of paradigm. Rockström presents a positive perception of the establishment of the Sustainable Development Goals. He considered it as a global road map to 2050. The future should be better than now. But, it is necessary to make efforts, to make serious changes. So, based on the description above, we can say that there is no distinction about who should make those efforts. The latter is an important point. There is no difference between a US citizen and a Latin American citizen. The critical question is who and how (UNEP 2017b: 27).

The view of Johan Rockström influenced the elaboration of the strategy of the GEF 2020 plan. The GEF CEO recognised it recently: “As a theoretical background for GEF 2020, I used the concept of planetary boundaries proposed by environmental scientist Johan Rockström. The planetary boundaries concept focuses on nine important system processes that constitute the Earth system, including the climate system, aquatic environment and biodiversity, and quantifies the burden human economic activities have placed on the Earth system. The concept is based on the assumption that once passing a certain threshold, the Earth system may become unable to function normally, and unpredictable changes may take place” (The University of Tokyo 2015). This point is quite important because it shows how Eurocentric perspectives influence the perception of the GEF CEO about the environment.

The concept of planetary boundaries was also present at meeting in Davos (Switzerland) of the World Economic Forum. In that meeting, held in January 2017, Naoko Ishii presented a view focusing on the critical environmental situation of the global commons and the inevitable necessity of making radical changes in our lives and the system that frames us, based on the idea of global commons. She said: “It is increasingly evident that the stability and resilience of Earth is being pushed to the limit, as the global commons that we have so long taken for granted have come under irresistible pressure. Action is needed, and it must happen fast. Business, as usual, will take us nowhere. The only solution is to fundamentally transform our key economic systems—our energy system, food production system, our cities, and our goods manufacturing system. We simply have no other option” (IUCN 2017).

## 6 Conclusions

This chapter addresses the current relationships between the GEF and the LAC countries. It argues that LAC countries within the GEF have a peripheral role, based on the dominant position of interests of industrialised countries. We presented evidence related to the GEF in the early 1990s, the dynamic and underlying aspects of the current governance, the priority allocation of the budget, and the underpinning of the environmental discourse.

We explored the GEF in the early 1990s and recognised that the WRI, the World Bank, and the GEF worked together. The purpose was to build a green financial mechanism at the end of the 1980s and the early 1990s. Since then, developing countries maintained its conflicts of interests against industrialised countries. Another aspect found is that donors receive benefits. We found that the nationality of GEF CEO and Chairperson coincide with the major contributor to the GEF budget (Japan). Besides, the major contributors to the GEF budget have their constituency, in which its interests are represented. Conversely, a constituency may include more than one country. If it is the case, the complexity of interests at stake increases. In consequence, the significant contributions have their interests better represented.

LAC countries are in the third position within the GEF priorities. Some LAC countries get most of the projects in the region (e.g. Brazil, Mexico, Peru, Colombia, and Argentina) and others are also donors (e.g. Argentina and Chile). Besides, scholars from industrialised countries influenced the way the GEF CEO frames the environmental problems. For instance, researchers from industrialised countries shaped the meaning of the concepts of “global commons” and “planet boundaries”.

The peripheral condition of LAC countries and the dominant position of industrialised countries are characteristics that may persist in the coming years. The region will be receiving funds, but here we suggest some ideas to take the most benefits of this international funding. The first is that the GEF may diversify the numbers of predominant ideas about the critical situation of the environment at the GEF and second, to think about the possibility of selecting the next CEO and Chairperson from a non-industrialised country. It will help to democratise the decisions in the organisation. Moreover, third is we suggest to discuss the role of the World Bank and its relationships with the GEF.

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# Chapter 2

## Challenges of Latin America in the Global Environmental Geopolitics of the Twenty-First Century



Fernando Estenssoro

**Abstract** This chapter argues that the geopolitics of the twenty-first century is and mainly will be environmental geopolitics. Within this framework, Latin America, due to its biogeographic features, will be faced with enormous sovereignty challenges from the interventionist interest of power of the Global North, with the purpose of having access, to appropriate and to manage their ecosystems. Those have the singularity of being located at Latin America or in a region or very close to it and are considered key to the functioning of the global or planetary ecosystem, such as the Amazonian space, the freshwater resource and the Antarctic region.

**Keywords** Latin America · China · USA · Geopolitics · Biodiversity · Climate change

### 1 Introduction

If we take into account that the biosphere of planet Earth—home of life and humanity—can be understood as a single large ecosystem, composed of multiple interconnected ecosystems, and if we consider that this macro-ecosystem is threatened by the so-called global environmental crisis, then we will understand why the solution to this crisis has emerged as one of the main tasks of the international system. This has been a task of extreme importance from the time this item was presented at the world public agenda more than 40 years ago with the celebration of the United Nations Conference on the Human Environment, held in Stockholm in June 1972. In this regard, the global environmental crisis can be defined as a paradoxical phenomenon because the economic growth, along with the high level of development and standard of living reached by the so-called industrial civilization (where the Global North or the First World is its archetypal example), created problems of ecological and environmental nature of such enormous magnitude that it has put at risk, for the first time

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in history, the continuity of the life of the human being on the planet. This crisis is primarily composed of the following macro-variables: pollution, loss of biodiversity, climate change or global warming, depletion of natural resources, the destruction of the ozone layer and the so-called demographic explosion. It was in the United Nations Conference on the Human Environment held in Stockholm in 1972 (which created the United Nations Environment Program, UNEP), where this concept of global environmental crisis made its formal debut in the world public agenda, highlighting the need to overcome it on the part of the international community (Estenssoro Saavedra 2009).

In the same way, if the biosphere is our geographical space—understood as the space of the universe that enables and sustains our life—that is to say, our living space, its threat of destruction through the global environmental crisis transforms this phenomenon into a clear political and geopolitical problem. Due to this issue, the use and the way in which we manage this space are being discussed, which undoubtedly includes the issue of national sovereignty, in order to put an end to this threat.

In this sense, the analysis of current political scientists, sociologists, geographers and other social scientists has multiplied. The analysis presented by all the above figures coincides in pointing out that if there is one determinant aspect in the geopolitics of the current twenty-first century, it is and will be the environmental and/or ecological problem. For example, the Spanish researchers Nogué and Vicente argue that the following are leading to the “greening of geopolitics”: “the scarcity of natural resources, ecological risks, the relationship between economic growth and environmental degradation, the fear of a global environmental crisis, the capacity for the social mobilization of ecology, the questioning on the part of the environment about some aspects of the sovereignty of the nation-state and the role of international agencies”. (Nogué and Vicente 2001: 200). For his part, the Canadian researcher Homer-Dixon points out that the “energetic stress” as a result of the petroleum production crisis, along with “environmental stress,” which includes problems such as deforestation, lack of water and population growth, and “climate change stress,” among other global tensions, are becoming a catastrophic threat for the world order (Homer-Dixon 2006). Giddens, in turn, has written a text to note that climate change will be at the center of the geopolitics world in the first half of the twenty-first century (Giddens 2010). And, from another epistemological tradition, Taylor and Flint conclude that ecological and environmental problems take the geopolitical conflict to a qualitatively different level. For them, there is the logic at present of global ecology that leads us to represent the planet as the “home of humanity” and makes us realize that we are destroying this home “at our own risk.” Therefore, the demand for the conservation of the planet will be emphasized because, after all, it is about our own conservation (Taylor and Flint 2002: 409). They add, however, that there are also other logics, such as the global logic of financial globalization, which conceives the world “as an action place, an abstract platform on which to perform, for instance, the 24-h-a-day financial space of world cities” (Taylor and Flint 2002: 409). Thus, while within a logic we wonder if this geographical space is “sustainable,” on the other hand we also wonder if it is “efficient” (Taylor and Flint 2002: 409). In this way,

very different variables exist within geopolitics of the globalized world, such as the concern about “the conservation of the tropical rainforests biodiversity,” along with “maintaining the competitiveness of, say, London as a world city player” (Taylor and Flint 2002: 409).

This situation can be highly confrontational when considering that the hegemonic model of life imposed by the USA and its principal allies of the developed capitalist world is characterized, schematically, by a high level of consumption. However, given the large number of inhabitants of the planet and its growth projections, it is not possible for Earth to hold that standard and lifestyle for all (that is, if human consumption is brought to power units, there is not enough energy on the planet for all its inhabitants to reach the level of consumption of an average US citizen). Therefore, these authors conclude that current trends are unsustainable from an ecological point of view, for which reason “the global ecological crisis is the ultimate space-time tension between making Earth a habitable place and exploiting it as a resources space” (Taylor and Flint 2002: 409).

Certainly, it is not about denying other political and geopolitical processes that are shaping (or deforming) the current international order. Something that characterizes this order at our current point in time at the end of the second decade of this century is its uncertainty insofar as the hegemonic power of the USA declines and other powers, particularly China, emerge with increasing power on the world stage. As Barrios correctly points out, today it is relatively consensual to note that the unipolar order as it arose immediately after the end of the Cold War would be moving to a multipolar order (Barrios 2011: 21). However, while the multipolar global order will be the most likely geostrategic scenario in the twenty-first century, it should be emphasized that the transition period in which we find ourselves means, among other things, “that we are approaching a prolonged phase of hegemonic rivalry between global and regional powers for gaining access to higher levels of powers hierarchy in the planet system” (Rodríguez 2010). And in this struggle, “ecology and the environment will be additional factors of conflict, both because of the states’ need to control water and preserve their own natural environments, and the imperative of safeguarding their respective territorial ecological heritage” (Rodríguez 2010).

## **2 Latin America in the Geopolitics of the First Half of the Twenty-First Century**

This article intends to highlight that the ecological and/or environmental factor is projected as an important and structuring generator of conflicts in the growing new world “order,” particularly relating to the sovereignty of nation-states—especially those in the Global South. Besides, at this stage of “transition” in which we find ourselves, and about which it is difficult to predict its duration (probably a great deal of this century), the situation in our Latin America and Caribbean region (AMLC) is extremely delicate precisely because of its physical and human geographical reality.

The first thing to keep in mind is that AMLC has only 8.5% of the world's population, and if we just refer to South America alone, this percentage drops to 6%. In fact, 90% of the world's population is concentrated in the temperate zone of the northern hemisphere, with Europe and Asia being the most populous continents, holding 86% of the world's population. Only Oceania, with 2.9% of the world's population, is less populated than the AMLC; however, unlike Latin America, Oceania's territory is largely desert. If we take into account that the destruction of ecosystems, among other aspects, is the greatest threat to biodiversity and this destruction has primarily occurred through human intervention, it is evident that territories with relatively smaller populations have ecosystems which are much healthier and more pristine. In this respect, it is considered that, at a planetary level, only 51.9% of land area (approximately 90 million km<sup>2</sup>) has not been transformed by man; however, if we exclude the desert, rocky and frost areas, then the ecosystems that have not been processed or where little intervention has taken place composed only 27% of the land. In this sense, South America has 62.5% of its territory where little intervention has taken place, mainly the Amazon ecosystem (Hannah et al. 1995).

On the other hand, AMLC is a megadiverse continent. Of the 30 countries on the planet with the largest biodiversity, 8 are Latin American countries: Brazil, Colombia, Ecuador, Mexico, Peru, Venezuela, Bolivia and Costa Rica. The same happens with freshwater sources, where AMLC has huge reserves of this vital element. Of the 30 countries with the largest reserves of freshwater at the global level, 10 are in Latin America: Brazil, Colombia, Peru, Venezuela, Chile, Argentina, Bolivia, Mexico, Ecuador and Paraguay. In summary, AMLC is a sparsely populated subcontinent that is rich in natural resources which are mainly demanded by the North; it also contains ecosystems that are key to sustaining life on the planet. These features in the framework of the global environmental crisis put this region of the world in a strategically complex situation.

From the moment the environmental crisis matter was settled on the global agenda, the tension AMLC has been subjected to by the Global North in regard to the sovereignty and management of their territories has only increased because the biogeographical space of this region is in itself a key "resource" in two strategic directions: First, it is key to the proper functioning of the planetary ecosystem, and second, to the economic-productive world order due to the large amount of natural resources it has.

Therefore, as it has been pointed out, during this twenty-first century the world is going to confront to confront growing tensions North-South as a result of the increase of the increase in the consumption of natural resources made by developed countries and the new emerging industrial powers. It is also going to deal with growing tensions between North and South due to the fact that it is in the southern part of the world where a good portion of these resources is located (Martín 2014; Klare 2003). In addition, we must add other phenomena components of the environmental crisis to this situation that favor the increase of global tension such as great biodiversity and the existence of important carbon dioxide sinks which are key to containing climate change. They are particularly important phenomena for AMLC because this region of the world is characterized by having ecosystems in which little intervention has



taken place, and the pressure from the North to keep them this way is increasing more and more.

All these elements explain the increasingly more aggressive actions coming from the North which intend to advance over the national sovereignty of AMLC countries, given that their territories are of great importance for the ecosystem “health” of the planet, as well as to ensure their access to increasingly scarce and therefore strategic resources.

#### (a) **The Amazon**

The discussion regarding the fate of the Amazonian ecosystem or the Amazon is a clarifying example of how, as a result of the environmental crisis, ecosystems taken in their entirety have become a strategic resource in themselves. And, while it is true that the interest of the North of appropriating this territory dates back to the nineteenth century, with the socialization of the global environmental crisis problem in the second half of the twentieth century this interest in their appropriation and control has acquired a greater and new impetus given that this region became a vital strategic objective for the Global North (Bruzzone 2010). As has been pointed out correctly.

Today, the Amazon has reached a previously never seen relevance due to two main reasons. The first is the increase in importance of the climate regime in the global context, bringing such issues as biodiversity governance to the surface. The second is the change in the way nature is represented, a change attributed to the increasing importance of nature in the political and economic spheres. All present and future discussions on the environment go through the South American forest, which is a great regulator of ecosystem services. Despite having had a place in the international stage since colonial times, in this new context, the Amazon has gone on to have a strategic importance (Bezerra 2012: 535).

For example, regarding the variable of climate change, the concern about the conservation and preservation of the main natural carbon dioxide sink such as the wooded masses and the oceans of the planet is well known. For our analysis, the case of the wooded masses is relevant given that all of them are located somewhere in the Earth space owned or claimed by a national state, unlike the oceans whose greater surface area is considered to be “high seas.”

If we consider that the Amazon, with its 6.5 million km<sup>2</sup>, is identified as one of the major wooded masses of the globe (tropical rainforest), due to the fact that it contains the greatest biodiversity on the planet and it is also one of the most important natural carbon dioxide sinks (that is why it is known as the “lung of the planet”), it is clear that its geopolitics projection has become even more complex, particularly for Brazil, which has the highest proportion of the Amazonian ecosystem (66%). However, it is also complex for the rest of the states that contain the Amazon, as they see their sovereignty increasingly questioned by the North whose regional and local actors operate more and more aggressively.

In the case of Brazil, Schoijet called for a restriction of sovereignty of that country, noting that while in the nineteenth century and early part of the twentieth, when ecology was in its infancy, no one questioned “the right of any country to use its

natural resources, including arable land,” despite the fact that it created enormous environmental disasters (as in the case of the Dust Bowl colonization). The “deforestation of the Amazon and Climate Change is occurring in a historically new situation, in which science has developed enough to foresee that the combination of both processes leads to a more likely greater disaster (...) that will surely affect many countries.” Thus, it is “essential to limit the sovereignty of Brazil on the Amazon by ordering its government to stop deforestation” (Schoijet 2008: 151).

On the other hand, Bolivia has denounced the deployment of environmental NGOs in the North in their portion of the Amazon, thus directly challenging the sovereignty of the government when it implements policies that are not to the liking of the elites of the North. In this regard, the Bolivian Vice President, Álvaro García Linera, reported that “in the case of Bolivia, several NGOs are not really non-governmental organizations, but organizations from other governments in Bolivian territory; they are a replacement of the state in areas where the neoliberalism of the past promoted its departure,” as in the case of USAID (García Linera 2012: 27). But also, NGOs, understood as non-governmental organizations, owning their own financial resources, define “subjects, focus, financing line, etc., from the priorities of that other government, becoming a foreign power within a national territory” (García Linera 2012: 27). And if we ask ourselves: what is the actual result of this ecologist policy of the North? In practice, it is seen that the “power in the Amazon is in the hands of, on the one hand, a landownership-business elite; on the other hand, there are companies and foreign governments negotiating the care of the Amazonian forests in exchange for tax reduction and biodiversity control for its biotechnology” (García Linera 2012: 30). It is a situation that not only occurs in Bolivia and in the Amazon countries as a whole, but is replicated in all multiple and diverse ecosystems and peoples of Latin America.

Therefore, traditional geopolitics visualized the Amazon as an immense territory rich in natural resources in what is a sparsely populated area, this area, now faced with an environmental crisis, has acquired a new strategic value due to it being a “natural lung of the planet,” a reservoir of biodiversity, the world’s genetic bank and the container of a fifth of the world’s freshwater. Thus, its value has increased and with it the interest in its ownership and management by various economic, transnational, international and political powers (Fregapani 2000).

## (b) **Biodiversity**

As has been pointed out, AMLC is a megadiverse continent and, more particularly, the Amazon is the territory of the planet in which the greatest biodiversity in the world is concentrated. No one argues the fundamental importance that biological diversity or biodiversity has in the functioning of the biosphere and society. This importance refers to the existence of species, natural resources, ecosystems and genetic resources of all kinds, as well as humanity’s own cultural development. For this reason, at the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992, better known as Rio-92 or Earth Summit, the Convention on Biological Diversity (CBD) was signed to slow down the alarming loss of biodiversity that

comprised a key aspect of the global environmental crisis. In this way, its protection and sustainable use became “a common concern of mankind” (CBD 1992).

The essence of the CBD, besides providing “the framework for conserving diversity, the sustainable use of resources and the fair and equitable sharing of benefits,” is based on the “concept stating that countries have the sovereign right to exploit their own resources pursuant to their own environmental policies” (IEPI 2016: 3; 12). This has been a historical demand, generally made by the South and in particular by the AMLC; this demand is due to the fact that before this Convention, biodiversity was considered a natural patrimony of humanity which allowed international agencies, multinational companies and other states access to natural resources that included this biodiversity without authorization of the states in whose territory they were present, as was the case of Ecuador (IEPI 2016: 3; 12). Therefore, the CBD was supported by the countries of the South; however, despite its progress, the sovereign rights of states regarding the biodiversity of their own territories is one of the most violated principles by multinational corporations and countries of the North, thus generating the phenomenon known as biopiracy, of which AMLC is the victim.

Biopiracy, or the looting of biodiversity, is the practice whereby researchers, scientists and companies in the Global North study, collect and illegally use the biodiversity of developing countries and the collective knowledge of indigenous peoples and their traditional peasant communities to create products and services that are commercially exploited without the permission of their owners, creators, innovators or holders. These actors in the North, under arguments to conserve biodiversity or to preserve ecosystems, use their highest scientific and technological development to appropriate ancestral cultural knowledge regarding the use of biodiversity by local communities, as well as collect the genetic properties of different species that exist in the ecosystems of the South. All this knowledge is then patented in industrial property offices of the North consummating the act of illicit appropriation (Delgado 2004; Martínez Castillo 2009; Garcia Vieira 2012). One of the most emblematic examples of this biopiracy is what happened with Stevia, a plant originally from Paraguay, Colombia and Brazil that is 300 times sweeter than sugar. The advantage that it carries is that it has no calories and carbohydrates and it does not increase the levels of sugar in the blood. Thus, in addition to being a real alternative for diabetics, it has been transformed into a popular sweetener. The first Stevia sweetener was developed in Japan in 1971 by the company Morita Kagaku Kogyo Co., Ltd. Thirty years later, in the year 2000, due to its extraordinary conditions, it had become the “holy grail of the food industry.” Between 2008 and 2012, there was an increase of 400% of products with Stevia, and only between 2011 and 2012 there was a 158% increase in the consumption of this sweetener used in more than 5000 products of the food industry (Ospina-Valencia 2010; Heyden 2013; GSI 2010).

In summary, the champions of this true plunder which was carried out “for the good of mankind” are the multinational biotech companies, laboratories and pharmaceutical companies that are mainly European, American, Canadian and Japanese, and who act directly or by financing studies in universities and research centers according to their interests. It should be recalled that “80% of the medicines produced in the world are plant based (...) plants and bacteria that are stolen and processed in lab-

oratories. Afterwards, the products are patented and marketed to their own benefit” (Bruzzone 2010: 75).

### (c) **Freshwater**

The issue of freshwater has been placed on the world’s public agenda due to the fact that the availability of this resource has been a concern of the elites of the Global North for decades.

As the influential British magazine *The Economist* reported: “water is the oil of the 21st century,” highlighting the words of the executive director of the chemical multinational DOW, Andrew Liverits. This high-level executive was extremely concerned as water “is under enormous pressure due to the growth of the world’s population and emerging middle class in Asia, which yearns to enjoy the intensive use of water—a popular trend in the western way of life” (*The Economist* 2008: 53). In this regard, it should be clear that for the industry and big business in the Global North access to water is essential. As Domic Waughray himself, Member of the influential World Economic Forum or Davos Forum, said: “without it, both industry and global economy die” (*The Economist* 2008: 53).

This “environmental concern” of the North has led political and geopolitical specialists to suggest that freshwater, with its character as a limited and irreplaceable resource, has been transformed into a strategic resource that “will be a cause of conflict at the international level, due to the problem of its distribution and inefficient use.” In addition, it already has left more than one-fifth of the world’s population without access to it (Ramírez and Yepes 2011: 152). Besides, outbreaks of conflict are expected, particularly in those areas where water is a scarce resource and, above all, because of “the limited available supply, the rapid increase in its demand and its privatization accentuates the struggle for its control” (Méndez Gutiérrez del Valle 2011: 30). We must keep in mind that “the population of the developed world, which is an estimated 12% of the total population, consumes around 80% of the drinking water, while 1.5 billion people do not have direct access to it according to the United Nations, which constitutes another exponent of this already mentioned structural violence” (Méndez Gutiérrez del Valle 2011: 30).

This concern of the Global North elites regarding the threat of “shortage” of freshwater is no less for the fate of AMLC and, more specifically, the fate of South America, because this region has 25% of the world’s freshwater and barely concentrates 6% of the global population. This means that South America is the region in the world that has the greatest concentration of freshwater resources in relation to its small population, which makes it the main target of appropriation and control on the part of the Global North, that is, by their states as well as their corporations and multinational companies. In this sense, the main sources and freshwater reservoirs in the region are: the watersheds of major rivers (mainly the Amazon, San Francisco, Río de la Plata, Orinoco and Magdalena); the Guarani Aquifer, which despite being only the fourth largest on the planet, is also the first in the category of renewable energy; the glaciers of the Andes Mountains and, lastly, the Southern Ice Fields, located in the southern border of Chile and Argentina, are the third largest planetary extension of continental ice after Antarctica and Greenland (Bruzzone 2010: 119).

#### (d) **The access to Antarctica**

The case of Antarctica is one of the less dealt with topics regarding the issue of resource scarcity, access to freshwater and environmental crises in general. However, it is a decisive variable in the geopolitics of this twenty-first century due to the importance it has for the fate of humanity. This continent, the fourth in extension of the planet, is a geographical space and a vital ecosystem for planetary functioning (in addition to being the world's largest freshwater reservoir, it is also an important reservoir of natural resources; it also influences the global climate system, among other factors), and it is practically unpopulated since it is the only continent that has no original human settlement due to its extreme climate.

This situation is of utmost importance to AMLC, because the Southern Cone, consisting of the territories of Chile and Argentina, has a determinant strategic value regarding this continent. This is the case since, although the coastal edge of Antarctica has a perimeter of 23,000 km, Chile and Argentina are the closest countries to the Antarctic Peninsula, the only portion of the continent that is not permanently covered by layers of ice and snow, thus giving the easiest access throughout the year. Therefore, it is regarded as the gateway to Antarctica (Sepúlveda Cox 2008; Damsky 2015).

It is true that this immense continent has been under the jurisdiction of the Antarctic Treaty since 1959, a treaty that froze, among other measures, any territorial claims on it. In this regard, the Antarctic Treaty was signed on December 1, 1959, by 12 original signatory countries: 7 territorialist countries, that is, demanding part of this continent as a national territory (Argentina, Australia, Chile, France, New Zealand, Norway and the UK) and 5 internationalist countries, suggesting this territory as international space (Belgium, USA, Japan, South Africa and the former USSR). The treaty applies to the south of the parallel 60°, determining an area of about 34 million km<sup>2</sup>. Of that surface, 40% is frozen continent and the 60% are oceans in summer, while in winter 32 million km<sup>2</sup> or nearly 94 percent of the whole area is frozen. Provided the treaty allows any member of the United Nations may be invited by the totality of the signatory advisory councils, the number of signatories in 2017 was 53 states, 29 of which possess the category of advisory members, granting them rights of decision-making. The remaining 24 have the quality of adherents; therefore, they do not have the right to vote. The treaty is in force indefinitely and can only be amended by unanimous vote of the consultative members (Riesco 1987; Sepúlveda Cox 2008).

And by the same token, in 1991 the Protocol on Environmental Protection to the Antarctic Treaty, or the Madrid Protocol, was signed. Along with determination that this continent was a natural reserve devoted to peace and science, it gave immense protection to its environment and dependent or associated ecosystems. It also stated in its Article 7 that any activity relating to mineral resources, except for scientific research, was prohibited (Environmental Protocol 1991). However, in this protocol, it is also noted in its Article 25 that this ban may be repealed by a future treaty that establishes a binding regulatory framework for that extractive activity. It also points out that this agreement is open for review in 2048 (Environmental Protocol 1991).

It is worth pointing out that thus far, the “operation of the Antarctic Treaty system has demonstrated, since its conception, that it is possible to find peaceful solutions by obtaining the agreement of all member countries, despite the existence of geopolitical interests in a region with significant and abundant natural resources” (Lorenzo et al. 2018: 20). However, it should be borne in mind that, beyond the agreements of the Antarctic System, faced with all the tensions that configure the geopolitical complexity of this twenty-first century, including those arising from the global environmental crisis, the scenario might change rapidly, with serious implications for AMLC given the geographical proximity of this continent to the Southern Cone.

Antarctica and the oceans that surround it are faced with a deepening global environmental crisis; however, the geopolitical importance that both can achieve is a very well-known situation and has been studied by the hegemonic powers in the Global North. This explains the colonial presence of the UK in the South Atlantic, with its occupation of South Georgia Island, the South Sandwich Islands and the Malvinas/Falkland Islands, as well as the bloody war with Argentina in 1982 for the Malvinas/Falkland Islands.

### **3 Latin America in the Face of the Growing Tension Between China and the USA**

It is known that the USA has historically considered Latin America and the Caribbean (AMLC), with its enormous natural wealth, as its “backyard”; that is, it has been considered its area of influence and expansion, as well as its most immediate security area. This is a situation that can be traced back to the well-known Monroe Doctrine (1823) with its slogan “America for the Americans” (Tulchin 2018; Maira 2014; Boron 2013; Boersner 1996). In this regard, it has been stated that the Monroe Doctrine allowed the USA to align its business objectives with its geopolitical objectives in order “to ensure that Latin America could be maintained as a supplier of low-cost manufacturing commodities for the expansion of the United States of the nineteenth and twentieth centuries” (Barton and Rhener 2018: 79).

And the truth is that the spirit of the Monroe Doctrine is still present in American decision-makers, as was well reflected in the words of the Secretary of State of the President Donald Trump administration, Rex Tillerson, who in February 2018, at the start of a tour of several Latin American countries and in direct reference to the growing presence of China in this region, pointed out that the Monroe Doctrine “has been a success” because “what unites us in this hemisphere are the shared democratic values” (quoted in Malkin 2018).

This allusion to the “validity of the Monroe Doctrine” for the Trump administration is directly linked to the rivalry that has arisen between the declining power of the USA as a world hegemon and the increasing positioning of China as a global power. This situation is quite evident in AMLC, as China became the second leading trading partner of the region in less than 15 years and the first in countries like

Brazil, Chile, Peru and Uruguay (Ferchen 2011; Mujica 2018). The bilateral trade China–AMLC went from \$15.765 million in 2001 to more than 100 billion in 2007, and \$277.175 million in 2014. If we just consider the first decade of this century, we'll notice that between 2000 and 2010 the volume of trade between the AMLC and China increased by 1,119.3% (Roldán Pérez et al. 2016: 28; Rodríguez Aranda and Leiva Van de Maele 2013: 498; Rosales and Kuwayama 2012: 69). Obviously, as the permanent history of North–South relations has been, this trade is carried out with a pronounced deficit for AMLC, where the region exports raw materials, particularly minerals, oil seeds and oleaginous fruits (especially soya beans), as well as copper, oil and wood, and imports of China's manufactured products of high added value, as well as of high technology (Dussel and León-Manríquez 2015: 202).

It is true is that Chinese consumption of raw materials and commodities has become essential for AMLC exports. In addition, China is making major investments in infrastructure in the region, some of them absolutely strategic within the framework of global geopolitics, as it is China's intention to open a transoceanic canal in Nicaragua as an alternative to the Panama Canal (Mujica 2018; Turzi 2017; Valero and Galloy 2015).

And everything indicates that this commercial relationship with China–AMLC will continue to deepen. In 2015, the Forum China-CELAC was formally launched (FCC) in which President Xi Jinping noted that China would invest in the region the sum of \$250 billion dollars between 2015 and 2025 (LatinReporters.com 2015). The installation of this Forum, whose first meeting was held in Beijing, sought to promote the “deepening of the integral cooperation between China and Latin America and the Caribbean,” pointing to the need to establish a “comprehensive and balanced” cooperation network between China and AMLC. They adopted for this, among other measures, the “China–Latin American and Caribbean countries 2015–2019 Cooperation Plan,” which identifies “priority areas and concrete measures of cooperation between China and the region in the future” (FCC 2015). In January 2018, in Santiago, Chile, the second Forum China-CELAC was held, in which the realization of several activities was welcome. Such activities were, for example: the 3rd Forum of Cooperation in Infrastructure, China–Latin America and the Caribbean (Macao, China, 1 and 2 June 2017), the 11th Business Summit China-AMLC (Punta del Este, Uruguay, November 30 to December 2, 2017), the 1st Forum of High Academic Achievement CELAC-China, organized by the Republic of Chile and the ECLAC (Santiago, Chile, October 17 and 18, 2017), as well as the Training Course for the CELAC countries on access to the Chinese finance within the framework of the FCC, held on November 30 and December 1, 2017, in the city of Buenos Aires (FCC 2018). As it is evident, this Forum is of great relevance to AMLC international politics to the extent that China has displaced the historic economic dependence of the region on the USA.

It is clear China is reshaping the classical North–South relationship, to the extent that a new Global North including the Asian giant is being redrawn in the middle of the global disorder, thus implying the decline of the USA as the current hegemon of the international system. In this sense, China has long ceased to be a “developing” southern country and has started to behave more and more like a new component



of the Global North by fighting for increasing quotas of power. China needs huge amounts of natural resources and commodities, and in this sense, the Asian giant has fully entered the historic North competition for access to raw materials and resources from the South. Herein lie its true interests and growing presence in AMLC (in addition to other places in the South, such as Africa). The question that now arises is whether AMLC will know how to use the opportunities open to them as they are faced with this new global scenario of increasing competition between these global superpowers, such as China and the USA, that is in full development.

## 4 Conclusion

As we have seen, when it becomes evident that the maintenance of a healthy planetary ecosystem is a matter of survival, it also becomes crystal clear that we are faced with a problem that goes far beyond its economic, environmental and cultural aspects, to completely enter the space of political analysis and, above all, geopolitical analysis.

This geopolitical dimension of the problem is even more complex if we take into account that the Earth is a single large ecosystem composed of multiple sub-ecosystems that occupy a given dimension in the planetary geography, which in turn is almost fully subdivided into sovereign territories of nation-states. We should add that, when faced with certain variables of the environmental crisis such as climate change, the scarcity of natural resources and loss of biodiversity, there are ecosystems and territories that are extremely important and significant at a planetary level, and it “just so happened” the biogeographical region of Latin America and the Caribbean contains these ecosystems in a privileged way, thereby forcing the region to become a very relevant geographical area regarding global environmental geopolitics.

Therefore, the privileged geography of Latin America, with its enormous wealth in natural resources and ecosystem heritage, places it directly in the eye of the geopolitical–environmental hurricane of this twenty-first century.

Today, under the global problem that involves the environmental crisis, Latin America and the Caribbean becoming the theater of operations of the geopolitical disputes of the great powers of this twenty-first century cannot be ruled out. On the one hand, this region of the world possesses huge quantities of strategic natural resources which are in high demand by large industrial and economic powers of the planet, such as traditional powers (the USA) and emerging economies (China, among others). On the other hand, this region of the world is rich in biodiversity and contains ecosystems considered vital for the functioning of the global ecosystem and, therefore, the maintenance of Earth’s life cycle. Therefore, as it has been rightly noted, “since the beginning of this century, Latin America has become an increasingly important region within the geopolitical map of the world” (Isbell 2008: 1). And it is likely that this importance will increase as long as two main factors for the development of the international order combine: (a) the increase in tension between the USA with other emerging powers such as China, among other reasons due to the



dispute for access to increasingly scarce strategic resources, and (b) the intensification of the global environmental crisis.

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# Chapter 3

## Dilemmas of South American Natural Resources. The Case of South American Transboundary Basins and Integration



Ana Mirka Seitz

**Abstract** The South American natural resources are generating various decisional dilemmas regarding pollution, use and distribution visualized on the basis of institutional consensus. Regarding that water is one of the principal riches and originalities of the South American continent, we have become interested in the confluence of integration and the dilemmas of use among those who share the water resource and also build integration. We wanted to visualize the tensions that challenge the resources considered in order to see the possibilities of consensus. The cases considered are the Amazon Basins, the Cuenca del Plata and Madeira and the Guarani Aquifer. The work is based on theoretical concepts defined initially within a phenomenological perspective of situated realism. About the end of the description and the analysis turns on these foundations to make a final balance.

**Keywords** Water politics · Water basin · Guarani aquifer · Amazon basin · IIRSA

### 1 Introduction

The theme and its axes will be addressed from a set of concepts designed in previous research that we want to project in this analysis. The concept of “Integrality” is defined as the way to evaluate the political–environmental issues from the smallest to the largest units in the sophisticated sense of what we call intra- and inter-species biodiversity and constitutive ecosystems of the region.

The other set of concepts is relevant to understanding the integration mentioned above mechanisms is the definition of “Integration” as “the process by which differentiated political units organize common and unified decision structures”. Within this idea, when trying to observe integration as a long-term historical process, we refer to the presence of three tendencies of synthesis in the international behaviour

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of the region that, originated and founded on different and sometimes combined elements give rise, until now, to three types of reiterated and permanent phenomena that currently tend to cross each other: One of them is the “Hispano-American Integration Proposal”, by which the region reacts collectively (Latin America/Ibero-America) against some external danger considered as common (Seitz 1983).

All these are based on the following theoretical foundations: we are operating from what we call “margin of manoeuvre realism” or “situated realism” (Seitz 1993) by which a theory of knowledge is adopted that values both the phenomenology and the concept of thought, located in the place in which knowledge is produced, in addition to considering the universal contents of it (Hessen 1996; Lander 2002; Mignolo 2002). Thus, the methods for recording and processing tasks are the descriptive-explanatory phenomenology and the theoretical construction grounded on it.

From this perspective, we consider the South American Infrastructure Initiative (IIRSA), which emerged in the 1990s with the help of the Global Environmental Facility (GEF) organized by the World Bank with support from the IDB, which response to a process of prioritization of trust funds that emerged at the time to the detriment of traditional multilateral funds. At the same time, the idea of traditional citizen political representation and tension is established by the predominance of a dynamic financial-productive type of will, often in collision with the democratic, electorally reflected. This dilemma of criteria is in addition to the need for road and energy infrastructure development, and the development of natural resources is inserted in the South American Integration process through UNASUR, particularly in the Planning Council or COSIPLAN. In previous studies, we found a clear decisional dilemma early on in the planned design, in subjects that currently have become the responsibility of UNASUR (BID-INTAL 2011) without further discussions and with great repercussions later (dams such as Bello Monte and Cajamarca and those of Conga and Tipnis).

That is why we are interested in seeing the IIRSA proposing to structure the region with the orientation of the infrastructure works and the use of the main fluvial courses of the area, particularly the River Plate Basin and tributaries of the Amazon. In parallel, the resulting institutions and governments we see conditioned by what we call “populist situation” because they persist in being “in a state of inadequacy with respect to themselves and force the claim for an effective taking of measures that put this institutionality to the limit to satisfy both sectoral and socially chronically unsatisfied demands” (Seitz 2004). Thus, the crisis and change are usually the “normality” expected. They are based on the Latin American social duality.

To this, we add the fact that it is currently occurring in a systemic international context of crisis, the result of new challenges posed by a prolonged financial imbalance, natural disasters resulting from the abusive use of resources, and a severe energy crisis implicit in the model productive and extractive.

That is why we see inertia arising from the IIRSA-COSIPLAN mentioned above Hubs, and now we want to monitor it and contrast it with another dynamic that emerges from the environmental data itself, which, in the case of our option for water, leads us to look at what are called basins cross-border of South America. This

dynamic that expresses geography and human communities crosses, enrich, connects and sometimes stresses the links between states and borders.

Regarding the dynamics mentioned above of the IIRSA-COSIPLAN Hubs, it is convenient to remember that there is a pre-eminence in the road and rail integration projects, an essential quota for the Bolivian Atlantic exit through the River Plate Basin and a total absence in the Agenda of the URUPABOL Project and of the Water Question in the NOA-Bolivia.

Thus, making an initial introductory balance, we can point out that South America is the region of the planet with the highest availability of water resources and, within its universe of 38 International Watersheds, it has in the Amazon, the Del Plata and the Orinoco, 92% of the committed waters covering 55% of the territory (Montes de Oca 2016). It explains why the issue of governance and management of transboundary basins is an issue of vital importance in the current environmental policy agenda, which necessarily requires a comprehensive approach by the countries involved. Although with marked nuances to each other, at the beginning of the current millennium, common elements that cross all the transboundary basins are visualized.

Regarding the three initial cases that we considered (Amazon Basin, River Plate Basin and Madeira River Basin), we observed that: (1) general concerns around the impacts on the environment, derived from the eagerness for economic expansion; (2) tensions and conflicts between the actors involved; (3) likewise, the need to advance in the development of new political and legal mechanisms (and the deepening of existing ones) that facilitate a comprehensive management of the issue.

## 2 Concerns About Impacts on the Environment

The selected bibliography detects as main concerns:

(1) Livestock production: Unsustainable use of fauna and alterations in biodiversity: The need to expand the areas with special pastures to raise livestock leads to the need to alter natural vegetation through various ways, mainly through deforestation. It has consequences not only on the hydrological cycle but also on the rainfall regime in the area.

(2) Erosion of soils, transport and sedimentation in bodies of water: Erosion of sandy soils product of the trampling of cattle and transfer of sediments to the Pantanal by rainwater and rivers. In the case of the Madeira River Basin, sedimentation is also considered a problem to be taken into account, as it is one of the rivers with the highest sediment load in the world.

(3) Mineral extraction activities. Transboundary pollution: It has an impact on the environmental balance by altering not only the composition of water (pollution from mercury, for example), but also aquatic life (fish—which affects fishing activity as well), in a population that consumes it and that of the mining workers of the area.

(4) Agricultural production. Unsustainable use of agriculture: After deforestation and planted grazing for livestock, the place is exclusively available for agricultural

production. The problematic use of agrochemicals for agricultural production affects the composition of the waters of the rivers and causes negative consequences on aquatic life and that of the population that gives a domestic use to it. In the case of the River Plate Basin, additionally, the contaminating potential of the waters is marked by agro-industries that produce sugarcane and other crops, installed on areas surrounding the basin.

(5) Brazil-Peru Interoceanic Route: Its construction was historically difficult to negotiate but, since the start-up of the IIRSA-COSIPLAN-UNASUR, this has changed. It should be noted that it also fuelled more intensely deforestation, illegal hunting, illegal contraband activities (mainly drug trafficking), loss of biodiversity and tensions/conflicts with local populations.

### **3 Tensions/Conflicts Between the Actors Involved**

The implementation of cooperation projects between countries on the management of transboundary water resources (registered under the IIRSA) implies having to handle any tensions that may arise between the actors involved, that is, not only among the participating countries but also with the riparian population (in most cases, of different indigenous peoples). Thus, the progress of certain projects not only has negative impacts on the environment but also impacts the quality of life of the population in general and the native population in particular.

### **4 Development of New Mechanisms (and the Deepening of Existing Ones) that Allow Comprehensive Management of the Subject**

Taking into account all the complex negotiations that characterized the previous immediate decades with respect to the water basins, we start from the need to reinforce the existing mechanisms and create new and solid political and legal mechanisms, at a national and international level, that control, regulate, minimize the environmental impacts mentioned, with the ultimate goal of improving/facilitating management and governance in relation to the use of shared water resources.

We must point out that the design and implementation of the main existing Programs and Projects concerning the shared water resources in the Amazon Basin, the Del Plata Basin and the Madeira River are linked to the Hubs of the Amazon and the Paraná-Paraguay-Perú-Bolivia-Brazil Hub, within the framework of the IIRSA.

## 5 Basins Considered in the Analysis

### 5.1 Amazon River Basin

It is shared by Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, Venezuela and French Guiana. (With Brazil, Bolivia and Peru occupying more than 90% of the total basin approximately) (Steinke and Saito 2010). The area we are talking about is approximately 7,050,000 km<sup>2</sup>, which is why it is the largest hydrographic basin in Latin America (Bermudez and Ribeiro 2010). We must also point out that the main and significant tributaries are more than 60 (Duarte 2010: 56–57).

Regarding the Agreements and Institutional Organization, the main milestones that we must mention are:

- (1) Amazon Cooperation Treaty (TCA), 1978 (Duarte 2010: 5–57).
- (2) Organization of the Amazon Cooperation Treaty (ACTO) and annually the subsequent Meetings of the Amazon Cooperation Council, 1998 (Organización del Tratado de Cooperación Amazónica 1978).
- (3) In the 11th Meeting of the Amazon Cooperation Council of the ACTO of 2002, the countries decide to establish the “Framework Program for the Sustainable Management of Water Resources of the Amazon, Considering the Impacts of Variations and Climate Changes” (Sant’ Anna 2012).
- (4) This Framework Program is presented to the GEF to help finance it (Sant’ Anna 2012).
- (5) The ACTO, the OAS and the UNEP sign an agreement for the execution of the “preparatory phase” of the Framework Project (BLOCK B) (Sant’ Anna 2012).

#### 5.1.1 Tensions

(1) As part of Group 6 of the group of projects of the Amazon Hub promoted by IIRSA (2005), the start-up of the construction of a waterway within the framework of the Binational Development Plan of the Border Region of the Napo River Basin to improve the navigability of the river, has been an element of conflict with the group “Rede de Comunidades do Rio Napo”, the main representative of the indigenous population of the area (Sant’ Anna 2012).

(2) Tensions between the environment and soybean production, livestock and mining activity. With respect to soybean production, scientific studies show empirically that for every the soy produced per day, suspended solids are generated, which transform the basin into a potential candidate for the totality of its water does not flow properly due to debris accumulation (Steinke and Saito 2010: 243).

(3) With respect to livestock production, this activity involves the deforestation of the area and its replacement by special grazing land for livestock, which has led to impacts in the hydrological cycle (particularly, the rainfall regime) (Steinke and Saito 2010: 243).



(4) With regard to mining activity, one element to consider is the impact of mercury levels on the health of the population and aquatic life, which appears as a by-product of the extraction or refinement of other metals (zinc, gold and silver) (Steinke and Saito 2010: 205).

## 5.2 *Cuenca del Plata*

The countries that share the Cuenca del Plata are Argentina, Bolivia, Brazil, Paraguay and Uruguay (with Brazil and Argentina occupying 75% of the total of the basin approximately (Kettelhut and Gomes Pereira 2006). With 3.1 million Km<sup>2</sup> it is the second largest hydrographic basin in Latin America (after the Amazon Basin) (Steinke and Saito 2010: 205). Their main rivers are: Río Parana, Río Paraguay, Río Uruguay and Río de La Plata (Kettelhut and Gomes Pereira 2006).

### 5.2.1 **Tensions: Between the Environment and Soybean and Sugarcane Production and Mining Activity**

With regard to the production of sugarcane, we warn about the potential negative impacts on the environment that the installation of agro-industries entails in the areas of the Pantanal (Matto Grosso Del Sur), which may throw chemical waste (particularly pesticides that they use the sugarcane plantations) to the rivers, contaminating not only the superficial waters of the basin, but also the subterranean ones.

With respect to mining activities, they have a great impact on water courses in the basin, especially in the basins of the Bermejo and Pilcomayo rivers. According to documents published by the United Nations Organization, “This impact is caused by the discharge of water used for the extraction and processing of minerals. In Bolivia, mining is practiced mainly in the headwaters of these rivers, resulting in the contamination and erosion of their channels. An estimated acid drainage of 4,000,000 m<sup>3</sup> has been estimated, associated with a discharge of 643,000 tons of solids. In Brazil, the mining activities in the Paraguay River Planalto resulted in contamination by mercury deposits in the river sediments. Finally, in Argentina, oil contamination was detected in the sub-basin of the San Francisco River (a tributary of the Bermejo River), and the presence of heavy metals in the Pilcomayo river basin. In Misión La Paz (Argentina), high concentrations of lead, arsenic, copper, mercury and silver have been found. “With respect to the livestock activity, there is a problem of erosion of sandy soils resulting from the trampling of cattle and consequent transport and sedimentation of the Pantanal” (UN Hábitat 2009: 26).

### 5.3 *Madeira River Basin*

The countries that compose the Madeira River Basin are Bolivia, Brazil and Peru, covering 1.5 million km<sup>2</sup>. In The main rivers that make up the basin are the Mamoré, the Beni and the Madre de Dios and all its tributaries (Switkes 2008: 17). Regarding the Agreements and Institutional Organization, the main milestones that we must mention are few data and the consulted bibliographic sources do not have the same amount of information regarding the political-institutional mechanisms except the references that emerged from the IIRSA.

#### 5.3.1 Tensions

- (1) The “Madeira River Hydroelectric Complex” project, which forms part of Group 3 (Madeira-Madre de Dios-Beni river corridor) of the Brazil-Bolivia-Peru Hub (IIRSA), foresees the construction of two large power plants: a) San Antonio Hydroelectric Power Plant; and b) Jirau Hydroelectric Power Plant. In this sense, the implementation of this project has been an element of tensions and conflicts with the “Movimento Dos Atingidos por Barragens”. This is an organization that represents the population most affected by this project, which warns and manifests itself systematically on the potential negative consequences that the project has on the environment and the quality of life of the population of the area.
- (2) Tensions between the environment and soy production. It is estimated that the implementation of the project “Madeira River Hydroelectric Complex” will increase soybean production considerably (by 25 million tons per year) both in Brazil and in Bolivia, because of the elimination of high transportation costs. However, soybean production has become the main cause of deforestation in a large part of the Amazonian territory. According to the studies carried out by the Brazilian Strategic Fund for Biodiversity (FUNBIO), the project Hydroelectric Complex of the Madeira River could affect more than 142,000 km<sup>2</sup>, with additional impacts in north-western Bolivia.
- (3) Tensions between the environment (aquatic life) and the “Madeira River Hydroelectric Complex” project. The construction of the two hydroelectric power plants poses a tension with the fishermen. Its operation could cause the extinction of certain species of fish typical of the Amazon region that usually migrates during their reproductive cycle. The interruption of the migratory flow produced by the construction of the power plants could place the survival of these fish species at a risk. This supposes a tension with the fishermen of the area as well, whose commercial profits would be negatively affected.
- (4) Tensions between the environment and mining activity. The extraction of gold in the Beni River and the Madre de Dios River causes the release of mercury into the environment which, as in the case of the Amazon Basin, entails potential

corrosive effects on the health of the population and aquatic life (Switkes 2008: 12–14).

## 5.4 *Guarani Aquifer*

The member countries of the Mercosur Integration Agreement made an explicit reservation of joint rights in 2005 to the United Nations regarding the groundwater and emerging waters of the Guarani Aquifer. After that, the Guarani Aquifer Agreement was negotiated and signed in San Juan, Argentina in 2010. This agreement provides for dispute resolution and joint action mechanisms regarding the exploitation and production of field studies. Article 9 establishes that each signatory Party shall inform the other Parties of all activities and works that it intends to execute or authorize in its territory that may have effects on the Guarani Aquifer System beyond its borders (Acuerdo sobre el Acuífero Guaraní 2010).

Regarding the construction of a common vision not only for the aquifer but for the entire River Plate Basin, border issues such as environmental sanitation, navigation, energy, control of extreme events and conservation of sources, should be considered. The potentially problematic situation that has been modified was the previous profile of dissent and political asymmetry in the stage of the controversy regarding water resources and the advantages that could result from the construction of the Itaipú and Yacyretá dams. After the planning and with the building of the dams, the Treaty of Argentine-Brazilian Integration (Tratado de Integración, Cooperación y Desarrollo entre la República Argentina y la República Federativa de Brazil, 1985) and later the Mercosur Treaty finished with this and consolidated a solid integration path.

### 5.4.1 Contemporary tensions

Consequent floods and droughts, excesses and water deficit; 2. Little sustainability in the use of transboundary aquifers; 3. Conflicts of water uses in quantitative terms; 4. The dams: the security and emergency plans; 5. Water Quality; 6. Erosion, transport of sediments, organisms in the water; 7. Change of biodiversity; 8. Limitation of navigation; 9. Unsustainable uses of fishery resources; 10. Impacts due to unhealthy water; 11. Environmental impacts of irrigated areas (Coelho, 2004).

## 6 Balance

We are witnessing the configuration of a new “geography of conflicts” (Bloch 2015) delimited by the existence, production, transport and logistics of strategic natural resources: oil, gas, coal, fresh water, lithium, copper, zinc, strategic minerals such

as bauxite or nickel, wood, cereals and the existence of semi-empty and empty territories.

Furthermore, there is a new concern towards the protection and use of these vital resources, especially the one that arises from the developed countries that import them, which generates a new attention for the protection and use of these resources. Michael Klare alludes that the advance of the economy as an international strategic tool has intensified competition for access to strategic natural resources and that this leads to design “the wars we will have in the future, mainly for the position and control of vital resources for economic production...” (Klare 2003: 261).

Water reserves will be a strategic natural resource in a few years, since the continuity of life and development of all the countries of the world will depend on them. Some experts say that it could even be a reason to generate severe conflicts, especially in those areas where it is progressing over time, and the phenomenon of desertification and drought seasons is more frequent and intensifies with the passage of time.

In order to evaluate these phenomena, UNESCO experts together with scientists from different countries have been working since 2000 under the International Hydrological Programme (IHP), where for the first time, they have designed a world map to locate the largest reserves hydric of the planet.

The V World Water Forum met a final declaration in which more than 100 countries are committed to developing active policies for water purification and sanitation and that this resource is effectively provided to the population as well as to develop policies that confront the problems arising from floods and droughts (Suárez Rubio 2011).

The authors allude to the existence of “situations in which water managers try to control situations of unsustainability or lack of investment through legal mechanisms”. It is this acceptance of the dilemma that is most innovative in this document, which also adds multi-causality as an unavoidable criterion if one wants to understand what the water crisis in our continent is about, which we will focus more specifically on today’s MERCOSUR, from the most relevant case study: the Guaraní Aquifer.

MERCOSUR had already launched a plan a year before to know the potential of the aquifer, whose surface area is estimated at more than 1.2 million square kilometres in the subsoil of north-eastern Argentina, a very extensive south-western area of Brazil. South-east of Paraguay and a good part of Uruguay with 37,000 estimated cubic kilometres of fresh water.

Thus, water, while an overflowing resource in South America, is also a critical and still scarce resource that generates competition, tension and conflict. As we said, we have known this in the history of the La Plata Basin Treaty that had extreme tensions between the member countries while Itaipú and Yacyretá were being built. But, once they were finished building, this tension was diluted towards cooperation and solidarity, particularly between Brazil and Argentina. So, in the context of the Falklands War, Brazil will not only be the diplomatic representative of Argentina but together they will proclaim and they will maintain the Doctrine of the “South Atlantic, Zone of Peace.” Later, with the recovery of democracy in both countries, will come the Treaty of Argentine-Brazilian Integration (1985) and the subsequent

construction of what we know as Mercosur that will install a regional integration. Thus they will have cooperation and institutional building with solid but slowly and prudent advances.

This profile of intra-regional relations is projected in oceanic waters that surround us. There, too, we can highlight the solid and persistent cooperation between Brazil and Argentina in joint positions in the International Maritime Organization since the constitutional changes in both countries between 1988 and 1994, particularly in the Committee for the Protection of the Marine Environment (Salonio 2017).

Thus, and taking into account the theoretical elements mentioned at the beginning of this work, we can see that the discord has not been eliminated but it can be said that, within the initially mentioned criteria of Hispanoamerican and Latin American integration, we coordinate our economic integration behaviour and we maintain the reinsurance of reacting jointly to what we evaluate as a common external danger.

It is not enough to make disappear the dilemmas or the problems detected that the water basins generate but it continues manifesting unusual coordination of these dilemmas in front of what is seen as a joint threat. The case of the Guarani Aquifer illustrates this vulnerability reinforced by our perception of integration. The basins examined in a general way also register a complex but systematic organization of cooperation. The La Plata Basin concentrates the greatest amount of population, polluting production and old complex conflicts currently transformed into cooperation. The Amazon Basin includes a multitude of protagonists and regional marginality. It does not have important institutionality, except in specific cases and, although it is also threatened in its ecosystem, it does not register manifest conflicts due to binational use without mediation.

Finally, an approach from an International Relations perspective, we conclude that we are in a regional coexistence conditioned by the internal, regional, hemispheric and global contexts. Our cooperation continues in force and is consolidated but is conditioned by a system that continues to manage diverse changes in its organizational paradigm.

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# Chapter 4

## Scientific Knowledge Regarding Natural Resources in Latin America: Conditioning Factors and Strategic Challenges for the Region



Rosina Soler and Joel H. González

**Abstract** There is a worldwide trend towards growth in scientific production in different disciplines. Notable progress of individual countries in Latin America in scientific development is recognised worldwide. However, it is necessary to understand how this scientific knowledge is generated and what are the underlying factors shaping the understanding of local natural resources. Scientific knowledge related to natural resources is a crucial issue for a region that contains the highest proportion of the rural population, almost half of the world's tropical forests and a quarter of the world's potentially arable land. Not only the availability of natural resources but also their governance reinforces the need for an independent scientific structure. We argue that funding (allocation and provenance), institutional priorities, international cooperation and unequal representation of gender bias or direct the scientific knowledge and researches in our region. This paper summarises some evidence of different realities and ways of knowledge production according to (1) the autonomy (i.e. funding, human resources and local institutions) in scientific research, (2) collaborations networks with foreign researchers and (3) the role of women in Latin American science. We discuss the relevance of an autonomous, participative and collaborative scientific development in Latin American countries.

**Keywords** Natural resource management · Research funding · Science and development · Women scientists

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## 1 Introduction

Political leaders worldwide have long recognised the importance of incorporating scientific knowledge into proposed solutions to the increasingly complex challenges that global change poses to society at both local and global scales. More knowledge-based solutions to environmental challenges are needed to establish sound decisions about natural resources management. Scientific knowledge has a significant rise over the past two decades, and research spending has increased in most countries in different disciplines. Indeed, notable progress of certain countries in Latin America in scientific development is recognised worldwide (Van Noorden 2014).

Latin America has doubled the scientific production in the last ten years (from ~50,000 scientific articles in 2006 to > 96,000 in 2016). This growth rate is higher than developed regions and countries such as Europe and the USA, which maintain a considerable difference in the number of total annual publications (> 610,000 scientific articles in 2016) (World Bank Data 2018a). Over the last 10 years, some countries in the region (e.g. Argentina, Brazil and Chile) have been leading in several parameters of science in Latin America (Hansen et al. 2002) although the percentage of investment at the national level in these countries is still low and fluctuating (Ciocca and Delgado 2017). The production of knowledge is easily quantified and monitored through the publication rates (i.e. scientific articles and congress), patents, number of projects and public–private funds allocated to research and development (Hermes Lima et al. 2007; Ciocca and Delgado 2017), among others. However, there is a lot of understanding of nature by local and indigenous communities (mostly empirical knowledge) known as traditional forest-related (Blazquez Graf and Flores 2005). It considers the interplay between traditional beliefs and practices and formal forest science catalyses potential synergistic applications between these different knowledge systems. And many of this traditional knowledge is managed by women.

Latin America has a high proportion of rural population (117 million, or 20% of total Latin population in 2017) that lives most linked to the use of natural resources (World Bank Data 2018b). Latin America is considered a world reserve of natural resources in high diverse ecosystems, which are shared by several countries globally classified as megadiverse. The region also contains almost half of the world's tropical forests, a quarter of the world's potentially arable land, a third of freshwater reserves and a wide range of mineral reserves, including hydrocarbons. One of the challenges of Latin American countries lies in how to use and manage such biodiversity and natural resources to empower local economies and promote sustainable development. Managing or governing natural resources is intrinsically linked to the ability to constitute and understand the natural resource through scientific-technical knowledge (van Assche et al. 2017). The knowledge about the resource itself and about how it could be managed is, therefore, co-evolving with actors and institutions.

Among local actors close to natural resource use and understanding, a growing number of women participate in the formulation of alternatives to environmental and development problems (Vizcarra Bordi 2005). Its visibility has crossed different feminist struggle spheres, from the academic field to the recognition of the



existence of feminine ecological knowledge in rural areas, and specifically in indigenous people. However, the role of women in understanding, acquiring practice and managing natural resources within local or rural communities has been little explored by the scientific community. Women's knowledge tends to be linked more directly to household food consumption, including collecting non-forest products and fuelwood for cooking and heating, water quality for consumption and traditional natural medicine. For example, within agroforestry systems women often have highly specialised knowledge of trees and forests concerning species diversity, management, conservation and use (Setyowati 2012). Moreover, Larivière et al. (2013) found that scientific specialities dominated by women include nursing, midwifery, speech, language and hearing, education, social work and librarianship. Although women contribute substantially to the use and knowledge of natural resources, their roles are not fully recognised or documented. Moreover, women rarely have equal involvement to men in the formulation, planning and implementation of policies as well as in academic positions (Larivière et al. 2013).

At the same time, the role of women in science is an opportunity to enhance new insights facing different problems, topics and ways of knowing. In some countries of South America, women have gained many spaces in science. In Argentina, for example, female researchers reached 52% of scientists during 2015, in contrast to the 30% observed worldwide (UNESCO 2018). Likewise, Fondecyt in Chile reported that female participation within research projects increased from 25% in 2001 to more than 36% in 2014. The achievements are not only related to the increasing number of female researchers into the scientific system but also what that means concerning new insights for research. Definition of priority problems to investigate, data analysis and interpretation, interaction with colleagues without prior power relations, the metaphors from which scientific knowledge is built, are biased by gender perspective in science and technology (Blazquez Graf and Flores 2005).

Knowledge, therefore, in any of its forms plays a key role in the coordination of decision-making regarding natural resources. South America has the opportunity and the potential to generate the basic and applied knowledge necessary to ensure the governance and improve the management of natural resources (Hogenboom et al. 2012; Ciocca and Delgado 2017). However, at the same time, the region faces numerous obstacles (e.g. instability and inflation) to build a productive and stable scientific structure over time. Moreover, the accelerated dynamics produced by the current global change generates even more significant challenges for all dimensions of the international scientific arena. For this, it is necessary to understand how this knowledge is generated and what are the underlying factors behind scientific advances in Latin America. We argue that funding (the allocation and the provenance), institutional priorities, international cooperation and unequal representation of gender bias or direct the scientific knowledge and researches in our region. This paper summarises some evidence of different realities and ways of knowledge production according to: (i) autonomy (i.e. funding, human resources and local institutions) in scientific research, (ii) establishing collaborations with foreign researchers (which could be interpreted as good collaborative networks or as the lack of infrastructure

and resources necessary to carry out high-level research independently), and (iii) the gender equity in research and development.

## 2 Evidence in Literature

Literature reviews contribute to summarise and synthesise a large amount of data and information often dispersed, but available. Also, review articles bring a broader analysis and interpretation of the problem under study, which goes beyond the individual findings. Here, we selected three examples of literature reviews used as evidence of conditioning factors behind scientific knowledge in Latin America. The articles selected are related to specific literature about knowledge production for agrosilvopastoral systems, scientific collaboration networks between Europe and Latin America and finally, the role of the Latin American woman in botany. These articles enable us to identify particular issues and reveal some of the challenges that the region has to face in order to enhance regional science.

First, the autonomy of science implies many things, but we mainly refer to who conduct researches and where the funds come from in Latin America. The current situation of autonomy or external dependence in scientific varies according to the country under analysis. Soler et al. (2018) in their literature review of knowledge production for agrosilvopastoral systems in South America, also highlight this by showing how agroforestry systems and fundings related to it has developed significantly in Latin America in recent decades. The funds come from a wide variety of actors: the private sector, governments, nongovernmental organisations, and bilateral and multilateral cooperation agencies.

Despite the increment of funding, the current knowledge about agroforestry in South America is unevenly distributed regarding types of production systems, geographical coverage and study topics. One of the key problems identified at the regional scale is the need to develop a joint strategy for the use of natural resources, accompanied by a permanent and systematic research programme. The authors affirm that knowledge production can be biased by different socio-political factors such as the way funding is assigned by each country, institutional priorities and constraints on international cooperation. Aspects rarely questioned or analysed.

With this problem in focus, Soler et al. (2018) synthesised and analysed the scientific articles on agroforestry systems in South America in order to understand the process of knowledge production and the influence of underlying conditioning factors on it. The main objective of the research was to answer the following questions: (1) What are the main components of agroforestry systems investigated in South America? (2) Who conducts and fund these studies? (3) Which kind of recommendations are provided? and (4) Which are the main factors affecting the research?

The article concludes that, concerning the topics of research, studies were mainly focused on the production of goods and services (monetary or non-monetary approaches), except in Brazil, where conservation was the principal study objective. Moreover, the authors identified two clear trends: (1) conservation and social aspects

were mainly supported by sources from external countries led by principal foreign investigators (Bolivia, Peru, Ecuador and Paraguay) and (2) production issues were supported from sources within countries and supported high levels of cooperation among institutions (Argentina, Chile, Brazil, Venezuela and Colombia). In relations to funding, Brazil, Argentina, Colombia and Chile had more frequent cooperation among institutions and countries but mainly used their funding. In contrast, Bolivia, Ecuador and Peru had almost 100% of their studies supported by foreign countries. In general, countries with greater internal funding of research generated more long-term studies. The main outcome of the analysis done is that the growing scientific development in South America is a key instrument for the natural resources management in this region. The countries with the most significant investment in science differ from those still dependent on external financing for study objectives. The capacity that each country has for funding its research projects will be one of the main challenges, as well as the development of a regional strategy in South America for science.

To conclude, this article shows internal and external structural elements that constrain knowledge production. At the same time, allows visualising the role of important domestic players like ranchers and local producers, who are involved in more than 60% of the studies.

Second, the analysis of collaboration networks with different regions of the world supposes a relevant element for the regional science. However, there are disparities in this exchange on which Latin America should work. Dangles et al. (2016) inquire about collaboration networks between Europe (European Research Area, hereinafter ERA) and Latin America and the Caribbean (hereinafter LAC) concerning research focused on biodiversity and climate change. The authors show that over the last twenty years, the ERA and LAC countries have committed themselves to consolidate their links through a strategic partnership with three primary objectives: to build countries capacity, to promote academic excellence and productivity and to properly study the interplay of biodiversity and climate change issues over the entire LAC area.

However, for Dangles et al. (2016), it is not clear how these European, trans-continental and bilateral research programmes impact scientific cooperation at the interface of biodiversity and climate change. The outcome of the different research programmes developed for promoting ERA-LAC research collaboration remains to be evaluated, in particular for hot topics like the interactions between biodiversity and climate change. For these reasons, authors analyse specifically the temporal evolution of these collaborations, whether they were led by ERA or LAC teams, and which research domains they covered. Dangles et al. (2016) provide an overview of the structure and dynamics of research networks by reviewing scientific publications involving authors from the ERA and LAC published between 2003 and 2013. They evaluated the relative importance of ERA-LAC collaboration compared to collaborations with other regions, the temporal evolution of the importance of ERA-LAC collaboration, the nationality of corresponding authors and the type of research domain covered.

The authors conclude that while most ERA-LAC studies are performed on sites located in LAC territories, only one-third of the corresponding publications are led by

LAC scientists. Besides, the relationship between capacity building and publication authorship is not straightforward, and the poor leadership of LAC scientists may also illustrate the ERA origins of the funding and lack of research coordination in the LAC region. Their results also indicate that ERA-LAC collaboration is biased towards a few, emerging countries, with most studies carried out in Brazil and Mexico (i.e. middle-high income countries). Some countries such as Brazil have played an important role in increasing research flows.

The article highlights there is a need to better tailor cooperation with low- and mid-income countries of LAC by conducting more targeted collaborations for R&D studies on biodiversity and climate change. Nevertheless, strengthening the connection between less developed countries and the global cooperation network suppose a great challenge.

The authors mention several reasons to explain the rise of international scientific cooperation, among them: current global networks, historical relationships like former colonial ties (e.g. Mexico–Spain and Brazil–Portugal) and development of national research funding programmes (e.g. Argentina, Chile and Brazil). Finally, the study indicates the urgent need to better tailor cooperation with low- and mid-income countries (e.g. Bolivia) by conducting more targeted collaborations on R&D.

Third, the role of women in science supposes both a challenge and an opportunity for the knowledge construction in Latin America. In her study, Lobato de Magalhães (2018) analyses the relationship between gender and science in the field of botany. The author claims that until the eighteenth century, this discipline appeared strongly associated with women and was considered the first area of science appropriated for the cognitive abilities of women. It was presented as an activity of a passionate nature, a type of distraction with low scientific objectives. Given the above, women received an informal education, and their contribution to botany was not publicly recognised. In the nineteenth century, while men participated in naturalist expeditions, women were limited to classifying and herborising the collected material. For this reason, their names were not cited in scientific papers, and in this way, a large number of women had ‘invisible careers’. Due to the aforementioned, it is inferred that the female contribution in Botany differs from the other Science areas.

The author shows that Latin America does not escape this tradition. In fact, between the 20th and 21st centuries, some women were distinguished as pioneers in botany in Argentina, Brazil, Costa Rica, Guatemala, Mexico and Panama. For this reason, this article analyses the current role of botanical women in Latin America and provide an approach to the gender issue in this particular science area. As a methodological proposal, 19 Latin American countries were selected, from which data on scientific articles, herbaria and botanical societies were revised and compiled.

Lobato de Magalhães (2018) affirm that despite the consensus on Botany as an ‘intrinsically feminine activity’, women’s participation is quite equivalent to male participation as curators of herbaria, presidents of botanical societies and congresses and authors in scientific publications. However, it is likely that even today there are women with ‘invisible careers’. Additionally, the author argues that participation is not balanced in Latin America, given that there are countries such as Argentina,

Brazil and Mexico where there is a higher number of herbaria and publications of women than in other countries in the region.

The study concludes that the participation of women scientists assuming a leading role in the Botany of their countries is fundamental both for the strengthening, development and dissemination of plant research and for the promotion of women in Science in Latin America.

The aforementioned case study shows how the social aspects and historical constructions linked to the gender perspective modify the processes of knowledge construction and emerge as an important conditioning factor in Latin America.

### 3 Discussion

#### 3.1 *International Collaborations*

Despite the abundance of natural resources in South America, it is still the most unequal region in the world (ECLAC 2016). Moreover, as the global economy has contracted, foreign direct investment into Latin American natural resources management and conservation has decreased (IMF 2016). In this context, it is essential to understand to what extent local or foreign countries orient funding towards scientific research and technological development, as well as what influence they exert as a result of what is studied, and thus to develop a long-term strategy from Latin American countries integrating social, economic, and political dimensions.

The Latin America science is still strongly influenced by foreign interests, except in those countries investing significant proportions of its annual budget in research and development (e.g. Brazil and Argentina, although the latter country is undergoing a sharp reduction since 2016). Moreover, countries with more internally funded research generated more long-term studies (Soler et al. 2018). Recent articles (Van Noorden 2014; Ciocca and Delgado 2017), including two study case presented here (Dangles et al. 2016; Soler et al. 2018), highlight two strategies on knowledge generation followed by Latin American countries. On the one hand, in Brazil, Venezuela, Colombia and Argentina, R&D activities are predominantly financed by public funds (e.g. national government, universities). These countries have national science and technology bodies (e.g. MINCyT—the ex-Ministry of Science, Technology and Productive Innovation, Argentina, CONICET—the National Council for Scientific and Technical Research, Argentina, CONICYT—National Council for Scientific and Technological Research, Chile, MCTI—Ministry of Science, Technology, Innovation and Communication, Brasil) that invest in human resources training, scholarships and projects and prioritise research related to specific national priorities (Ciocca and Delgado 2017). Several factors explain the success of Brazil in R&D: a deliberate state policy to improve postgraduate education and research, a planned and guided way with dependable public funding, and the institutionalisation of a systematic evaluation process (Neves 2007). In Argentina over the past decade, CONICET (the

National Scientific and Technical Research Council) has prioritised funding national scholarships for graduate study but also providing financing for short research periods abroad for Ph.D. students and postdoctoral researchers.

On the other hand, funding from the USA and Europe is still an important source for R&D in some countries of the region (Salager Meyer 2008). Soler et al. (2018) did not find internally supported studies in Bolivia, Peru and Ecuador regarding agroforestry systems in South America. In such places, scientific-technological development depends on external financing but is also conducted by foreign researchers and institutions. This weakness has been attributed to the lack of enough trained researchers, equipment and technical supplies (Holmgren and Schnitzer 2004). Latin American publications with more European Union and US funding tend to be led by European or North American authors, as occurs in other countries and multiple disciplines (Salager Meyer 2008). It is rather obvious that richer countries can invest more resources in science and therefore account for the most significant number of publications. The point is what kinds of recommendations or conclusions foreign authors highlight on the basis of their scientific results from studies in Latin America. According to Soler et al. (2018), scientific articles regarding agroforestry systems developed in South America territories but supported by external funding and authored by foreign researchers do not provide science-based recommendations. Only a few cases of foreign-led studies in Bolivia, Ecuador and Paraguay formulated recommendations, e.g., oriented towards conservation and management of local tree species, smallholder-oriented forestry and growing trees to generate rural income and rehabilitate degraded lands with the participation of smallholders and indigenous communities (see references in Soler et al. 2018).

Some countries depend almost exclusively on scientific collaborations with the Northern hemisphere to boost scientific production. Peru is the country with the best citation rate in South America because most publications have European or North American co-authors (Van Noorden 2014). In the same way, Ecuadorian scientists publish mostly through collaborations with researchers from outside the continent (Soler et al. 2018). Finally, although Dangles et al. (2016) recognise the low percentage of studies led by Latin scientists they never question why Europeans are highly interested in studying Latin America territories. LAC is an excellent reservoir of biodiversity, and therefore, Latin American territories are more attractive for investment in scientific research. We believe that the dependency mentioned above could be understood in different ways. One possibility could be the preferences of local researchers in publishing with foreign authors and the ability to generate collaborative networks with foreign institutions. Another possibility is that the lack of infrastructure and human resources necessary to develop high-level research independently forces Latin American researchers to resort frequently to collaborative networks. However, cooperation programmes promoted by Europe and North America still fail in one important objective: lack of research coordination and building capacities in the LAC region to promote academic excellence and productivity in situ (i.e. supporting research initiated by investigators in periphery countries).

### **3.2 *Language Barrier***

The bulk of knowledge regarding natural resource management in Latin America is published in English, presenting a language barrier for Latin American scientists, as the so-called ‘international’ or ‘core’ journals do not belong to this region. This indicates, on the one hand, the growing acceptance of science produced in Latin America in top-tier journals (Holmgren and Schnitzer 2004). The encouragement and funding from various international organisations (e.g. GEF—Global Environment Facility, FAO—Food and Agriculture Organisation of the United Nations, TWAS—The World Academy of Sciences) also help to increase international scientific, technological and academic cooperation by those in the region with centres of excellence in the North and South hemisphere (e.g. TWAS-UNESCO Associateship Scheme). On the other hand, the dominance of English may be evidence of the effect of journal rankings derived from the Science Citation Index (SCI) (Vessuri et al. 2013), and the competitive pressure under which Latin American scientists (or any ‘peripheral’ region of the world) operate if they wish to elevate the reputation of their research—they need to publish in high-impact, high-prestige journals, and such journals are mainly in English and reluctant to publish highly specific local studies. The current challenge is to find a research strategy that supports the improvement of the level of science in Latin America while preserving the possibility of addressing problems relevant to the region.

### **3.3 *Conflicting Priorities Between Local and Foreign Scientific Agendas***

The priorities that define the scientific agenda worldwide have been changing as ‘fashion issues’ (e.g. the IUCN initiative Countdown 2010 to save biodiversity) and climate change is the subject that undoubtedly attracts more funding, human resources and international interest of the developed countries. However, at the same time, there is a discrepancy or disconnection of interests between the international priorities defined by these countries and the regional needs or country interests.

In Argentina, the National Science, Technology and Innovation Plan (Argentina Innovadora 2020) is the instrument through which the country establishes the scientific, technological and innovation policy guidelines until 2020: agro-industry, engineering and industry, health and medicines, environment (meteorological services, water resources, environmental remediation and waste management), development and social technology. Similarly, in Chile, CONICYT has the National Fund for Scientific Development in Priority Areas (FONDAP). This program supports research centres in order to promote high-impact scientific research within priority areas in Argentina that respond to strategic problems of great relevance to the country. Moreover, the recent Ministry of Science and Technology of Chile (created in August 2018) aims to guide strategic priorities for public spending in science, technology



and innovation, and criteria, goals and indicators for monitoring and to evaluate the performance and development of the system in the medium and long term (Law 21105). Bolivia has decided to structure a national policy in science, technology and innovation as one of the pillars for the transformation of the productive matrix. Thus, the Vice Ministry of Science and Technology prioritises research lines and programs in agricultural development, industrial and manufacturing transformation, local and ancestral knowledge of indigenous peoples, natural resources, environment and biodiversity, energy, mining, health, information technologies and communication. In many cases, environmental issues as mitigation of climate change are addressed as transversal rather than be considered as a priority topic in itself.

However, at the regional level, the absence of a common scientific research agenda is perceived. We understand that situations such as this could hinder access to financing for scientific research for the entire region. What is worse, this situation could weaken even more countries with a less consolidated internal research system. Europe is the primary donor for research and development cooperation in Latin America and the Caribbean (LAC) and is a key promoter of regional integration (Dangles et al. 2016). However, the topics on which Europe allocates scientific funding do not always coincide with topics identified as priorities by Latin American countries. For us, it would be interesting to question whether the knowledge generated by foreign research with foreign funds are true promoters of scientific progress and development in Latin America. Latin American countries are also concerned about poverty reduction, so regional priorities focus on strengthening local producers, adoption of new technologies, water resource management, land tenure, and production schemes with added value.

Some urgent issues prioritised by international research agendas also coincide with local needs (e.g. food production and quality), but many other cases do not. For example, there is a worldwide consensus that agriculture and forestry are vital sectors for meeting the challenge of climate change due to their potential for *C* capture and accumulation (Montagnini 2015). Although climate change is a global priority issue, its approach from the Northern hemisphere does not contemplate the reality and the local interests of the countries in Southern hemisphere. While the Northern countries are interested in mitigating and/or reduce the effects of global warming, the countries of Latin America have expressed the need of adapting the use and management of natural resources while maintaining local production of goods and services. Such differentiation was declared in the Paris Agreement (2015) which recognises different realities of developed and developing countries. The agreement (Article 4.1) states that developed countries should continue to lead efforts and adopt absolute emission reduction targets for the economy as a whole while developing countries should continue to increase their mitigation efforts (Carlino 2015).

Unfortunately, scientific collaborations within South America are scarce. The region was one of the most dynamic players in the exchange of knowledge and experiences via South–South cooperation. However, since a few years ago, the cooperative initiatives decreased due to underfunding in R&D programs in some countries (e.g. Argentina). Increasing such cooperation could be the key to fostering regional integration and generation of regional public goods.



An interesting focus, in cases such as Brazil, is to observe whether the orientation towards conservation as a main element of its research agenda responds to local interests and priorities or is oriented towards addressing the 'fashion issues' identified as central for international cooperation centres. The approach to questions like the one mentioned is of great relevance, especially in a country like Brazil, the main Latin American recipient of international research cooperation flows.

### ***3.4 Gender: Visibility, Participation and Equal Opportunities***

Although the interest of gender studies is not new, in recent years, they have undoubtedly emerged as one of the major topics of debate, proliferating in different fields of science. In this sense, from the processes of construction of knowledge, the role of women occupies a particular space. Both from the contribution to traditional knowledge and the scientific perspective, the issues related to visibility, participation and equal opportunities represent a point of relevance analysis.

Regarding visibility, although recent years have seen a series of new practices that imply new positioning, redeployment and visibility of the role of women, certain traditional assumptions in social discourse and educational practices are maintained (Fernández Rius 2005). Lobato de Magalhães (2018) expresses that, historically, many women have developed 'invisible' careers in the field of science and that this is very likely to continue today. In this sense, Macaluso et al. (2016) demonstrate significant gender disparities in contemporary labour roles in science. Women are more likely to earn authorship from performing experimental work, while men are typically associated with conceptual work and contribution of resources. It is important to understand not only how many, but also, in what ways women contribute to science. For this, these authors propose contributorship data—and not just authorship data—as a key reflection of our understanding of gender disparities in science. This shortcoming is also observed in traditional knowledge and the role that women have within it. Women find complications in making their voices heard, participate in decision-making, influence the allocation of local resources and are usually under-represented in agencies and institutions linked to local ecosystems (Setyowati 2012).

In general, in Latin America, the situation differs not only from country to country but also from within it. In some countries such as Venezuela, it is noted that although women made significant progress concerning the number achieving an undergraduate and postgraduate degree, this did not necessarily mean advances in gender equality in higher education and research positions (Vessuri and Canino 2005). This is a frequent issue also in countries such as Brazil, where the proportion of women is inversely proportional to the professional hierarchy. In this country, although women outperform men in obtaining the university degree, in research centres and institutions of higher education, there is a predominance of men (Tabak 2005). This gap can be problematic due to higher education, and research are typical areas of scientific knowledge construction. Additionally, Setyowati (2012), referring to traditional knowledge about forests, points out that even in countries where laws promote equal

opportunities, women find it difficult to access control, resource management and complementary services such as extension programs and training.

Undoubtedly, the respect for women's scientific and traditional knowledge, the increase in the visibility of their role in science and the generation of equal access to knowledge opportunities between men and women are key elements in the approach and strengthening of the Latin American science. At the same time, the claim of traditional knowledge is a source of opportunities for Latin America, which has a particular wealth in this sense and could turn this element into one of the engines of the construction of properly Latin American knowledge.

## 4 Conclusions

Latin American countries have resorted different strategies to expand scientific research in their territories. Some of them delineate state policies on R&D, while others deepen collaborations with foreign countries to counterbalance the lack of internal financing, trained people or infrastructure. In any case, a lack of regional unity that strengthens cooperation among Latin American countries is evident. Such regional union would be a clue to define a scientific agenda and to streamline its implementation, thus strengthening the governance and safeguarding of local natural resources. Knowledge generation, science and the governance of natural resources must be tackled with a gender perspective. The growing contribution of women demonstrates the current intention to build scientific knowledge, as well as the management of resources, in a more participatory manner. However, the recognition of women in scientific work remains linked to a disciplinary issue. The contribution and recognition of women researchers are one of the main challenges to achieve gender equality. It would be desirable that the political, economic and socio-environmental conditions imposed by the current global change strengthen the points discussed in this chapter to achieve unity and scientific autonomy in Latin America.

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# Chapter 5

## Identity-Based Cooperation in the Multilateral Negotiations on Climate Change: The Group of 77 and China



**María del Pilar Bueno**

**Abstract** This chapter analyses the cooperation in multilateral negotiations on climate change among developing countries, focusing on the Group of 77 and China, based on a constructivist approach of International Relations. Constructivism identifies how the formation of identities affects the Southern alliances, in contrast to other theoretical approaches of IR mainstream that rely on the material elements as a way of explaining actor behaviour and regimes evolution. Constructivism considers that these material aspects are significant as they compose, together with the ideational aspects and interests, the social structure. Therefore, this chapter states that the idea and construction of a ‘South’, as a space of multidimensional cooperation where the developing countries, with their multiple material and historical differences, find common positions based on all the elements of the social structure, is the source of the G77 and China cooperation and strength. This ‘South identity’ is closely linked to poverty eradication and other development dilemmas that have a concrete expression with regard to the adverse effects of climate change. The chapter makes specific emphasis in Latin American countries of the G77 and China, which is composed of all the countries of the region, except for Mexico.

**Keywords** Climate change · Negotiations · Constructivism · Identity

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## 1 Introduction

This contribution argues that climate change is socially constructed beyond a collection of facts such as temperature or extreme weather events. This approach from constructivism of International Relations tends to clash with traditional solutions of collective action problem. As stated by Onuf (2007) if the problem of the commons lies in the unintended consequences of the rational choices, it seems to be that only an agreement can forgo individual choices. Moreover, since climate change is defined as a global dilemma or problem, a global agreement should be conveyed in order to provide solutions at this scale.

However, it is not only a problem of regimes solutions and regime structure. Much debate took place between the top-down and bottom-up architecture of multilateral architecture, in particular at the United Nations Framework Convention on Climate Change (UNFCCC) since its adoption at the Rio de Janeiro Summit in 1992 (Rayner 2010; Hare et al. 2010; Leal-Arcas et al. 2011; Green et al. 2014). From different theoretical perspectives, has been stated that bottom-up approach according to the Paris Agreement design can provide the flexibility and large-scale social change needed to overcome a state-centric design full of dichotomies: public versus private; developed versus developing countries; state versus non state actors; public finance versus mobilization of resources; mitigation versus adaptation, among many others. Not only this, much work has been done regarding the design, as well as the effectiveness and robustness of climate change regime by itself and in comparison with others such as the Vienna Convention and the Montreal Protocol (Oberthür 2001; Canan et al. 2015).

Many others focused their work on the importance of improving the predictability of negotiations by reducing the number of references for negotiation (Lax and Sebenius 1991; Dupont 1996; Bhandary 2015). Likewise, recognizing the asymmetry of power relations—material aspects—at the international level and on the climate terrain, the structuralist paradox is posed by which weak states can negotiate with stronger positions and obtain more significant benefits, as a result of the association (Betzold et al. 2012; Habeeb 1988; Zartman 1997; Bhandary 2015). Thus, institutionalism has been successful in delivering the message in terms of the benefits of international regimes formation and even when they are not effective enough to accomplish their objectives, the problem identified is not the theory behind, but the design or the implementation of rules.

For constructivism of IR regimes matter but they are not the silver bullet of the collective action dilemma. That is the main reason why the United Nations Framework Convention on Climate Change (UNFCCC) as a territory of negotiations, disputes and solution construction, continues to be valid but not unique from a climate change constructivist analysis.

Therefore, in this chapter, we build upon the common interest in international cooperation in multilateral negotiations on climate change, but the focus is to analyse identity formation among developing countries or the so-called South identity.

Similar to what happens with the study of international regimes, coalitions and alliances theories acknowledge what constructivism name a material approach of social reality. Constructivism identifies how the formation of identities affects the Southern alliances, in contrast to other theoretical approaches of IR mainstream that rely on the material elements as a way of explaining actor behaviour and regimes evolution. Constructivism considers that these material aspects are significant as they compose, together with the ideational aspects and interests, the social structure.

Therefore, this chapter states that the idea and construction of a South, as a space of multidimensional cooperation where the developing countries, with their multiple material and historical differences, find common positions based on all the elements of the social structure, is the source of the G77 and China cooperation and strength. This ‘South identity’ is closely linked to poverty eradication and other development dilemmas that have a concrete expression concerning the adverse effects of climate change.

These arguments are also valid regarding regional South–South cooperation. Thus, we make a trial in contributing to the study of climate change cooperation between Latin American countries, collaboration long debated to the extent that the region has not managed to articulate a unique position in the negotiations at the UNFCCC.

The chapter starts by making a short contribution related to identity formation from a constructivist approach of IR. Then, we study G77 and China as identity representation of the South climate cooperation. The last part of the chapter is concentrated in the role of Latin America and the Caribbean and its system of climate solidarity: its strengths and weaknesses.

## 2 Identity and Constructivist Approach

Pettenger (2007) has pointed out the three main constructivist principles regardless the many differences between the authors aligned with this approach: the relationship between material and ideational forces; the agent/structure dilemma and the relevance of processes and social change. Additionally, we can mention the role of institutions and norms and the state-centrism features. What Pettenger so name principles are key ontological differences and breaking points with the mainstream of IR.

As expressed by Pettenger (2007), the constructivism denies the ontological primacy of material forces over the ideational ones. In terms of Wendt (1999), and referring to the mainstream, the problem is that neoliberalism shares the Waltzian concept of structure. This concept is intrinsically materialistic since even recognising the importance of ideas, do not realise that power and interests are its effects. For this reason, Wendt affirms it is necessary to re-conceptualise the structure as an idea, understanding it is more a social phenomenon. However, it is inaccurate to say that Wendt focuses his criticism to Waltzian neorealism in its state-centrism, but instead argues that both this approach and liberal neo-institutionalism present a materialist ontology (Wendt 1999). In sum, with ideational forces, actors gain agency as the ability to make choices as social beings interacting within the structure (Pettenger 2007).

In this way, agent and structure are co-constituted and can produce both cooperative and conflictive relations.

Constructivism assigns prominence to change as a result of the idea of the social construction of phenomena including social reality. Therefore, Cox (1981) states that the fact that neorealism considers social variables as immobile and generates obstacles in the possibilities of change in the system. Hence, it supports an International System mainly unchangeable and unfair. That is why the critical theory of IR has anchored its assumptions in social change.

From this perspective and unlike Waltzian neorealism, the structure is found in constant change due to the dynamic relationship between the structure and the process, just as it happens with the agent and the structure. These are critical elements that enable social change.

There are different approaches to constructivism, in some cases, authors put some emphasis on material and non-material forces. In other cases, ideational aspects and their influence on material issues, which together make up the social structure, retain more attention when looking for explanations of behaviours, interests and identities of the actors, whether or not they are states. In these cases, ideas can be seen as a precondition for behaviours and interest construction, as well as the diverse identities of the actors (Wendt 1999; Copeland 2006).

Identities are cognitive constructions motivated by the actors that are in turn co-constitutive with the structure they make up, building and being constructed in the process of social interaction. This assessment enables a view of the social change to the extent that seeks explanations of behaviours and interests instead of focusing on the consequences of them. However, it does not presuppose an automatic change to the extent that, for it to occur, it must be institutionalised. It is institutionalisation, especially in Wendt (1999), a process of social internalisation rather than a material structure, an agency or a written or unwritten rule. Institutions are defined by the author as relatively stable sets or structures of identities and interests (Wendt 1992). For that reason, we understand UNFCCC as a territory composed of many identities of different types, including geographical, historical and political. A territory traditionally moved by dichotomies where the differentiation between developed and developing countries and their differentiated responsibilities and actions are the main feature of the architecture. Despite the efforts of the developed countries to erase the differentiation between Annex I and not Annex I Parties of the Convention, the Group of 77 and China and, in particular, some subgroups have upheld the principle of common but differentiated responsibilities (CBDR) as a pillar of the system. We cannot deny its divergences in terms of composition, membership and approaches, but common positions should be recognised, in particular, historical ones, such as adaptation and finance.

In a critique of constructivism, Purdon (2014) affirms that this approach is focused on incremental levels of awareness towards climate change as a result of climate science and from a moral responsibility. With which, the author asserts that constructivism does not explain the question about why the transnational norms of moral responsibility are insufficient to generate a response to climate change. This perception from Purdon could imply a moral view of constructivism. Constructivism can



afford to recognise the omission and the breach of written and unwritten environmental and climatic rules. The explanation of why this occurs lies in the internalisation of the norms in the international society. In Wendt's view, the low internalisation seen as Hobbesian climate culture can advance asymmetrically between the actors towards Lockean and Kantian cultures as a product of the gradual and heterogeneous internalisation of new behaviours and interests. This process with different times inside and outside the states coexists with interests and perceptions of the legitimacy of the variable norms.

Analysing the national relevance assigned in the USA, Germany and the UK to international environmental standards and in a normative constructivist analysis named after Pettenger (2007) and Cass (2007) also agrees that both affirmation and compliance with norms can occur as a result of coercion or as a result of persuasion, a notion similar to what Wendt identified as legitimacy. Now, Wendt assumes that the advance of history is necessarily progressive. It means that once the international society internalises a culture, there will be no regression.

Some might say that the recent defection of the USA constitutes a setback. However, we understand that different interests, perceptions and therefore cultures related to climate change have survived and persisted within the USA that also transcend geographical frontiers. However, those actors who have already internalised a change of culture in Wendt's words hardly go back on their interests and identities.

In this regard, we see that various state and non-state actors from the USA have continued their fight against climate change impacts and energy transition related to mitigation contribution of the USA even when the federal administration has announced the withdrawal of the Paris Agreement.

With this, we are interested in applying this look to analyse an object that has traditionally been viewed from the perspective of liberal institutionalism, such as political and regional alliances within the multilateral climate negotiating process. In this regard, we are preparing to analyse the causes that motivate the continuity of the cooperation of the developing countries in the Group of 77 plus China as well as, at the regional level, the atomisation of groups in Latin America and the Caribbean.

### **3 The G77 and China as Identity Representation of the South Climate Cooperation**

It is not by chance that the establishment of the G77 took place in the context of the first United Nations Conference on Trade and Development (UNCTAD) in 1964, a space formed by and from the developing countries as a common platform of efforts. UNCTAD and G77 pursued from their origins to combine common aspirations, unity and solidarity of the South, seeking the conformation of an own economic and social development agenda, in the context of the East–West conflict, but also of a world in the process of decolonisation with a growing number of newly independent developing states. These aspirations and common interests advanced in a programme of

South–South cooperation that was expressed in diverse agendas having as standards equity and justice, especially in international economic relations. This process of progress in the search for common positions in different agendas was accompanied by a constant increase of members until reaching the 134 countries at present.

The areas of interest that were established in the declaration of the seventy-seven countries agreed upon in Geneva in 1964 were reiterated and deepened in various documents, such as the Ministerial Declaration for the fortieth anniversary of the formation of the group held in Sao Paulo in 2004. In Brazil, the group not only recalled its foundational pillars and the need to achieve an equitable international trade regime, but also alluded to some of the many features of current cooperation, such as finance, foreign direct investment, capital markets, external debt, food, agriculture, industrialisation, intellectual property rights, social development, health, education, sustainable development, science, technology, information and communications and among many others.

Beyond the existence of the group as an articulator of the efforts of the developing countries, the category of South has been continuously discussed in the literature and whether the distinction between developed and developing countries maintains or does not apply anymore (Krasner 1989; Miller 1992, 1995, 1998, 2000; Kamrava 1993, 1995; Williams 2005; Berger 2004; Najam 2005). In this sense, we have argued that the persistent recurrence to its conceptual function from the theoretical debate evidences its actuality (Bueno 2013). Much more is evidenced by the diversification of the South's agenda parallel to the international agenda, with the G77 constituting the first reference space in which at least macro common positions are sought.

Taking into account the chosen theoretical matrix, we are interested in analysing some of the group's identity conditions that explain the fact that developing countries continue to seek in the G77 and China a cooperation territory in climate negotiations.

Some authors have indicated the automarginative logic of the group concerning the category of South as well as the debates about the qualification of these countries as Third World, underdeveloped and developing (Najam 2005). This has generated a process of collective identification behind the developed countries that supposedly reached a stage that the developing countries are still looking for. In this way, it involves a tacit qualification where the former operates as leaders that condition the way forward and the latter as mere followers and in some cases as proselytes. This logic of exclusion entrenched in the theories and discourses of the North and the South entails dispossession and self-inflicted renunciation of power as well as to the capacity to build it. The process described is endorsed, in turn, by theories of power anchored exclusively in material conditions, not promoting change to the extent that they understand that only the accumulation of certain specific capabilities such as the military and economic are liable to invest the States as relevant actors of the International System. This position would entail and condition a dynamic of collective disempowerment that, nevertheless, does not coincide with reality. Regarding climate change negotiations, this material conditionality could be expressed in the determinism of mayor emitters as the most important players (Bueno and Yamin Vázquez 2017).

Another issue very much claimed regarding the South and the G77 as a space for the articulation of developing countries' interests is the heterogeneity of its members (Harris 1986; Caparros et al. 2004; Roberts 2011). From this perspective, cooperation is more viable if members have similar conditions (Constantini et al. 2007), especially referring to traditional economic indicators. In this sense, some authors have argued that the basis of the continuity of the G77 lies in the homogeneity of interests concentrated in three aspects: the validity of shared problems with different degrees of political vulnerability, poverty and economic underdevelopment (Kasa et al. 2008). These qualities generate some dilemmas when analysing the impact of the growth of some of the countries in the group, such as China, India or Brazil in comparison with others. It could be thought, therefore, that they can operate as new leaders or Sherpas in the development process or that they can deepen the heterogeneity of the group.

We wonder how heterogeneity constitutes an identity element of the G77 including social, economic, political and environmental indicators. This does not mean that identities are unchangeable, in fact, identity construction is a social process in motion that cannot be considered immutable. Considering the question about whether Chinese, Indian or Brazilian growth can officiate as a dynamic element of confidence among other members, in the sense of a demonstration effect, we do not have an answer. Since the identity is based on elements that include material capabilities but also other ideational aspects that give meaning to the former, neither economic nor social progress is denied, but the possibility of programming that other actors may want the same is discarded, since their starting points, histories, trajectories and needs are different.

In the UNFCCC scenario, the G77 and China have operated as a framework for the construction of power especially in the identification of some strategic positions of the group. It does not constitute a platform to resolve all the issues, but it allows framework political consensus, as well as build and maintain historical battles of the developing world in terms of climate change, such as adaptation, finance and other means of support. This does not take away other vital aspects such as agriculture, response measures and technology, coinciding with what was stated in the 2005 Declaration in Sao Paulo.

At the same time, important differences persist among members regarding the concept of responsibilities and their relation to capacities, as well as especially regarding vulnerability and special needs. Although the group has granted preferential treatment to small island states (SIDS) and the less developed countries (LDCs), it has not consented to include Africa in such a group, despite its many and heated attempts at the Paris (COP21) and Marrakesh negotiations (COP 22). This pursuit has the main background to have achieved this recognition in the Green Climate Fund (GCF). This debate was reflected in the Paris Agreement through greater flexibility in the presentation of national determined contributions (NDCs) by these two groups of countries (LDCs and SIDS).

Focused disagreements referring to vulnerability have not radically altered the group's unity in other agenda items. Reaching common positions is an arduous

process due to the heterogeneity of interests and the big number of actors. However, when the level of alignment is achieved, it is usually broad.

The existence of subgroups or alliances, whether regional or political, that coexist within the G77 and China are part of the heterogeneity, and for some observers is a sign of weakness. For others, they operate as a complement to the positions reached in the large group (Chasek and Rajamani 2003). We understand the subgroups can reduce the number of actors in the negotiation tables of the G77 and China when it is necessary to take decisions, as well as help to organize positions in terms of clusters, identifying critical points for the different subgroups based on the principle of no harm, main pillar of the Southern climate cooperation in the group.

The principle of no harm has had different interpretations and meanings in environmental regimes. It is related to principle 21 of the Stockholm Declaration of 1972 and principle 2 of Rio Declaration of 1992 which urge not to cause damage to areas beyond national jurisdiction (Khan and Roberts 2013). Schroeder and Okereke (2013) also argue that there are many references to the same principle applied to reducing emissions from deforestation and land degradation (REDD plus) projects in terms of no harm to local communities. However, some authors have recognised that this principle extensively applied to environmental law and regimes was almost replaced by the principle of common but differentiated responsibilities in climate change multilateralism. Concerning developing countries cooperation within the G77 and China, this principle refers to the practice of developing countries of avoiding open opposition to an interest expressed by another country or group of developing countries. However, this rule has its limits when there are red lines between the subgroups that opposed. In those cases, the resolution is political and of the highest level.

In this chapter, we address the situation of Latin America and the Caribbean in recent multilateral climate change negotiations, recognising their atomisation and seeking explanations from theory in terms of identity formation and change.

## **4 Latin American and the Caribbean and Its Solidarity System**

The Latin America and the Caribbean region has been the centre of various debates regarding the difficulty in establishing permanent cooperation mechanisms, especially in political matters. This includes the debates around regionalism and how the region sought integration from the European model, which often resulted in disappointment.

The issue of solidarity has been closely linked to the debate on homogeneity versus heterogeneity and its impact on cooperation. The common colonial past anchored to a greater extent in Spain and to a lesser extent in Portugal, Holland, Great Britain and France has left an important linguistic community. Furthermore, as Lander (2001) points out, both the theories and the predominant forms of thought in Latin America that come, in many cases, from Europe and/or the USA, assume an ethnocentric and

colonial role. These are the cases of liberal independence thinking, conservatism, positivism, Marxism and neoliberalism, among others.

Nonetheless, a confluence of Latin American thought has been progressively forged, claiming identity, traditions and common past, both colonial and pre-colonial that belongs to the original people of America. All these experiences define Latin American identities, which overlap political demands on marginalisation and inequality and reproduce ethnocentric models linked to the Northern concept of development.

In addition to the debate on heterogeneity and diversity, attention is usually drawn to the fact that Latin America is a democratic area, a zone of peace and one that is prone to integration and consensus (Rojas Aravena 2013). These aspects also forge Latin American identities that, despite claiming to be a land of peace, dangerously increase the level of intra-national violence (Salama 2008).

At the same time, the differences persist, especially as regards how Latin American elites perceive the way to achieve development, which in some cases adheres to concepts of equity and redistribution, as was the case of the governments included in the so-called left turn. While in other cases, it seeks an international opening to markets, foreign investment and the expansion of trade with either traditional regions such as the USA and Europe or with Asia, especially with China with whom the commodity trade represented a significant factor in the boom of the last decade.

Thus, both homogeneity and heterogeneity shape the American and Caribbean identities. In terms of how this diversity and parallelism of pathways and knowledge has an impact on climate debates, it should be noted that Latin America and the Caribbean represent between 7.20 and 8.31% of total greenhouse gas emissions at 2014 values (either including or not including sector emissions, land use and afforestation). Also, its population is close to 8% worldwide.<sup>1</sup>

Debate on how material sources feed climate change conversations and Southern cooperation includes the contribution of the region to total greenhouse gas emissions, as well as the profile of the main regional emitters. The three main regional issuers (at 2012 values and using the Climate Data Explorer (CAIT) of the World Resources Institute) are Brazil, Mexico and Argentina, in that order. However, when referring to emissions per capita, this position is strongly modified, given that some of the small island states occupy the first positions (Table 1).

Brazil is responsible for 32.35/ 39.97% of regional GHG emissions (excluding or including LULUCF). Its profile is below the regional and global average excluding LULUCF emissions and above the average including LULUCF both in regional and global terms. Mexico is the second regional emitter with 23.13/ 16.42% of GHG emissions in Latin America and the Caribbean and it is below the regional average in per capita emissions, either including or excluding LULUCF. Finally, Argentina is responsible for 10.8/ 8.88% of Latin American and Caribbean emissions of GHGs and is above the regional average of per capita emissions both including and excluding the land-use sector. It should be noted, in the latter case, that the Latin American and

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<sup>1</sup>Data collected from CAIT, available in [www.cait.wri.org](http://www.cait.wri.org).

**Table 1** Main emitters of Latin America and the Caribbean (2012)

Country/region	Total greenhouse gases emission excluding LULUCF	Total greenhouse gases emission including LULUCF	Total greenhouse gases emission excluding LULUCF per cápita	Total greenhouse gases emission including LULUCF per cápita
	MtCO <sub>2</sub> e	MtCO <sub>2</sub> e	tCO <sub>2</sub> Per capita	tCO <sub>2</sub> Per capita
Latin America and the Caribbean	3130.03	4560.99	5.18	7.55
Argentina	338.00	405.03	8.23	9.86
Brazil	1012.55	1823.15	5.10	9.18
Mexico	723.85	748.91	5.99	6.20
World	43,286.10	46049.41	6.20	6.60

Source Own elaboration based on data from CAIT

**Table 2** Sectorial emissions in Latin America and the Caribbean (2012)

Country/Region	Energy	Industrial processes	Agriculture	Waste	LULUCF
Latin America and the Caribbean	1835.31	135.10	901.42	241.41	1430.96
Argentina	205.73	9.70	106.73	15.83	67.03
Brazil	469.73	53.88	444.41	44.54	810.59
Mexico	490.69	40.54	83.44	109.20	25.06

Source Own elaboration based on data from CAIT

the Caribbean average of GHG per capita emissions in relation to the global one is already high.

It is possible to distinguish some significant differences between the three main emitters of the region from a sectoral point of view, as it results from Table 2. The sectorial pattern of emissions at the regional level is given by a distribution of 40% of emissions from energy, just over 30% of the land sector, 20% of agriculture and between 3 and 5% for industrial processes and waste, respectively. This pattern is reproduced more faithfully for the Argentine case, with the only difference of alternating the land sector with agriculture. However, it must be taken into account that the CAIT numbers do not coincide exactly with the Argentine inventories of the same date and that, in turn, the measurements from 2016 involve a change in the methodology of measuring agriculture emissions that reduces its participation in the total of emissions.

The profile of Brazil alternates the main emitting sector to land (45%), with energy and agriculture involving 50% of total emissions. The most significant difference in the Brazilian profile compared to the rest of the region lies in a more diversified energy matrix.

The Mexican case is radically different, as 65% of its emissions come from energy and the sector of waste has bigger participation (15%) in comparison with the other countries of the region. The difference in the emissions pattern of Mexico is also reflected in the smaller participation of LULUCF and agriculture.

From a material point of view, the numbers expressed could show some reasons for the pre-2016 Argentina–Brazil partnership in the climate change negotiations in terms of agriculture. However, with the formation of ABU (Argentina, Brazil and Uruguay) alliance in 2016, it was striking that the only two areas in which the group did not achieve a common position were agriculture and markets. The explanations must go beyond the material aspects, given that the sectoral aspects specified in terms of emissions have not changed. Nor has the identity relevance of the land sector changed for countries like Brazil and Argentina and in fact, it also applies to Uruguay. However, Argentina, with the change of government and political sign, stopped paying the political price to block discussions related to mitigation in agriculture. In this sense, Argentina moved towards a position that more closely resembles the Uruguayan.

The same material perspective would allow understanding why Mexico cooperates more with developed countries, from its participation in the Environmental Integrity Group (EIG) with a more industrial-type issuer profile when analysing the energy sector. Mexico no longer shares the developing countries grouping (G77). Unlike Chile, when Mexico acceded to the OECD, it stopped participating in the G77 and China.

The material perspective is not enough to explain cooperation and comprehend the reasons why countries decide to start or stop participating in groups, alliances or coalitions with regional or extra-regional actors.

Coming back to the Argentine case, this country emissions profile has not changed significantly since it chose to participate in the Like Minded Developing Countries (LMDC) group to Paris and then decided to partner with Brazil and Uruguay since 2016. What changed was the management of the national government that considered the first group was a burden on their interpretation of international climate negotiations. It should be noted that former political opposition, in the context of the Paris negotiations, now the government, interpreted LMDC's positions and countries as unwilling to assume international climate responsibilities. This image, supported by the idea that Argentina had had an active profile in the negotiations until the early 2000s, cultivated the need for 'change' and 'return', in some way, as the general motto of the new government also applied to encompass climate positions in the UNFCCC.

So, in Argentina, as in many other countries, there are forces that promote more ambitious climate actions at the international level as a way of pushing decisions in the domestic sphere, together with other forces that could be seen as backsliding with varied perceptions about climate change. Some continue to identify climate action as contrary to development policies, others refute climate science and others prefer to build a refuge around agriculture activities or carbon emissions from energy sector looking for others to take the lead. However, in a specific moment, one discourse gains predominance over another one and that is what Pettenger (2007) classifies



as discourse-oriented constructivism. The same author also inquires how certain dominant norms and discourse gain power and knowledge in a certain moment? This idea provides a classification of constructivism in the norm, discourse and structure oriented (Burch 2002).

As Pettenger (2007) affirms, climate change must be understood from the context of social settings. These social contexts allow to explain why certain countries question climate science like the USA, while in Germany climate change knowledge is interwoven with nuclear debate (Cass 2007); Dutch climate change policy is based on sustainable development norms (Pettenger 2007) and Japanese policy was interlaced with domestic norms related to energy efficiency, economic growth, international cooperation and environmental protection (Hattori 2007). Thus, social settings are critical to understanding the development and evolution of climate change debate, norms, discourses and policies.

Different elements that contribute to the formation of Latin American identities that lead to participation in one or another alliance or negotiation groups in the UNFCCC. These include material aspects such as emissions profile, but also immaterial aspects, of an ideational nature that help to interpret the former. From pre- and post-colonial identity constructions, through the relationship with extra-regional actors, changes in political elites, the progressive but asynchronous increase of awareness towards the effects of climate change, climate science and social perceptions about vulnerability and risks are just some of the many elements to take into account when rethinking why Latin America is atomised in the multilateral climate negotiations.

We wonder why would a country like Brazil traditionally reluctant to negotiate in subgroups that could limit its margins of manoeuvre decided to join with Argentina and Uruguay in the context of the implementation of the Paris Agreement? It is true that Brazil continues to participate in the G77, but the traditional positions of this group as adaptation or financing are not the primary interest of Brazil in the multilateral negotiations, but other issues such as REDD plus, markets, mitigation and transparency to the extent that it affects the last two. It is true that it also participates in BASIC, but it is not a negotiation group that discusses individual agenda items but a macro-political consensus developed in light of COP15 in Copenhagen and the risk that the burden of climate action will migrate from developed countries to the main emerging countries (Bueno and Pascual 2016).

There are traditional, historical and geographical aspects that allow us to think of ABU as a possible option for Brazil in 2016. However, still, we have the question on why to gamble autonomy when Brazil always played alone and achieved good participation in the themes of its main interest? There are contextual aspects of political, economic, social and institutional weakness that generated a substantial increase in domestic and international criticism against Brazil climate policy. With the arrival of Dilma Rousseff to the Presidency of Brazil, there is a change in the development model based on her interpretation of international conditions with conservative–regressive consequences in environmental policy and particularly climate change. This includes not only the support of the government for the reform of the Forestry Code, but the deepening of support for fossil fuels, the increase



of benefits to the industry and the promotion of consumption, as a product of its support for economic growth. This was evidenced by Viola and Franchini (2014) in the fact that Brazil, as host of the Rio + 20 Summit, supported fundamentally the economic and social pillars and the agreement, undermining the environmental one, in the context of sustainability dimensions (Bueno 2017).

If the ABU alliance is analysed correctly, the topics in which common positions were reached and those in which no, it is possible to affirm that Brazil has not seen its main positions eroded. In terms of mitigation and transparency, there are ABU positions, but they are led by Brazil based on the group's rotating leadership system. With which, rather it has achieved an alliance for the defence of its interests where Argentina and Uruguay have not had significant differences. While in markets and agriculture, there is no common position, thus Brazil can continue to play on its own. We understand that, as recognised by Pettenger (2007), starting with Brazilian ideational forces, the country interprets it could gain agency being more cooperative with its neighbours in the interaction within the structure. It does not mean it could come back to less cooperative scenarios if it interprets agency power gained is not enough.

The case of Mexico is significant and striking at the same time, since it still considers itself a developing country but has left the G77 and China after its entry into the OECD and negotiates in the UNFCCC with the only group made up of countries both of Annex I and non-Annex I (Environmental Integrity Group, EIG). This implies that Mexico understands that the distinctions between annexes are not necessarily applicable to the negotiating process anymore and that is a profound difference with the G77 and China. On the other hand, EIG is a group led by Switzerland that develops most of the interventions on behalf of the group, especially on sensitive issues such as mitigation, transparency, markets and financing.

It is also remarkable that Mexico's positions on means of implementation seem to be from the level of official information, not so distant from the G77. Perhaps one of the key differences lies in its greater acceptance of the mobilisation of private financing, which is not something that the G77 questions as a primary source, but rather a struggle for developed countries to comply with their public finance commitments. However, in other points such as transparency and mitigation, Mexico has had a position that some members of the G77 have interpreted as diluting the CDR principle. However, Mexico is not alone in Latin America and the Caribbean with this kind of proposals, during Paris negotiations, other groups, such as the alliance of small island states (AOSIS), composed by Caribbean countries and the Independent Association of Latin America and the Caribbean (AILAC), composed by countries of the Pacific Alliance, had mitigation positions closer to EU than to other developing countries. However, it does not mean that both AOSIS and AILAC, when negotiating adaptation, do not have clarity in their membership and support to the common position of the G77 and China.

Thus, Latin America and the Caribbean includes very diverse alliances, not only ABU, AILAC, AOSIS, EIG, but also the countries included in the Bolivarian Alliance for the Peoples of our America (ALBA) that also participate in the LMDC group.

Anyway, everyone—except Mexico—cooperates in the G77. The subgroups are seen as arenas for the construction of positions and interests that in many cases coincide with geographical, political and ideological affinities.

We still wonder why LAC has not achieved a single negotiation group in climate change negotiations so far? Despite historical environmental inter-ministerial cooperation in the region, it has not been possible for this cooperation to become a regional alliance, as happened with the African group. As we have already explained, the interpretations are very varied. Is that a weakness? Maybe. That is why the region only joins an external threat of significant dimensions such as the potential recognition of special needs and vulnerabilities in Africa. In the context of the Paris negotiations and currently during the first stage of implementation of the Paris Agreement, the region has been very specific in rejecting the recognition of Africa's special needs and vulnerability. This means that solidarity systems exist but that they focus mainly on the defensive scheme and the cooperative dimension of the G77 and China.

## 5 Conclusions

This is a work in progress on multilateral climate cooperation in the UNFCCC by developing countries, emphasising, first, the positions and identity formation of the G77 and China, and then in the Latin America and the Caribbean region. We were interested in studying identity aspects that affect the participation of the States in one or another alliance or group, seeking to banish ideas based solely on elements of a material nature, such as the emissions profile, the distribution of emissions by sector or per capita emissions, among others. These aspects are relevant but do not have an explanatory power by themselves. If this were the case, the participation in alliances would be stagnant, or its main variation would occur due to a substantive change in some of these aspects.

Most recent cases of changes in climate alliances in Latin America, i.e. Argentina and Brazil, suggest that countries can change its negotiating alliances or groups or participate in new groups because of many reasons of domestic and international nature if it is possible to make this distinction just for the analytical purpose.

The identity aspects are crucial to understanding the association and cooperation including climate change negotiations. The G77 and China is a group formed today by 134 developing countries that share a common history, at least, since 1964 and whose claims began in the socio-economic field and had been extended to other agendas. Despite the debates about the heterogeneity of the group and its segregation at certain moments of negotiation, it was a keystone to reach the Paris Agreement. Except for Mexico and Tuvalu, all the developing countries are included, and it has been critical to install political parity between mitigation and adaptation, the relevance of climate financing and other crucial means of implementation for climate action.

The analyses that opt exclusively or mainly to examine the supposed interests that the members of the G77 have in common, in the understanding the interests as derivatives of material indicators, forget the identity of the South and how the

countries consider it a platform of solidarity. For us, there is certainly common ground expressed in terms of development priorities, poverty eradication and common needs related to those that express themselves in these traditional common positions such as adaptation and finance.

Latin America does not negotiate as a single regional group in the UNFCCC, but the constituency of countries of Latin America and the Caribbean (GRULAC) only operates as a group of negotiation of candidacies. The atomisation in subgroups can be seen as a weakness and as a reflection of the diversity of the region and again of its interests, as was the case with some G77 analysis. We can also note that beyond the different emitting profiles and energy matrices, other identity elements that allow solidarity in the large group of the G77 but not in the GRULAC. The only case that is connoted by the GRULAC unit in the context of recent climate negotiations is the search to block Africa from being considered more vulnerable, together with other groups such as SIDS and LDCs. This could show that the LAC has a joint climate agenda underdeveloped. However, if the region has achieved progress in integration and cooperation processes and these processes involve environmental aspects: why is the climate agenda still lagging behind? Given that it is a provisional work, we understand that more research is required regarding these aspects, seeking to cross identity variables with political change, economic indicators, social perceptions and national and international contexts for specific cases.

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# Chapter 6

## Environmental Concern in the Global South: Tackling the Post-materialist Thesis and the Impact of Ideology



Patricio Yamin Vázquez

**Abstract** Academics have analyzed individual environmental perceptions for a long time. Researching on friendly attitudes toward the environment has progressively gained relevance as support for public policies on the topic. Since most of the literature deals with public opinion in industrialized countries, mainly the USA, the topic in the rest of the world has been generally overlooked. The main goal of the present chapter is to identify if drivers of environmentally friendly attitudes are the same in the North than in the Global South. Against this backdrop, the present work tackles the impact of political values on the levels of environmental concern in the developing world, with a particular focus in Latin America, by using worldwide survey data to test the most extended academic explanations and their resilience when they are applied in the Global South. Results of this work suggest that the effect of ideology is the inverse in the developing than in the industrialized world: while environmental concern is heavily associated with left-wing ideology in developed countries, and in the Global South it is linked with market-oriented and right-leaning attitudes. On the other hand, the effects of post-materialist values appear to be region-dependent, with a similar impact in Latin America to the observed in industrialized countries.

**Keywords** Environmental attitudes · Political values · Post-materialism · Public opinion

### 1 Introduction

Scholars have largely analyzed public opinion on environmental issues for almost three decades. Most of the studies, however, are focused on the drivers and contents of environmental attitudes in industrialized countries, particularly the USA and Western

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Europe. The Global South<sup>1</sup> has been generally overlooked and only included in cross-section studies where little reflection is done on the particularities of personal attitudes toward the environment in the developing world. During the emergence of climate change as a global challenge, the main focus was in industrialized countries since they were the main source of greenhouse gases, with little contribution of the rest of the world to the problem. However, economic growth of emerging countries over the last two decades and their subsequent rise of emissions changed the landscape. In this context, public opinion in the developing world is currently a surprising ignored topic in most of the academic literature.

The extensive research done in the Global North on public environmental concern allowed scholars to reach a tacit consensus on the best available explanations on individual behavior and consequently most of the academic work refers to similar sets of predictors. However, there is little evidence of the resilience of these explanations in the rest of the world due to the absence of studies focusing on identifying different effects by region.

Against this backdrop, this work will be focused on the impact of ideological factors on individual environmental concern. In this regard, the present chapter will suggest that ideology presents the inverse effect in developing countries than in the industrialized world. Whereas the definition of the left-right continuum is fairly clear and consistent in industrialized countries, it may be fuzzier in the rest of the world. This work will assume that a left-wing ideology favors governmental intervention in the economy, holds a pro-labor stance, and presents a defensive position toward economic liberalization. On the contrary, right-wing values are associated with pro-business, free markets, and a favorable stance on globalization. Consequently, while in the Global North supporters of left-wing values are expected to show higher levels of environmental concern, in the Global South environmentally friendly attitudes tend to correlate with pro-market visions, usually associated with right-wing ideologies.

In addition, I will also test the resilience of the post-materialist thesis which asserts that environmental concern only arises after individuals achieve physical and economic security. In spite of its relevance explaining environmental awareness in developed countries, the impact of post-materialist values has been put into question in the Global South by both academic studies and historical experience. The present work will also deepen on this relation. Results suggest that the effect of post-materialism is region-dependent and may be null in most of the Global South.

In order to test these hypotheses, the present work will perform statistical analysis of worldwide survey data. As a regional case study, I will also deepen in the effects observed in Latin America and the variation between countries. Even though it will be particularly focused on different impacts of ideology and values as drivers of individual environmental concern, I will also test the most extended academic explanations and their resilience when they are applied to the Global South. In order to

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<sup>1</sup>Defining the “Global South” is not an easy task. Terms as “Global South,” “Third World,” or “developing countries” have been often used indistinctly as synonyms. Even when different definitions coexist, most of them refer to “the Africans, Asians, and Latin Americans, that is the people of the countries located roughly in three southern continents and sharing a history of underdevelopment and colonialism (Braveboy-Wagner 2009: 2)”.

achieve the aforementioned goals, the work will be divided into three parts. Firstly, I will introduce the theoretical debate on ideology, post-materialist values, and public opinion on environmental issues. Besides, I will also summarize previous work on the topic to identify other relevant predictors to be included in the statistical models. Secondly, an empirical testing will be performed by using worldwide data by the World Values Survey. Since the present work seeks to tackle the possibility of different explanations by region, I will use multilevel regression models that permit to vary coefficients by the group. The work will be focused on the expected effects of ideology and post-materialist values by region, with a special focus in Latin America. Lastly, a set of final remarks will be presented, suggesting possible ideas for further research in the future.

## 2 Public Opinion and the Environment

### 2.1 *The Role of Ideology*

Ideological standings held by both leaders and voters have been a major factor predicting political behavior and subjective attitudes. Academic research on political parties and their stances toward the environment is abundant and provides strong empirical evidence pointing that left-wing political actors are prone to hold favorable attitudes on the topic. Different studies on political manifestos and leaders' statements consistently show this relation (Carter 2013; Carter et al. 2017; Farstad 2017; Neumayer 2004). In terms of environmental performance, scholars have also found evidence that left-wing governments in the developed world are greener than their right-wing counterparts, regarding, for example, air pollution or national climate policies (Neumayer 2003; Tobin 2017).

Likewise, left-leaning individuals consistently present higher levels of environmental concern than conservatives and right-wing voters. In this regard, Neumayer (2004) found that left-wing individuals are more inclined to privilege the environment over economic growth, as well as more prone to behave in environment-friendly ways than right-wing individuals. In the same line, Guber (2013) points out that voters identifying with left-wing parties show higher levels of environmental concern. Individual attitudes toward climate change have occupied a great deal of academic research, as the most prominent and complex environmental challenge. In this context, empirical evidence also suggests that a left-wing ideology correlates with a lower propensity to climate change denial as well as higher levels of concern on the topic (Egan and Mullin 2012, 2017; Kvaloy et al. 2012).

However, academic studies dealing with the relation of ideology and individual environmental positions have been restricted to the USA and Western Europe and systematically ignored the rest of the world. Despite the strong evidence supporting the correlation between left-wing values and environmentally friendly attitudes, it will be argued that this hypothesis is problematic in the Global South. Since economic



and social development are an essential part of the political debate, environmental politics are regarded differently from the South. I will affirm that this is a consequence of two factors: the belief on an economy-environment trade-off and the increasing importance of environmental concern as a value of the global liberal order.

In the first place, the existence of an impossible dilemma between economic development and the environment has been a powerful and persistent idea held by several political actors in the developing world. In fact, since the very beginning of the inclusion of environmental concern in politics, developed and developing countries present clearly divergent views on the topic; from the South, the problem was not only environmental, but a development and power-related issue (Joshi 2014; Najam 2005a, b; Williams 2005). Academic empirical evidence suggests the existence of an Environmental Kuznets Curve implying that at the first stages of economic development, pollution is expected to increase, which is in line with the aforementioned belief (Grossman and Krueger 1995; Holtz-Eakin and Selden 1995; Selden 1994). Even though some studies pose doubts on the strength of this thesis nowadays (Stern 2004), recent work on the Global South tends to still support this environment-development trade-off (Spilker 2013). Since left-wing positions tend to care more on social welfare of low-income workers, whose economy is often based in low-skilled polluting industries or primary resource exploitation, it will be argued that in the Global South left-wing individuals tend to choose economic development over environmental protection and, consequently, be less worried about the latter.

In the second place, environmental norms and stewardship have been progressively included as a major part of the current international liberal order (Falkner and Buzan 2017). Consequently, individuals with favorable views on globalization and the global political order tend to accept environmental concern as a positive value. In addition, the globalization of environmental norms generates incentives to pro-market political actors to include it as a part of their concerns. On the contrary, this can enhance resistance in left-wing individuals if they perceive this as a threat to economic and social development.

## ***2.2 The Role of Post-materialist Values***

Academics have deeply analyzed the relation between wealth and environmental concern. The most common view on the topic has been post-materialism, which suggests that concern on values such as protection of the environment only arises after physical and economic security is assured (Inglehart 1981, 1990). In this line, some studies support this hypothesis, particularly in the Global North (Kahn and Kotchen 2010; Kimmelmeier et al. 2002).

Most of the previous work on individual attitudes used the post-materialist index (PMI) in order to test this hypothesis. The PMI is based on each person choices between physical security and economic development, on the one hand and post-materialist values such as freedom of speech or leisure, on the other. Consequently, it is expected that people who favor democratic values are more likely to care for the

environment. In the same line, democratic regimes have been associated with higher environmental standards than autocracies, as a consequence not only of institutional incentives, but also moral values (Gleditsch and Sverdrup 2002).

However, the post-materialist thesis has also been the target of criticism. Two main arguments may be identified in the academic literature. In the first place, the emergence of a widespread environmentalism in developing countries has been pointed out as a major challenge for this hypothesis (Brechin and Kempton 1994). In the second place, empirical testing on public opinion has often shown contradictory results on the topic (Dunlap and York 2012; Kim and Wolinsky-Nahmias 2014; Mildenerger and Leiserowitz 2017; Mostafa 2013). Besides, previous work suggests that it successfully explains the emergence of environmentalism in developed countries but fails to predict environmental positions in the Global South (Dunlap and York 2012).

### ***2.3 Other Drivers of Public Concern on the Environment***

Scholar research on individual drivers of environmental concern has steadily grown during the last decades, and a tacit consensus was achieved on which variables should be included in quantitative works on the topic. Even when some of their effects have found controversial empirical evidence, most of the studies include a set of similar predictors.

Exposition to environmental problems has been widely used as a predictor on individual positioning toward the environment. This has been particularly the case of studies dealing with views on climate change, where the exposition to extreme weather events, such as unusual high temperatures or flooding, correlates with higher levels of concern (Bruine De Bruin et al. 2014; Egan and Mullin 2012, 2017; Weber 2011). The causal mechanisms of ecological vulnerability point in two directions. On the one hand, pollution and extreme weather affect the quality of life and the economic situation of most people. In this regard, air and water pollution are associated with higher levels of health-related problems, as well as extreme weather may affect housing and income, and may even threaten human lives. On the other hand, the exposition to extreme weather helps to shift perceptions on problems that are otherwise perceived as distant. Even though most of the models include a measure of the exposition to environmental problems, some authors have challenged this view. In this regard, Carlton et al. (2016) argue that most of the studies overestimate the impact of extreme events on the possibility of shifting climate beliefs.

Several studies deepen on the impact of information in individual conceptions and beliefs. It is generally assumed that media coverage and the availability of information on the topic exert a positive impact on the degree of environmental concern (Brulle et al. 2012). Previous studies provide support for this hypothesis, suggesting the importance of including information exposure in analytic models.

Higher levels of education have been consistently associated with greater concern for the environment (Kemmelmeier et al. 2002; Kvaloy et al. 2012). Studies dealing with beliefs on climate change found similar results.

Gender has also proven to be a powerful predictor. Most studies show that women are invariably more inclined to care for the environment than men. McCright (2010) observe a robust effect of gender on climate change perceptions; not only women were more concerned on global warming but also present greater knowledge on the topic. In their study on green consumption patterns, Brough et al. (2016) suggest the existence of a cognitive linkage between environmentally friendly behavior and femininity. As a consequence, men may perceive as a threat to their own masculinity engaging in green patterns of consumption. Moreover, most of the literature dealing with individual attitudes toward the environment usually controls for gender finding similar effects. This is also consistent with most of the literature in sociology, politics, and international relations on gender and individual attitudes.

Lastly, age should be also considered as a control variable for predicting environmentally friendly attitudes. Theoretical expectations assert that younger generations should be more eager to care for the environment as they were socialized in a context marked by the emergence of environmentalism. Climate change studies tend to confirm this hypothesis, but mixed results have been found on the impact of age on other environmental positions.

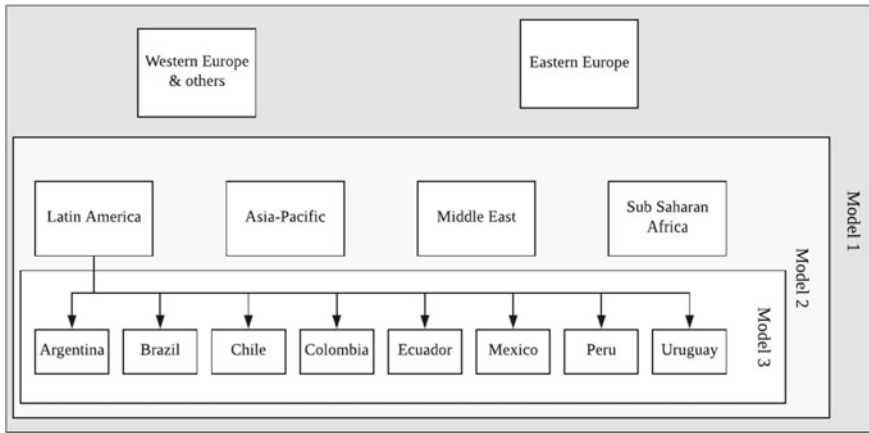
### **3 Empirical Testing**

#### ***3.1 Research Design***

Since the main goal of the present work is to check for different effects among groups, I will use multilevel linear regression to identify the variation of the predictors' effect by group (Gelman and Hill 2007). This type of regression allows to model a hierarchical structure where observations are grouped in different levels. In this case, surveyed individuals are observations, each of one belongs to a country (first-level group) within a region (second-level group).

Multilevel models adopt a middle ground between two opposite solutions to use hierarchically structured data: complete pooling, meaning no distinction between groups; and no-pooling, performing different regressions for each group. While the former ignores differences between groups, the latter assumes that the effect of the same independent variable is different depending on the group. Adopting a partial-pooling model implies that coefficients between groups are related but they may differ among grouping. Since the argument of the present work is that ideology presents different effects according to the region and country, coefficients for each one of them will be estimated.

In order to test the aforementioned hypotheses, I use waves 5 and 6 of the World Values Survey (WVS), which collects public opinion data on several topics between



**Fig. 1** Data structure and regression models

2005–2009 and 2010–2014, respectively (Inglehart et al. 2014). Each wave was performed by using the same questionnaire in all the included countries. Even when questionnaires change from wave to wave, many questions are repeated over time. The utilization of WVS datasets is widely spread and accepted in comparative public opinion literature.

Three different multilevel models will be presented with different types of partial-pooling. Figure 1 represents the hierarchical structure for each model. Model 1 includes worldwide polling and two levels of grouping: Region and Country. They cover 68 countries and six regions: “Latin America,” “Asia-Pacific,” “Middle East,” “Sub Saharan Africa,” “Eastern Europe,” and “Western Europe and others”, including the USA, Canada, Japan, Australia, and New Zealand.

Model 2 is focused in the Global South, by setting aside “Eastern Europe” and “Western Europe and others” and keeps the four remaining regions. Therefore, it includes 45 countries divided into four regions. Finally, Model 3 refers to Latin America and only includes a country-level grouping for the observations, covering Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Uruguay. All models will also include a grouping by year, in order to control for time-related effects.

Environmental concern will be the dependent variable. It will be measured by using the level that each individual feels represented by the following statement: “Looking after the environment is important to this person; to care for nature and save life resources.” The level of agreement is a five-point scale ranging from “not at all like me,” coded as 0, to “very much like me,” coded as 5.

Ideology may be difficult to measure across different regions. The most common measure in studies dealing in developed countries is the self-positioning in a scale between left and right. However, this may be problematic in the Global South, since very different understandings of “left” and “right” may exist. As a consequence, I will use the individual position toward market-oriented values, by taking the average

of the positioning toward four socioeconomic aspects: income equality, economic competition, state ownership of the business, and the role of hard working to achieve economic success. Surveyed individuals positioned themselves in a ten-point scale in each of these issues. Left-wing positions should be more prone to defend income equality and state ownership, less confident on the role of competition on the economy, and highlight the importance of luck and connections in bringing success. The resulting ideological index ranges from left to right, which their more extreme positions were codified as 0 and 1, respectively.

Post-materialist values will be measured with the 12-item PMI, which is included in the WVS database. The index is the result of the choices from surveyed individuals in three different lists of values. Post-material values are related to political participation, humanitarianism, freedom of speech, and leisure. On the contrary, material values refer to economic growth and stability, and order and physical security against crime and foreign threats. The lowest score in the PMI is 0, while the highest is 5.

Household wealth will be included as a control variable since both the effects of both ideology and post-materialist could be related to socioeconomic level. Moreover, the post-materialist thesis suggests a positive correlation between wealth and environmental concern. As wealth is often difficult to measure, it will be included as an index resulting from the subjective perception on the social class that the person belongs to, the scale of income, and the possibility of the family saving money during the last year.

The impact of information will be operationalized by an index resulting from the average of the utilization of different sources of information by each individual. Two types of questions are included. The first group inquires if the person used newspapers, watch television reports, or found information on the Internet, among others, during the week before. Positive answers were codified as one. The second type deals with the frequency of using each source: “Daily” was the most frequent use of information sources and was codified as 1; while the least frequent, “never,” was codified as 0. In the middle, “weekly,” “monthly,” and “less than monthly” were codified as 0.75, 0.50, and 0.25, respectively.

The rest of the control variables, including the highest level of education attained, gender, and age are also taken from the WVS database. Education is operationalized by using the highest level of education attained in a seven-point scale. Gender is codified as 0 for men and 1 for women.

Since multilevel modeling allows using both group and observation-level variables, a group level predictor for the impact of ecological vulnerability will be included. This item will be operationalized by the vulnerability index generated by the University of Notre Dame Global Adaptation Index (ND-GAIN), which measures the adaptive capacity, sensitivity, and exposure indicators in six areas: health, food, ecosystems, habitat, water, and infrastructure (Chen et al. 2015).

Sources and summary statistics of each variable are summarized in Table 1. In all the cases referring to the WVS, data was taken from the aggregated (1981–2014) data file and identification variables within it are indicated in brackets.

**Table 1** Sources and summary statistics

Variable	Source	Mean	St. Dev.	Min	Max
Environmental concern	WVS (A197)	30.555	10.215	0	5
Ideology	WVS (E035, E036, E039, E040)	0.587	0.172	0	1
Post-materialist index (PMI)	WVS (Y001)	10.987	10.160	0	5
Household wealth	WVS (X044, X045, X047)	0.492	0.188	0	0.967
Information	WVS (E248-E253, E258-E262B)	0.542	0.251	0	1
Education level	WVS (X025)	40.860	20.196	1	8
Gender	WVS (X001)	0.510	0.500	0	1
Age	WVS (X003)	40.876	16.116	15	99
<i>Country level</i>					
Ecological vulnerability	ND-GAIN—vulnerability index	398	70	276	620

### 3.2 Results and Analysis

Models outputs are summarized in Table 2. It should be noted that in the case of ideology and PMI, it only includes the estimated fixed effects. Despite the fact that the impact of ideologically leaning right appears to be positive and statistically significant in all models, it does not mean that the expected effect is similar in all the groups within those models. In this regard, both ideology and post-materialism will be analyzed separately.

Most of the other predictors present the theoretically expected results in most of the cases. Household wealth is positive but not statistically significant in any model. Access to information correlates in a positive and significant way with higher levels of environmental concern at the 0.01 level in all the models. The effect appears to be moderate but considerable, especially in Latin America, as the estimated coefficient of Model 3 suggests.

Education is also positive and statistically significant at the 0.01 level in Models 1 and 2, in line with previous work and theoretical expectations. In Model 3, however, the estimated coefficient is only significant at the 0.10 level. In addition, its impact appears to be rather small: the expected level of environmental concern only raises 0.063 points between a person with incomplete elementary studies and one with a university degree.

Gender also presents the expected effect, with statistical significance at the 0.01 level in all cases. In spite of the strong evidence of the existence of a correlation, the estimated impact is relatively small.

**Table 2** Regression outputs

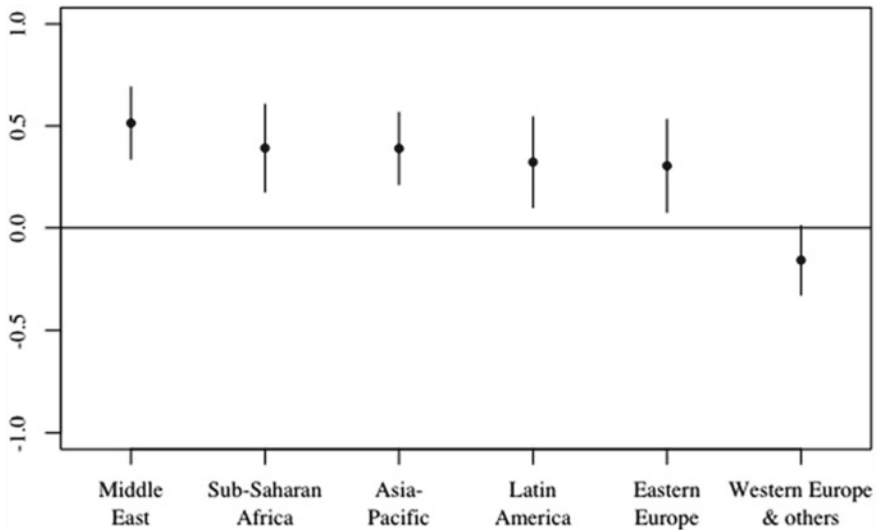
	Dependent variable:		
	Environmental concern		
	(1)	(2)	(3)
Pro-market values (ideology)—fixed effects	0.294** (0.118)	0.451*** (0.066)	0.364*** (0.110)
Post-materialist values—fixed effects	0.016 (0.018)	−0.003 (0.017)	0.040* (0.020)
Household wealth	0.003 (0.021)	0.040 (0.026)	−0.079 (0.065)
Access to information	0.214*** (0.017)	0.167*** (0.021)	0.316*** (0.052)
Education level	0.015*** (0.002)	0.014*** (0.002)	0.009* (0.006)
Age	0.008*** (0.0002)	0.005*** (0.0003)	0.005*** (0.001)
Gender (F)	0.069*** (0.007)	0.032*** (0.009)	0.066*** (0.021)
Country vulnerability	2.745*** (0.713)	4.018*** (0.962)	−2.649 (2.186)
Constant	1.656*** (0.308)	1.164** (0.455)	4.049*** (0.881)
Observations	104090	69400	12343
Log likelihood	−162032.600	−109137.800	−19338.540
Akaike Inf. Crit.	324111.200	218321.600	38711.090
Bayesian Inf. Crit.	324330.900	218532.000	38837.240

Note \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

More surprisingly, age appears to have a positive impact on the level of environmental concern in all models. Despite the fact that previous literature showed mixed results in terms of this variable, most of the academic work related to climate change attitudes presents evidence in the opposite direction. It should be highlighted, nevertheless, that the expected effect is not strong. Further research is probably needed in order to tackle the problem of age and environmental attitudes in the Global South.

Ecological vulnerability presents mixed results. While it has the positive expected effect in Models 1 and 2 with a significance of 0.01, the negative estimated coefficient in Model 3 is puzzling, even when it is not statistically significant.

Since the present work is focused in analyzing the expected effects of political values on the levels of environmental concern, the regional coefficients require more



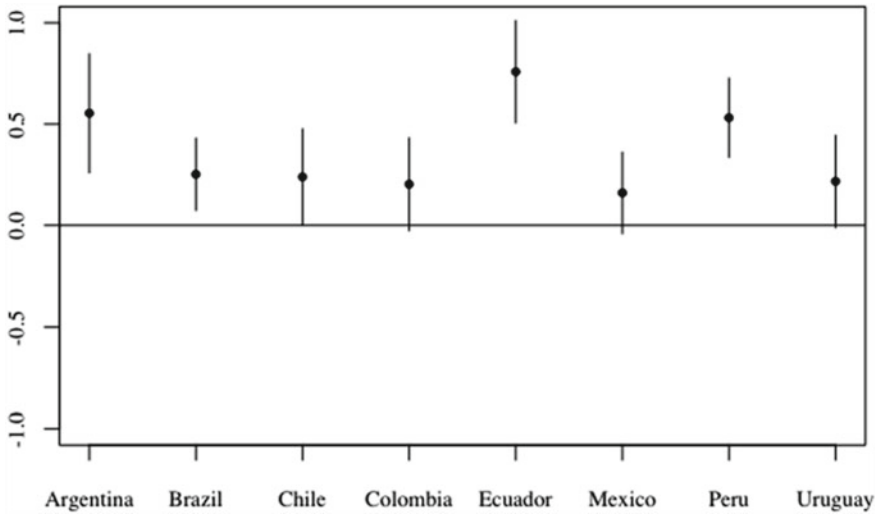
**Fig. 2** Estimated effects with 95% confidence interval of right-leaning ideology on environmental concern (Model 1)

attention. Figure 2 shows the predicted coefficients for ideologically leaning right by region with their 95% confidence interval. Estimations are based on Model 1. The first conclusion that can be drawn from it is that the effect of ideology tends to be the opposite in Western Europe and other developed countries than in regions from the Global South. The model estimates that in Western Europe individuals that lean right is expected to be less environmentally friendly, which is consistent with all the previous literature on the role of ideology and public opinion in both the USA and Europe. Even when its 95% confidence interval does not reject the null hypothesis, the estimated coefficient is significant at the 0.10 level.

On the contrary, the results point in the opposite direction in the rest of the world. In the case of Latin America, adopting pro-market views would raise 0.322 points the level of environmental concern, according to Model 1. Since partial-pooling assumes the existence of fixed effects across groups, it tends to reduce the coefficients variation among them. When there are groups with both negative and positive effects, estimated effects tend to get closer to zero. In fact, the ideological effect estimated by Model 2 increases up to 0.481 in the region.

Model 3 estimates the coefficients only for Latin American countries and its results point in the same direction. Coefficients and their confidence intervals are plotted in Fig. 3. Two conclusions arise. First, all countries in the region show a positive correlation between market-oriented values and environmental concern, but only four of them are statistically significant at the 0.05 level. Second, Latin American countries present differences in terms of the expected effects. According to the model, Ecuador is the country where right-leaning most strongly correlates with higher levels of individual environmental concern.

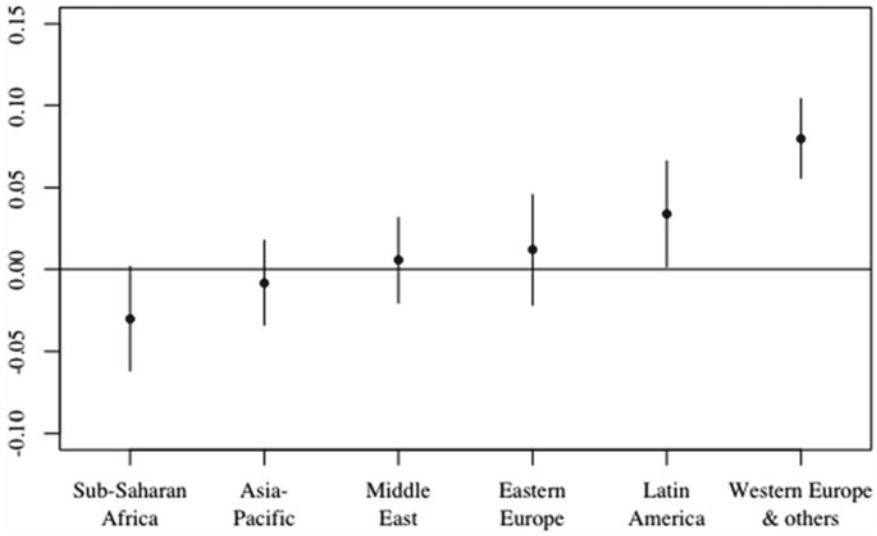




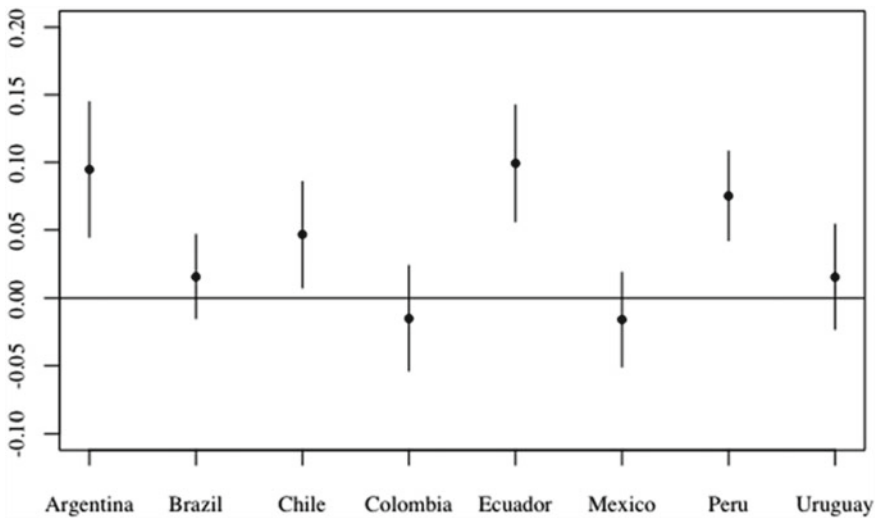
**Fig. 3** Estimated effect with 95% confidence interval of right-leaning ideology on environmental concern in Latin America (Model 3)

The estimated effects of post-materialist values also show differences between the Global North and South, though they are less clear. Coefficients by region with their 95% confidence interval can be found in Fig. 4. Like in the case of ideology, the impact of post-materialist values is expected in Western Europe and others. In line with theoretical expectations and previous empirical studies, the estimated coefficient is positive and statistically significant. Results regarding the Global South are however mixed. While the post-materialist effect seems to be the same in Latin America than in the Global North, it is not distinguishable from zero in the rest of the Global South. Moreover, the effect is surprisingly negative and even statistically significant at the 0.01 level in Sub Saharan Africa. In Model 2, where only surveys from the Global South are included, the estimation for the effect of post-materialism in Latin America is not distinguishable from zero, suggesting caution on the resilience of the hypothesis in the region.

Results on the impact of post-materialism in Latin American countries are presented in Fig. 5. The conclusion that can be drawn from the model is that results are heavily country-dependent. On the one hand, Colombia and Mexico present negative non-significant effects. On the other, the rest of the cases show a positive correlation, which is not statistically significant in the cases of Brazil and Uruguay, and statistically significant at the 0.05 level for Argentina, Chile, Ecuador, and Peru present positive and statistically significant coefficients.



**Fig. 4** Estimated effect of post-materialist values with 95% confidence interval on environmental concern (Model 1)



**Fig. 5** Estimated effect of post-materialist values with 95% confidence interval on environmental concern in Latin America (Model 3)

## 4 Final Remarks

The main goal of the present work was to shed light on the individual drivers of public opinion toward the environment in the Global South, a generally overlooked aspect of environmental politics, with a special focus on the impact of political values. Building upon the vast academic literature on the topic based in the developed world, I proposed three statistical models to test the main hypotheses and to identify different effects among regions and countries.

On the one hand, results of the present work suggest that ideology may have an opposite effect in the Global South, since market-oriented values consistently correlate with higher levels of environmental concern. This conclusion was robust through the three models, involving different sampling. Explanations may point to the fact that leftist ideas tend to prioritize social welfare and the fact that environmental protection is usually perceived as contradictory with economic development. Moreover, right-wing ideologies in the South are often associated with favorable stances toward the liberal world order and some of its normative principles, including environmental concern.

It should be highlighted, however, that some caution is recommended on the results. The proposed models present some limitations since they are based on the level of environmental concern that individuals declare. This does not mean that right-wing voters tend to have greener attitudes than left-wing individuals. Further research is probably needed in order to establish correlations between environmentally friendly behavior, such as political engagement on the topic and ideological values. This chapter shows that right-wing individuals tend to declare higher levels of environmental concern, holding all the other variables constant, at the contrary of most of the previous works focused on the Global North.

On the other hand, estimations regarding post-materialism in the Global South present mixed results. Nevertheless, a positive effect appears to be more important in Latin America than in other regions. Model 1 estimates a similar effect than in the Global North, while Model 2 suggests prudence before jumping to conclusions. Model 3 points out that the effect of post-materialist values may also be different between countries.

In general terms, results suggest that pro-market values correlate positive with environmental concern. Post-materialism may impact in the same direction, but the evidence is not robust, even when some countries in Latin America present statistically significant coefficients. Considering that post-materialism includes democratic values, the combination of both suggest that democratic right-wing individuals tend to be more concerned on the environment, at least in countries where both estimated predictors were positive and significant.

Another important conclusion highlights the fact that most of the rest of the variables present the expected results. The exceptions are age, with a puzzling positive effect on environmental concern and household income, which was not statistically significant in any model. The latter is usually difficult to measure and requires further

research in order to assess its impact on environmental perceptions in the Global South.

It should also be noted that the results regarding developed countries are the theoretically expected and in line with previous empirical work. According to Model 1 results, left-wing ideologies and post-materialist values correlate with higher levels of environmental concern in the Global North.

In the particular case of Latin America and the included control variables, some other conclusions can be drawn. Access to information appears to have a stronger effect than in the rest of the Global South. A deeper look into this predictor would be also recommended in the future. The estimated impact of education appears to be surprisingly small in Model 3. Ecological vulnerability, finally, appears to be non-significant, in an other potentially difference of the region.

Results on both ideology and post-materialism suggest that the current status of academic research is insufficient to understand environmental attitudes in the Global South. Further public opinion research focused in different developing regions is clearly needed. The environmental importance of the Global South is steadily increasing, especially regarding the most urgent environmental issues, such as climate change, forestry, and biodiversity. In this context, knowing the factors that motivate personal stances is essential to activate political support and planning effective public policies. The present work sought to contribute in this line by identifying the drivers of public opinion stances on the topic.

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# Chapter 7

## Climate Change and Tourism in Latin America



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**Abstract** This study analyses the scientific papers resulting from the search in Spanish of climate change and tourism or tourist. It is about ten studies published in Spanish in the last ten years. All the articles refer to Latin American realities, and most of them were developed by academic entities from countries coinciding with the countries addressed. It is evident a focus on tropical tourist destinations that coincides with countries most affected by the phenomenon of climate change. However, they are also underdeveloped States where tourism is a relevant economic support. In the context of these tropical destinations, particular attention has brought beach tourism. These publications are widely based on sources from developed countries and documents produced by relevant international organisations. Such sources predict that climatic changes would cause geographic redistributions of tourist flows, economic costs for specific tourist destinations, limitations for the development of certain seasonal activities, but also benefits to some tourist destinations with historical cold climates. From a methodological perspective, half of the works have displayed perception studies as research strategies and have preferred to consult residents, instead of tourists.

**Keywords** Perception studies · Tourism industry · Tourism research · Global warming

### 1 Characterisation of the Literature Reviewed

This study analyses the scientific papers resulting from the search in Spanish of climate change and tourism or tourist (books, chapters, thesis and other academic reports were excluded) in Google Scholar and Google. It is about ten studies published in the last decade (Aguirre González 2011; Buzinde et al. 2010; Camargo

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Velandia 2016; Da Cruz 2009; Mancilla Velasco et al. 2014; Moreno Moreno et al. 2015; Nava Escudero 2008; Olmos Martínez et al. 2013; Picón et al. 2014; Rubio 2017) at a rate of one per year (none in 2012 and two in 2014) in Spanish (except the work in English by Buzinde et al. 2010). A decade later than in Europe, and even today with modest intensity, the concern for the subject is beginning to originate intellectual products in Latin America.

All the articles refer to Latin American realities: half of them address Mexican tourist destinations, two Costa Ricans, one Panamanian and one Brazilian (the article by Mancilla Velasco et al. 2014, as a status of the issue, does not focus on any particular destination). Likewise, most of the publications were developed by academic entities from countries coinciding with the ones addressed, except three: Buzinde et al. (2010) belong to North American and English institutions but analyse a destination in Mexico; conversely, with institutional affiliation in a Mexican university, Camargo Velandia (2016) takes a case from Panama and, as indicated, Mancilla Velasco et al. (2014) do not focus on any particular case but offer a review of world literature.

The ten studies come from and deal with Latin American tropical countries (Mexico, Costa Rica, Brazil, Panama). At the same time, no article comes from or deals with the realities of non-tropical or partially tropical countries (Argentina, Chile, Paraguay, Uruguay). Then, it is clear that the scientific interest in the pairing tourism and climate change nests in tropical countries, perhaps because of the most sensitive effects of this phenomenon. But, not all tropical countries produce knowledge on the subject. It is possible that the production of scientific knowledge, in addition to the level of exposure to climate change, is related to the degree of tourist dependence and the scientific capacity of the countries. Let this hypothesis be a seed for future research.

With regard to the paper by Mancilla Velasco et al. (2014), and typical of a status of the issue, it is observed that it refers to three of the works analysed here (Buzinde et al. 2010; Da Cruz 2009; Nava Escudero 2008) that is a large part of the articles published until 2014. On the contrary, the other publications examined do not refer to each other: a decision that was not reversed over time despite the increase in the number of publications. Conversely, sources from developed countries and languages other than Spanish abound. That is, the few Latin American studies were eluded by Latin Americans themselves, and the construction of arguments based on Northern knowledge is preferred.

The grounds (secondary sources) on which the papers reviewed are based are analysed below. And later, original results (primary sources) produced in the ten works studied here are commented focusing on the most used methodology: perceptual studies.

## 2 Scientific Sources and International Documents

As indicated, the sources of the articles analysed come from central countries and go back to a decade. Morales et al. (2018) locate in the mid-1980s the first scientific



publications in the world that linked tourism to climate change. Other authors refer to research on tourism and climate in the late nineties in this sense. On the one hand, Moreno Moreno et al. (2015) identify the study of Koenig and Abegg (1997) as a founding paper that links the variables of temperature and tourism demand. The same authors comment about later works that relate tourist variables with rainfall, wind, humidity, radiation, fog, the number of days or hours of sun (De Kaján and Saarinen 2013; Ramasamy and Swamy 2012; Polovitz-Nickerson et al. 2011). On the other hand, Mancilla Velasco et al. (2014) recognise Gómez (1999, 2005) as a pioneer in the subject, and they point out her reflections about the influence of climate on seasonality and tourist profitability.

Among the articles examined, it is also common to find arguments based on international documents. Indeed, at the beginning of the century, international tourism organisations were interested in knowing, diagnosing and taking actions on various aspects of the subject: ecological and economic impacts of tourism, future scenarios of GHG emissions (greenhouse gases), potential modifications in tourist flows and probable natural damages (Mancilla Velasco et al. 2014).

Thus, Olmos Martínez et al. (2013) mention the third report “Impacts, Adaptation and Vulnerability” of the IPCC Working Group II (Intergovernmental Panel on Climate Change) published in 2001. This document refers to the problem in Latin America but does not deepen on tourism aspects. The impacts of climate change on tourism were also addressed in the IPCC fourth report (2007). At reviewing this report, Nava Escudero (2008) highlights the concerns regarding summer tourism, particularly in the Mediterranean and winter tourism in mountainous areas due to the melting of snows and glaciers.

Likewise, Djerba Declaration (Tunisia, 2003) has raised particular interest among the publications analysed (Mancilla Velasco et al. 2014, Nava Escudero 2008). This document was the result of the First International Conference on Climate Change and Tourism, organised by the UNWTO (World Tourism Organization). Four years later (2007), the UNWTO summoned the Second International Conference on Climate Change and Tourism in Switzerland (the last held so far). Da Cruz (2009) and Nava Escudero (2008) analyses the resulting document “Climate Change and Tourism. Respond to global challenges”, also known as the Davos Declaration.

Perhaps because of the novelty of the document, no study addresses the UN-SDO (Sustainable Development Goals of the United Nations) from a tourist and regional perspective, particularly the 13th goal related to climate change “Adopt urgent measures to combat climate change and its effects”. Here is another seed for future papers.

### 3 Dependent Relationship Between Tourism and Climate

Several Latin American authors outline the issue of climate change and tourism from the dependent relationship of tourism concerning climate (Da Cruz 2009; Lam González et al. 2018; Mancilla Velasco et al. 2014; Moreno Moreno et al. 2015;

Rubio 2017). In effect, variations in climate, on the one hand, can diminish the attractiveness of specific tourist resources and even complete tourist destinations. On the other hand, they can also modify operating costs for heating or cooling, irrigation, water supply and food, etc. They can also alter the perception of risk by tourists. Consequently, the climate can decisively influence the choice of a tourist destination by tourists, that is, the weather can determine the seasonality of tourist demand. This is how tourist destinations competitiveness finds in climate a central factor.

Among the climatic factors, global warming is a vertebral variable. Latin American articles are generally based on studies conducted in destinations belonging to developed countries (Aguirre González 2011; Da Cruz 2009; Moreno Moreno et al. 2015): European countries (Agnew and Palutikof 2001, 2006), New Zealand (Becken 2012) and Organisation for Economic Co-operation and Development (OECD) countries (Wietze and Tol 2002). These sources argue that temperature is a key variable and perhaps the most important to explain the behaviour of tourist demand.

In view of the tourists, and based on the evidence that they prefer temperatures around 21 °C, it is affirmed that the global warming would not modify the preferences of the demand, but the dates and the destinations chosen; this would cause redistributions of tourist flows (Da Cruz 2009; Lam González et al. 2018; Moreno Moreno et al. 2015). In perspective of the destinations, many cold places would enjoy the mild climate, many mild destinations would get warmer and many warm ones would suffer from oppressive temperatures. Thus, in warm destinations, drought events and heat waves would be more frequent, which would result in the rise of cooling costs, and in the increase of diseases, with the consequent decrease in tourism (Da Cruz 2009; Morales et al. 2018; Moreno Moreno et al. 2015; Rubio 2017). In winter destinations, the reduction of snow (in quality and quantity) would shorten the winter season, which would affect the possibility of practising certain tourist activities (e.g. skiing) and would increase the costs of producing artificial snow. However, summer season would also be longer; this would happen in destinations such as Canada, Northern Europe, Russia and on certain beaches during wintertime (Aguirre González 2011; Morales et al. 2018; Moreno Moreno et al. 2015; Nava Escudero 2008).

## 4 Impact of Tourism on Global Warming

The effect of tourism on global warming is one of the five lines of research identified by Mancilla Velasco et al. (2014) in their review of the global scientific literature on climate change and tourism. They call it “Ecological impacts and vulnerability” to the set of works that focus on the costs of tourism concerning environmental sustainability and climate change. According to the authors, almost one-third of the publications on climate change and tourism respond to this line and, within it, a relevant proportion (44%) analyses the aspects of the ecological footprint. Such concerns are also present among Latin American publications, but these papers reproduce secondary sources instead of taking it as an object of study.

Indeed, several Latin American publications recover data about the contribution of tourism activity to global warming through 5% of GHG emissions. It is the result of 21% of CO<sub>2</sub> emitted by accommodation, 32% by ground transportation and mainly 40% by air transportation (Da Cruz 2009; Mancilla Velasco et al. 2014). However, Mancilla Velasco et al. (2014) refer to three difficulties: measuring GHG emissions systematically, producing prospective analyses from available models, and accurately registering tourism participation in view of the sectors mentioned above (transportation and energy). Interestingly, the authors rightly conclude that:

By pointing to tourism as one of the causes of GHG emission, its negative side is revealed again, as when in the decade of the eighties it was shown as an actor of environmental deterioration and new paradigms had to be found that allowed theorising about acceptable forms for its practice, such as sustainable tourism, low impact tourism and responsible tourism, among the most renowned. (Mancilla Velasco et al. 2014: 547)

## 5 Costs for Tourism, Destinations at Risk and Focus on Beach Tourism

The works reviewed get from other sources the idea that the impacts of climate change on tourism would lead to environmental, sociocultural and economic repercussions (Rubio 2017; Da Cruz 2009). It is pointed out as terminal impacts, on the one hand, the lack of time for the complete recovery of physical and human systems by virtue of the increase in the frequency of adverse climatic phenomena and, on the other hand, the difficulty that tourist destinations will face in order to reach the objectives of sustainable development (Rubio, 2017; Da Cruz 2009).

In geographical perspective, affected destinations would be those regions, countries and localities: 1. underdeveloped; and/or 2. with vulnerable climatic conditions (and therefore with less adaptive capacity); and/or 3. with economic dependence on tourism (Moreno Moreno et al. 2015). The list includes Europe (particularly the Mediterranean and the Alps), energy-exporting countries, tropical countries (particularly the Caribbean and small island countries in the Pacific Ocean and in the Indian Ocean), China, India, Mexico and the USA (particularly North and Southeast) (Mancilla Velasco et al. 2014).

Particular attention is paid to the economic impact of climate change: a topic that coincides with one of the five research lines identified by Mancilla Velasco et al. (2014) in their analysis of the state of global knowledge on climate change and tourism. The authors call it “Economic Effects” and note that it is one of the least developed lines of research. Although this issue is also a widespread concern in the Latin American articles analysed, there is no record of publications focusing on this aspect as an object of study.

Always based on secondary sources, the literature examined maintains that, as a consequence of the warmer temperatures, tourism in natural scenarios will be the main damaging activity. It is a type of vital tourism for Latin America and the Caribbean considering that two-thirds of foreign tourists in the region visit at

least one protected natural area in their trips (Camargo Velandia 2016). This type of tourism includes sun and beach or coastal tourism and snow, winter or ski tourism. Consequently, locations, where it takes place, would be the most affected ones: coasts and tropical islands (particularly the smaller ones), mountains and polar regions (Buzinde et al. 2010; Mancilla Velasco et al. 2014; Morales et al. 2018; Rubio 2017). According to Morales et al. (2018), it is not by chance that those first studies on tourism and climate focused on coastal and snow destinations.

Of the two types of tourism indicated at risk, beach tourism has raised more significant concern among Latin American scientists. Forecasts focus on the changes that hurricanes and sea level are suffering. From the tourism perspective, losses are expected in infrastructure, equipment, jobs, tourist attractions and also situations of insecurity and competition for the use of beaches between the tourism sector and other activities (e.g. fishing) (Buzinde et al. 2010; Da Cruz 2009; Nava Escudero 2008; Picón et al. 2014; Rubio 2017, 87). In relation to water resources, nautical tourism is analysed by Lam González et al. (2018), who marginally allude to the severe risks that climate change will represent for this activity in Ecuador.

The publications reviewed do not address snow tourism cases although, according to Aguirre González (2011), the most significant evidence of global warming is the glacial retreat in the Alps, Norway, Iceland, Kenya and even Latin American countries like Argentina and Peru. It is worth asking again about the relationship between the level of economic dependence on tourism in the affected Latin American countries and their scientific capacity.

## **6 The Cursed Trilogy: Underdevelopment, Tropical Location and Dependence on Tourism**

As noted, Latin American publications analyse situations of countries that respond, to varying degrees, to developing regions, with some economic dependence on tourism and specially affected by climate change: Mexico, Costa Rica, Panama and Brazil. In this study, papers in Portuguese were not analysed. But, it is noticed that Latin American works found in that language (6) treat the Brazilian case and surpass the Mexicans in number: Corrêa de Almeida Moraes and Zani dos Santos (2009), Grimm and Cioce Sampaio (2016, 2017), Grimm et al. (2012), Grimm et al. (2018), Machete (2011). Tourism in the Caribbean is also particularly vulnerable to climate change given the disadvantages mentioned above: fragile ecosystems, precarious socio-economic development, economies monopolistically supported on tourism, but also because of their small territories and high population densities (Camargo Velandia 2016). Although this study does not include the Caribbean region, the reading of Gable (1990, 1997) and Sookram (2009) is recommended.

Regarding the Mexican case, it is observed that most articles about this country highlight the global tourist relevance of Mexico and the importance of tourism for that State. Nava Escudero (2008) reminds that in 2008 Mexico was the eighth destination

in the world for foreign arrivals and the fourteenth destination for tourist currency income.

Likewise, the particular vulnerability of Mexico to climate change is underlined because its supply (and consequently its demand) is based on beach tourism. Almost 11,600 km of its coastline contains 15% of the population and gives place to 45% of the country's tourism activity. Besides, in 2005, half of the top ten Mexican destinations for foreign tourism were beaches and two-thirds of the investments on tourism corresponded to beach destinations (1,800 million dollars over 2,700). In this context, it is stated that the two main beach destinations for foreign tourism (Cancun-Cozumel and Los Cabos) are already experiencing the effects of climate change through alarming hurricane events (in intensity and number) and sea level rise (Nava Escudero 2008; Mancilla Velasco et al. 2014).

## 7 Latin American Research: The Centrality of Residents' Opinions

Researching the perceptions of specific actors of the tourism system, mainly tourists, is a recurrent decision in a number of scientific publications on climate change and tourism. It coincides with one of the five research lines identified by Mancilla Velasco et al. (2014) in their world analysis of 44 publications on climate change and tourism. These authors call it "Studies of Tourist/Visitors" and include, in addition to the perception, the behaviour of visitors concerning the new climate phenomenon.

Mancilla Velasco et al. (2014) reflect on the deductive or inductive nature of research, and they link these methods with top-down and bottom-up models, respectively. Then the authors conclude that the former generally involve macroeconomic studies and the latter consist of perceptual studies since they are based on individual consultations (e.g. tourists or entrepreneurs). Evidently, the authors inaccurately assimilate scientific methods (inductive/deductive) with analysis models (top-down/bottom-up). Although Mancilla Velasco et al. (2014) argue that tourism research extensively turns to surveys and interviews (techniques that they consider as bottom-up), they also point out that perception studies on tourism and climate change are one of the lowest productive research lines in the world.

However, the above observation does not apply to Latin American papers. Half of the works analysed prefer this approach:

- Aguirre González (2011): 996 interviews in 2008–2009 to visitors to Poas Volcano National Park (Costa Rica) to know their attitudes towards climate change and their sources of information on the subject.
- Buzinde et al. (2010): 88 reviews posted on TripAdvisor in 2007–2008 by visitors to Playacar (Mexico) to know their representations about the destination (a coastal enclave that has undergone devastating biophysical changes due to climate change) in contrast to the advertising brochures of a large part (12 out of 14) of the hotels in those beaches.

- Camargo Velandia (2016): interviews to key informants and 200 surveys in 2013 to residents of four islands of Bocas del Toro archipelago (Panama) to know their perceptions about tourism impact on their ecosystems and societies.
- Olmos Martínez et al. (2013): 250 surveys in 2011 to residents of the seven natural protected areas in Baja California Sur (Mexico) to know about their perceptions of vulnerability.
- Rubio (2017): six workshops of 80 people in 2013 with residents and services providers in Oaxaca State south coast (Mexico) to know the threats and damages related to the environment and climate.

Another difference concerning the conclusions of Mancilla Velasco et al. (2014) is that three of the five articles on perception have consulted residents, that is, the administration of interviews or surveys to tourists or visitors has not been the most widespread option.

Then, and considering the two differences indicated, a couple of questions arise: why do research on tourism and climate change in Latin America have preferred to study the subjective aspects of the phenomenon?, and why do research on tourism and climate change in Latin America prefer to know the representations of residents in tourist destinations instead of other actors (e.g. tourists, providers)?

## 8 Preference for Subjectivity

Firstly, we reflect on why articles on tourism and climate change in Latin America have preferred to study the subjective aspects of the phenomenon. From an operative perspective, this option may imply a shortcut for the researcher: it avoids a socio-natural problem that requires an unusual knowledge of different paradigms (climate and tourism). In this sense, it implies a less risky methodological technique, applicable to several phenomena. Nevertheless, Aguirre González (2011) indicates the difficulties of this type of research because of the variety of variables involved and the complication in determining a general perception.

We identified three types of perception studies:

- Perception of direct effects of climate change: residents of Jalisco perceived an increase in temperature (López-Fletes et al. 2015); inhabitants of Baja California Sur have an “empirical knowledge” about climate change effects (Olmos Martínez et al. 2013); and inhabitants of Oaxaca perceived impacts on flora and fauna and rainfall regimes (Rubio 2017). However, Bocas del Toro inhabitants did not notice deterioration in ecosystems (Camargo Velandia 2016).
- Acceptance of the idea of the anthropogenic cause of climate change: many respondents believe that climate change is caused by human activities; this is the case of foreign and national visitors to Poas Volcano National Park. Other secondary sources show similar results, such as almost 80% of the 22,000 people consulted in 21 countries, according to a worldwide survey by the London BBC cited by Aguirre González (2011).

- Level of knowledge about climate change: most of the people consulted know about climate change; this occurs with 62% of the respondents in Baja California Sur (Olmos Martínez et al. 2013) and with 80% of the informants in Jalisco. Other secondary sources show similar results: 82% of Americans consulted by *Los Angeles Times* and 96.5% of Spaniards surveyed by Mapfre (López-Fletes et al. 2015). At the other extreme and in a few cases, there are people who doubt about the existence of the phenomenon (López-Fletes et al. 2015).

Interviews, surveys and workshops are (generally qualitative) research techniques aimed at recording and interpreting subjective aspects of the participants: perspectives, points of view, emotions, priorities, experiences, meanings. Within the framework of the interpretive paradigm, perception studies seek to understand the “meaning of the actions of living beings, especially of humans and their institutions ... It postulates that “reality” is defined through the interpretations of the participants in the research regarding their realities” (Hernández Sampieri et al. 2010: 6).

We doubt about the usefulness of producing knowledge based on opinions about facts—realities that happen in spite of beliefs. It is even common in some publications to consult on climate issues, as if there were no instruments to record and know about climate. Or as if perceptions had more scientific value than measurement.

However, it is interesting to recover the idea of *psychological remission* set out by Aguirre González (2011): the magnitude of the problem would paralyse people from undertaking actions, its complexity would justify delegating it to specialists and the gradual occurrence of the phenomenon would postpone concerns to the future. In the case of Poas Volcano National Park, such a remission would be evident in the ignorance about climate change and in the confusion with other environmental problems, as well as in the perception of climate change as a secondary problem to other daily ones (e.g. terrorism, economy) or as a problem of greater concern in 50 years (*blackburner* effect). These perceptions are also present in other cases. Residents of Boca del Toro declare not to know how to protect the beach (Camargo Velandia 2016). And the inhabitants of Jalisco are unaware of the effects of climate change on their daily lives: they say they do not know what to do to face weather inclemency and they even assume that nothing can be done. These people visualise climate change as a phenomenon unrelated to their reality (López-Fletes et al. 2015).

## 9 Preference for Local Actors

Secondly, we question why scientific research on climate change and tourism in Latin America prefers to know the representations of residents in tourist destinations instead of those of other actors (e.g. tourists, providers). In fact, in one of the papers examined residents explain the reduction in tourist activity due to changes in the beaches (Olmos Martínez et al. 2013): in this case, residents respond for (potential) tourists and other possible causes are not considered (e.g. economic).

A couple of works analysed justify that studies administered to residents imply valuable inputs for public policies. It is stated that knowing the level of awareness, concern, sensitivity, information or understanding of the local population would make it possible to decide between adaptation or mitigation measures; propose alternatives, procedures and managers; involve the population and evaluate the implementation (Olmos Martínez et al. 2013; López-Fletes et al. 2015). This could apply to two types of perceptual studies identified above: on the one hand, knowing the *acceptance of the idea of the anthropogenic origin of climate change* could reveal levels of responsibility facing the phenomenon, and it could support concrete adaptation and mitigation measures. On the other hand, identifying a low level of *knowledge about climate change in the population* could originate and justify measures to raise awareness.

The third type of perception study registered, the *analysis of perceived direct effects*, could lead to relevant comparative studies: comparing to facts (e.g. in order to know social denials or exaggerations) or to other voices (e.g. media news, statements by decision-makers and politicians, forecasts made by experts, perceptions by other tourism actors, changes and continuities of perceptions over time).

In this sense, the article by Buzinde et al. (2010) proposes a comparison between facts and perceptions. However, the reality is fallaciously communicated, and perception gives a better account of reality. Indeed, the authors compare the persuasive promotional speeches of hoteliers in Playa del Carmen, who deny biophysical impacts of climate change on these beaches, with the comments of tourists on the Internet, which bare the reality of the disaster.

Finally, it can be seen that the comparison between broadcast messages and received messages on climate change and tourism has not led to publications in Latin America. However, a related aspect appears in some of the papers reviewed. Indeed, the data of the Internet and television as sole sources of information is warned by several authors (Aguirre González 2011; López-Fletes et al. 2015; Rubio 2017). They reflect on the responsibility of the “popular media” of mass communication, as well as on the weak voice of academic-scientific sources and the scarcity of governmental programs of dissemination on the phenomenon.

## 10 Conclusions

- The scientific literature on tourism and climate change in Latin America consists of ten articles published in the last ten years: a decade later than the first works on the subject in Europe. These publications are widely supported in sources from developed countries and generally avoid references to Latin American studies. The arguments of the papers analysed are also widely based on documents produced by relevant international organisations (IPCC reports, UNWTO declarations), but none of them refers to the UN-SDO (2030 Agenda).



- The works examined marginally refer to the impact of tourism on climate change. Although this concern has guided a third of the world literature on tourism and climate change, it is still not an object of study in Latin America.
- Unlike other activities, tourism has a strong dependence on climate. Hence, several authors identify global warming as a determining variable for the development of this activity. Consequently, the predicted climatic changes would cause geographic redistributions of tourist flows, economic costs for specific tourist destinations, limitations for the development of certain seasonal activities, but also benefits to some tourist destinations with historically cold climates.
- The focus on tropical tourist destinations in the articles analysed coincides with countries most affected by the phenomenon of climate change. However, they are also underdeveloped States where tourism is a relevant economic support. It is probable that the gap in the scientific production capacity of the different Latin American States could explain the lack of studies about other tourist destinations in the region that suffer these same climatic disadvantages.
- In the context of these tropical destinations, particular attention has brought beach tourism among the publications reviewed. Although snow tourism is also among the main victims of climate change, Latin American papers have not taken these cases as an object of study.
- Half of the works analysed display perception studies as methodological strategies. Although it is an unusual technique in the world to know the binomial tourism-climate change, it is the most used among the articles examined (half of them). In this regard, we doubt of the usefulness of the knowledge produced from opinions on a phenomenon that occurs despite personal impressions (perception of the direct effects of climate change, acceptance to the idea of the anthropogenic origin of climate change, level of knowledge about the climate change). We also speculate whether this preference responds to the (apparent) ease of the technique in the face of the complexity of the subject (need of knowing scientific paradigms of the natural and social sciences at the same time).
- Latin American scientific publications have preferred to consult residents, unlike tourism studies from other latitudes that have used this technique to know the perceptions of tourists. In this regard, we agree with the idea that specific studies of the perception of residents can be valuable inputs for the formulation of public policies. In other cases, they would gain consistency if they are contrasted with other registers of reality or other perceptions.

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# Chapter 8

## Economy and Nature: Perspectives from South America



Silvina Alejandra Romano, Julián Kelly and Juan Lavornia

**Abstract** This chapter seeks to understand the complex relationships between Nature and economy in recent decades, in the global context of environmental change. Within this framework, the objectives of this study are threefold. First, we analyse how orthodox and heterodox economic theories depict the tension between the exploitation over natural resources and their environmental impact. Second, we examine theories that consider the importance of the environmental factor in their world views, such as the bioeconomics and the ecological economics. Third, we will introduce Latin American Perspectives, considering the cases of Argentina, Colombia, Ecuador and Peru. This chapter presents the results of a qualitative research and provides an updated vision of the relationships between Nature and economy, paying special attention to the recent historical process of South American countries.

**Keywords** Environment · Natural resources · Economic theory

### 1 Introduction

There is no way to understand human history without considering the benefits and conditions imposed by Nature on the development of human activities. The economic activity, whose development implies the use of matter or energy coming from Nature; activities that have been and are understood as conditioning the level of well-being

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reached by societies. However, despite this dependence of economies on natural resources, not all of them constitute economic goods, since some of them are so abundant that assigning them an exchange value would not make sense within the economic systems. Consequently, the dominant rationality in said modern discipline overrates the value of those natural goods that can be incorporated to the market and is unable to consider others, regardless of their importance for man (Leff 2004). In such a context, the authors of this paper wonder: How do the different schools of thought within economics incorporate natural resources?

On the other hand, facing the inherent complexity of environmental systems (Funtowicz and De Marchi 2000) and attempting to understand the multiple wefts (García 1994) that make up the current environmental scenario, it becomes necessary that the approach of the economic dimension is made in the light of other subsystems, such as the ecological, political and social, to truly make a contribution to the “field of environmental knowledge” (Leff 2000). In addition, given that the environment can be understood as the “historically constructed society–Nature relationship” (Fernández 2000) the proposal is to socially and politically contextualize the implied process and attempt to understand in which context the different answers to the environmental crisis have been developed within the dominant thought in Economics, and especially from the Latin American Perspective.

The peripheral condition of South America in the international system determines how its economies engage in global economy (Wallerstein 2005). It is through the exploitation of its natural resources that this region has comparative advantage. The need for foreign currency in order to acquire commodities, capital goods or foreign debt service payment overloads the primary sector of economy. How can this be observed in the economy–Nature relationship?

This chapter addresses the relationship between Nature and economy, understood as a complex phenomenon with a direct impact on global climate change. First, this relation is approached from the mainstream theoretical perspectives in economic theory: neoclassical and Keynesian schools, then two alternative perspectives are added: bioeconomics and the theory of good living (better known as *Buen Vivir* according to their Spanish name). It is worth mentioning in this point that, although there are different schools of thought in the region that criticise and re-signify the economy–Nature relationship, this work follows the South American current based on the works of the Rosa Luxemburg Foundation as well as the Latin American Council of Social Sciences (CLACSO, for its Spanish acronym) which are grounded on critique to the traditional economics that does not acknowledge the environmental limits to production; this current understands the need to develop a Latin American thought leaving aside the “thought determined” by the West (Eurocentrism), and thereby manage to change the capitalist logic of Nature.

To this end, the following analytical categories are established: anthropological conceptualisation, epistemological principle, economic growth, function of production, role of the State and view on Nature, which are applied to four emblematic Latin American cases. There is a brief presentation of the historical background behind the processes for the countries in the region and then the cases Yasuní-ITT Initiative (Ecuador); mining in the Quindío (Colombia); mining venture in Minas

Conga, Cajamarca (Peru); large-scale surface mining in Iglesia Department, San Juan Province (Argentina) are introduced. These cases are examined qualitatively, through primary and secondary sources.

## 2 The Relationship Between Economy and Nature

### 2.1 *The Economic Tradition*

#### 2.1.1 On Production

The explanation of the natural component in the economic analysis varies throughout history; each school or group of authors integrates natural resources to the economic study as a way of understanding this relation. The first approaches can be found among “Physiocrat” authors in the eighteenth century, who emphasise the relevance of natural resources to economic analysis. Thus, authors such as Quesnay (quoted by Naredo Pérez 2006) name the economic discipline “economy of Nature” which is based on an organicist view and understands that natural resources (animals, plants and minerals) are at the service of production; i.e., all wealth comes from Nature: “economic growth occurs thanks to the wealth generated by Mother Earth (agriculture)” (5: 2006). These authors believe the existence of the State unnecessary, as long as the agricultural sector is strong, then economic strength will lie in it (Passet 1996).

The Industrial Revolution (late eighteenth century) had a profound impact on the evolution of economic thought. Classical school Smith (1991) and Ricardo (1985) understand the economy–Nature relationship as a requirement for production. On the one hand, the category “Land” (L) is part of the economic process, distinguishing between “productive” and “unproductive” lands, leaving aside other resources necessary for production. On the other hand, technology is regarded as the source that allows expanding the production frontier, therefore leaving aside the limits of natural resources.

Furthermore, the notion of homo economicus conceptualises the representative agent as an individualistic where the sum of the individual behaviours expresses collective action. The main goal is consumption through the ordering of the individual preferences. This way of understanding man is hegemonic in economic theory; alternatives such as cooperative or collective behaviour are discarded. It is worth noting that the emergence of this tradition was strongly influenced by the positivist paradigm and, through it, by the supremacy of the hypothetico-deductive method over other methodological approaches.

With the irruption of the Marginalist revolution at the end of the nineteenth century, the neoclassical economics (Alfred Marshall) modifies the way of understanding production. The production function is formalised, graphically and mathematically representing the product quantity that can be obtained from the com-

bination of labour (L) and capital (K) factors (Screpanti and Zamagni 1997). Under mechanistic assumptions, it uses the principle of untimed conservation and maximisation, whereby which the production process is separated from the natural and it is the investment that allows the land resource to become capital (Georgescu-Roegen 1975). This notion completely dissociates the human being from his dependence on Nature. In this context, the neoclassical ideal world is defined, resulting in perfect markets emptying, i.e. the supply and the demand management to be carried out at the equilibrium price. Producers can anticipate the behaviour of consumers to know what, how much and how to produce. This approach to the use of natural resources assumes that they are fully available and inexhaustible. Each time there is an increase in pressure on the productive system; technologies will be found to optimise their use.

It is also important to point out that the market is the mechanism regulating social relations, and the State complements this in specific areas, such as security. In terms of Naredo Pérez (2006), the definition of the neoclassical economic system is what finishes burying the Physiocrats' Nature economics, which is definitively excised.

### 2.1.2 Growth

The concept of economic growth from the neoclassical economics explains the increase of a country's product (GDP). It is maintained that such growth is achieved through the increase of the capital factor, and that in this way, the production potential frontier of each country is moved forward; these are general principles for any economy. This movement is mainly achieved with the increase of technology (Solow–Swan Model). The system adjustment mechanisms occur spontaneously; the market is the one dealing with distribution, prices are the information system (Passet 1996; Roncaglia 2006), and State intervention is minimised.

Under these growth assumptions, the finiteness of natural resources is not considered; i.e., limits posed by the biosphere or the possibility of resource depletion are not taken into account; proof of this are statements such as “The world can, in effect, get along without natural resources, so exhaustion is just an event, not a catastrophe” (Solow 1974: 11).

Solow is one of the main advocates of the school of growth. Among his strongest ideas, he maintains that the transformation of resources into capital is one of the purposes of economic activity, leaving aside the effects this may have on the environment (and the impact on future generations): he maintains that increasing the capital endowment (at the expense of resources) leaves future generations in a better position (Solow 1974).

In the sphere of neoclassical economics, “environmental economics” is formalised, using the notion of externality to incorporate environmental damage. Externality implies analysing the costs or benefits that occur when an agent carries out a certain economic activity and affects a third party. Therefore, environmental damage can be measured through an environmental cost–benefit analysis, and thus, a price to pollution, for example, can be assigned. For instance, in Pigovian Taxes, an acceptable level of pollution can be determined, and a tax can be levied on whoever

is producing it (“the polluter pays”), incorporating pollution as one more variable of production whenever the producer can be identified (Galafassi 2001).

From the heterodox perspective, and strongly relevant at the beginning of the twentieth century with the crisis of the 1930s “the Great Depression” (Hobsbawm 1999) the Keynesian thought is formalised (later post-Keynesian), from the contributions of John Maynard Keynes as founding father as well as Michal Kalecki and Nicholas Kaldor among others. They find answers to the crisis giving importance to the role of the State in what was later known as “State of Welfare” which distributes and guarantees the fulfilment of basic needs of the society where the market does not, in opposition to the neoclassical idea; on the other hand, they emphasise the role of the State as dynamizing factor of the demand. These authors defended the progress view (Gudynas 2011).

Some of the authors who are considered to be Keynesians or post-Keynesians are highlighted; we are not including all the contributions of the schools that find their foundational ideas in Keynes. As for growth models inspired by Keynesian ideas, the Harrod–Domar model is one which focuses on long-term product growth, which is explained through the savings rate, the capital (K) growth–product growth ratio. The relevant variables are savings and investment which achieve the K increase and therefore the product. One of the most rigid assumptions of the model is the perfect complementarities between the factors of production (capital and labour). In order to achieve the K increase, it is necessary to save and that this saving becomes investment, and the technological progress is transformed into K increase and therefore in product growth. This model studies not only the conditions for growth of these factors but under which characteristics it is sustained in the long term with macroeconomic stability (González and Hassan 2005).

Although this current differs from neoclassical ones in terms of State intervention, market failures and the question of distribution, it does not achieve a formalisation that allows understanding the economic limit posed by natural resources—of course, the above does not underestimate the explanatory capacity of the Keynesian approach, whose analysis and public policy recommendations were essential to overcome the crisis of the 1930s and resume the trend of growth. These measures appeared in a historical context and faced with a particular economic problem: the demand depression. Within the Keynesian notions, approaches cannot be found that include the environmental dimension and, therefore, explain the factors of the economic activity that account for, for example, climate change.

The economy–Nature relationship is not explicit in this literature; a way to understand it or to find clues to conceptualise this relation is the production function, which in its most traditional form is represented as the combination of capital, land and labour factors—although the production function is restricted to the analysis of K and L. “The land factor” includes the natural resources implied in the process, which are unlimited in this modellization. The transformation of these resources into capital is what guarantees growth.

To ignore the relationship operating between these factors and the economical implication of the use of natural resources empties economics of its explanatory



capacity for long-term growth. The result of economic activities contributes to climate change and thus to the quantity and quality of available natural resources.

## ***2.2 Georgescu-Roegen Bioeconomics' Perspective and Other Critical Ideas***

The possibility of unlimited growth is first put at issue at the beginning of the 1970s. "The Entropy Law and the Economic Process" (Georgescu-Roegen 1996) is published and marks a milestone by posing alternatives to the production function and a strong critique of both neoclassical and Keynesian economics. These criticisms include the failure to understand the limits of growth, the failure to consider the complexity of natural resources, the mechanical view of economics as well as the principle of non-reversibility (Cervantes 2008).

One of Georgescu Roegen's main contributions to economic theory is the redefinition of the production function. This new approach includes time, waste generation and the disaggregation of the land factor in different natural resources as variables in the productive process. The production function of bioeconomics includes land as a productive factor (Ricardian land) as well as disaggregated natural resources (energy, inputs, inputs from other industries, among others). Disaggregation is approached from the second law of thermodynamics, the law of entropy; the inclusion of waste is intended to account for biospheric limits in absorbing waste from the process.

This view proposes that production processes should be analysed as entropic, generating a loss of energy quality at each stage of the process (Cervantes 2008); understanding the irreversibility of productive processes implies understanding the limitations of natural resources and the need to rethink the rules of the system.

In bioeconomics, the ecological sphere is analysed systemically as determining the limits of the system; thus, the social and the economic dimensions are subsystems thereof. This critique blames traditional economics for setting the market principles and understanding the economic process as isolated, to the point of assuming that man and his production methods always find or reach new energy forms or sources (Passet 1996).

From this perspective, and from a critical point of view to the epistemology of neoclassical economics, bioeconomics intends to develop a new epistemological look for economy as a discipline allowing to understand the systemic view, focusing the analysis on the environmental level result of the intervention in the economic activity; as it is expressed in the following quotation: "Homo economicus is a greedy being without feelings, a predator and is opposite to Homo bioeconomicus, who is a being satisfied with what it possesses, sensitive to the needs of others and to social, economic, biological and environmental realities" (Mohammadian 2005: 3).

The Ecological Economics follows the ideas presented by Georgescu Roegen, and from the understanding of the biological limits to the growth studies the relations between economic growth and natural environment (Martínez Alier 1987, 2001, 2004 among others).

### 2.3 *The South American Perspective*

The unfulfilled promises of development that cut across all “underdeveloped” regions urge the search for new models where the idea of “place” must be prominent so the relationships with Nature are thought in terms of territory. Understanding it from the field allows for an immersion in culture (Escobar 2014). The South American perspective is reflected in a great variety of literature on the economy–Nature relationship that incorporates the climate change dimension. This subsection focuses on the literature that analyses the use of natural resources as an economic development strategy and its implications. It is worth pointing out that these are not conceptualisations from economic theory, but that in their development one can find elements making significant contributions to that discipline.

It can be inferred that in the name of the economic development, Nature has been mercantiled; hence, a “deconstruction of the economics” is proposed as a practice that involves an integral approach including economy, philosophy, politics and the social factor in order to achieve a new field of knowledge that allows to challenge the established social order (Leff 2008). This task requires removing the idea of rationality and infinity of the natural resources from the economics to achieve a resignification of Nature. Leff (2006) emphasises “the environmentalization of the indigenous and peasant struggles and the emergence of a Latin American environmental thought”; and in turn, his proposal integrates the criticisms of different fields around the inequalities of the capitalist world system (Wallerstein 2005) in peripheral states such as colonisation, international division of labour and transculturation, among others. For that reason, the alternatives must overcome the notion of development in any of its variants, not to think of possible developments but to leave the idea of development behind (Gudynas 2011). To this end, Svampa and Alvarez (2010) proposes an “eco-territorial turn” in order to highlight the territorial struggles of local movements in the defence of their lands. Under this outlook, the transformation “from below”, outside the State, gains a central position.

In order to rethink the economic logic and the use of resources, this current incorporates the ideas of “Buen Vivir” or “sumak kawsay”. These notions represent a different way of being in the world that tries to break with the logic of capitalist consumption as an articulating mechanism of societies. Some of the principles of this new cosmovisión (world view) were incorporated in the Constitutions of Ecuador (2008) and Bolivia (2009), as part of a profoundly decolonial movement; in this line “Neither the Gross Domestic Product (GDP), nor the paradigm of sustainable development, nor the ‘fighting poverty’ minimalist social goals embody the expected horizons to delineate and define the medium and long term” (Alcoreza 2011: 232).

In a biocentric turn, these new legal systems consider Nature as a subject of right; any citizen can file an action where rights of Nature are allegedly being violated. Gudynas (quoting Magdalena León) understands “Buen Vivir” in the context of “reciprocity, cooperation, and complementarity that implies a shift from accumulation as a central category to life” (Gudynas 2011: 195). Rethinking and reconstructing the relationship between man and Nature imply an epistemological change, consid-

**Table 1** Dimensions of the different schools of thought in economics about the economy–Nature relationship

Dimensions	Traditional economics		Bioeconomics	South American ‘ <i>Buen Vivir</i> ’ perspective
	Neoclassical	Keynesian		
Anthropological conceptualisation	<p><i>Homo economicus</i> Maximise consumption</p>		<p><i>Homo bioeconomicus</i> To be cooperative in harmony with one’s environment</p>	<p><i>Homo naturalis</i> Man is a natural being</p>
Epistemological principle	<p>Anthropocentric. Mechanistic vision of economy. The articulating axis is consumption</p>		<p>Biocentric. Entropic process. The articulating axis is given by the biospheric limit</p>	<p>Ecocentrism. Knowledge is not to discipline. Nature is the articulating axis</p>
Economic growth	<p>Unlimited. Measured by GDP. Investment and technology key to growth Resources become capital</p>	<p>Unlimited. Measured by GDP. Sustained by the growth of effective demand (internal or external)</p>	<p>Impossibility of unlimited growth. Economy is a subsystem of the biospheric system. It must adapt to systemic limits</p>	<p>Deconstructing the economy. It does not refer to economic growth, but to the need to rethink economic practice in order to be in harmony with Nature</p>
The production function	<p>Technology and free availability of natural resources increase capital sustaining growth</p>		<p>Proposal for a new production function that includes resource, waste, and energy expenditure</p>	<p>The concept of production relations is reframed and as such the function is left aside. It is necessary to rethink social relations according to the conception of man as a natural being</p>

(continued)

**Table 1** (continued)

Dimensions	Traditional economics		Bioeconomics	South American ' <i>Buen Vivir</i> ' perspective
	Neoclassical	Keynesian		
Role of the State	Liberal State Guarantee legal security, non-intervention in the economy Market regulates economic activity	Welfare State Intervention in countercyclical movements The State regulates economic activity	Modified Welfare State. Intervention in production processes	The governments of the region must try to break away from the colonial order that is based on the epistemology of modernity
View on Nature	Environmental economics: natural resources are available for production. Admission of negative/positive effects (externalities) that are corrected with punishments or rewards	Nature is marginalised from the models	Resources matter, and in the face of the possibility of exhaustion, those processes that have the least entropy should be selected	Natural man. It is necessary to refocus on that relationship. Nature encompasses all knowledge while being a subject of right

Source Prepared by the authors

ered as liberating and decolonial since it modifies the logics of power (Blanco 2017; Madoery 2016). For these reasons, the State expresses the difficulties and limitations derived from years of neoliberalism; the attempts to get rid of the “colonial” and imperialist practices (Lander 2011) on the part of progressive governments in the region generated great tensions and contradictions inside their societies.

Table 1 shows how the three perspectives analysed, namely traditional economics in its liberal and Keynesian forms, bioeconomics, and “Buen Vivir” account for the relationship between economy and Nature through a six-dimensional analysis.

### 3 Case Analysis

#### 3.1 Background

Prior to the case analysis, the economic and political processes preceding the study period are discussed, providing a necessary frame of reference since this paper postulates that the current situation is an emergent of what has happened, in economic terms, in recent decades.

In the last quarter of the past century and so far in this century, South America has been the scene of political and economic processes that marked a period of deep ruptures and continuities. These are framed within the economic perspectives analysed above. On the one hand, those traditions that promote different models of development and international insertion, either based on “outward growth” or oriented towards an international insertion based on the domestic market growth and a participation not subordinated to the interests of the states at the centre of the international economic system (Sunkel and Paz 1980; Cardoso and Faletto 1969). On the other hand, some countries of the region incorporate in their policies elements of the “Buen Vivir” notion, originated in Latin America and including ideas from the world views of the indigenous peoples (Gudynas, Escobar, Svampa, among others) and the bioeconomics (Georgescu, Martínez Alier), constituting a profound critique of modernity. The implementation of these policies in South America can be structured in three stages. The first comprises the last three decades of the twentieth century and is arranged around neoliberal structural reforms; in the second, the first 15 years of the twenty-first century, there is a quest for alternatives to the policies of the previous stage—this process was heterogeneous and failed to consolidate a new development scheme; finally, from 2014/2015 onwards most countries in the region abandon the path started in the second stage and return to apply neoclassical and conservative policies.

After the Second World War, the bases were established in the region of what Cavarozzi (1991) calls the state-centric matrix, which is twofolded: (i) the State—market relationship characterised by import substitution, high rates of economic regulation, closed or semi-closed economies and patterns of moderate inflation; (ii) the relationship between civil society and the State, where stirred subordinate classes and

the dispute over State control played a central role in the type of political system. In turn, economic growth was accompanied by an increasing insertion of transnational corporations in local economies (O'Donnell 2010). In the 1970s, the limitations to economic growth were more and more marked; bottlenecks were generated in local industrial production while the fiscal deficit increased. In the early years of this decade, the neoconservative and neoliberal voices that maintain that inflation and the excessive participation of the State in social demands formed the basis of the developed economies' financial deterioration (Portantiero 1984) are increasingly echoed. The debt crisis of 1982 is the event that initiates the path towards neoliberal structural reforms in Latin America (Barcena 2014; Ocampo 2014). The political dimension is strained; after years of authoritarianism, the expectations of improvements in the new democracies are frustrated; political and union leaders, governments and state bureaucracies are blamed for it (Cavarozzi and Casullo 2002: 11). The solution to the debt crisis effects was offered by the USA with a peculiarity: the policies of the governments requesting it must incorporate the guidelines of the Washington Consensus, i.e. i. government budget discipline; ii. redirect government spending to education and health areas; iii. tax or fiscal reform, with broad taxpayer bases and moderate taxes; iv. financial deregulation and market-driven interest rates; v. competitive, market-driven exchange rate; vi. free trade between nations; vii. opening to foreign direct investment; viii. privatization of public enterprises; ix. deregulation of markets; x. property rights assurance (Stiglitz 2002). From the implementation of economic policies based on these guidelines, governments hoped to return to the international capital market to regularise their debts and thus be able to resume the path of economic growth. However, the new growth scheme and the resulting social structure were far from the inward-growth model ideal. In order to explain this change of course, one should add to the economic factors, required condition, the political factors: the ideas, the social-political forces and the institutions (Torre 1997). For societies to accept the new recipes for diagnosis under neoliberal assumptions, a context is needed establishing a new "common sense". It is considered that governments do not implement a plan that they had beforehand to leave the pre-existing development model. It was the impossibility of coming out of recurrent crises that opened the doors to new policies.

The implementation of neoliberal reforms was favoured by the institutional framework of Latin American countries. The rules of the game, formal and informal, give Latin American presidencies ample room for manoeuvre to promote their government policies (O'Donnell 2011; Mainwaring and Shugart 2002). Several South American countries included the environmental dimension in their regulatory frameworks through constitutional reforms, Colombia in 1991, Peru in 1993, Argentina in 1994, and Ecuador in 1998 incorporated articles on the environment, state sovereignty over natural resources and the rights of indigenous peoples. By means of environmental fiscal reform, "green taxes" began to be imposed, a process based on the European experience in the previous decade. They intended to achieve a sustainable development model through the incorporation of externalities through taxes. The solution, in line with the proposals of environmental economics, proposes to correct through the price mechanism the distortions that the capitalist system effects on the environment and natural resources (Fanelli et al. 2015). As mentioned, structural

reforms advanced over two axes: one, the State is reduced, privatisation and deregulation policies went to the detriment of its intervening and benefactor role, and the other, financial income is prioritised over productive income (Thwaites Rey 2010).

The search for access to international financial markets and free-market policies in foreign trade led to a policy of international insertion and had a negative impact on the local industry. In Argentina, the industrial product went from 25% of GDP in the 1970s to 17% at the end of the 1990s. On the other hand, the foreignization of the economy increased with the consolidation of “a productive structure specialised in natural resource-intensive activities that benefited mainly the large national and transnational economic groups” (Roark et al. 2013: 37). The effects of the new economic course (state apparatus and industrial sector contraction) were strongly felt in the middle and lower sectors. ECLAC points out that poverty and inequality in the region increased (Ansaldi and Giordano 2012); it should be noted that inequality rates in Latin America are the highest in the world (Vilas 2011). This insertion profile also conditions economic policy options to the postulates of the International Monetary Fund and the World Bank and increases external vulnerability (Stiglitz 2002). The recurrent international financial crises of emerging economies are a clear example of this (Mexico 1994, Malaysia 1997, Russia 1998, Brazil 1999, Argentina 2001).

Parallel to the advent of neoliberalism, there are voices questioning the direction taken by the regional governments. Resistance comes mostly from social movements and, to a lesser extent, from political parties and trade unions. The active participation of civil society created spaces for resistance to neoliberalism, as is the case of Sem Terra (landless workers) Movement in Brazil, Piquetero (road blockers) groups in Argentina, Cocalero (coca growers) movement in Bolivia, and indigenous movements in the Andean countries. Likewise, various critical political forces constantly increased their electoral flow (Partido dos Trabalhadores in Brazil, the Frente Amplio in Uruguay and Movimiento al Socialismo in Bolivia, among others).

In the second half of the 1990s, the governance crisis became widespread in several countries (Venezuela, Argentina, Ecuador, Bolivia, among others), a situation that led to new programme agreements between political elites, subordinate sectors and fractions of capitalist spheres. As a consequence, new governance is born. The presidential elections in South America account for this process: Venezuela in 1998, Brazil in 2002, Argentina in 2003, Uruguay in 2004, Chile in 2005, Bolivia in 2006, Ecuador in 2007 and Paraguay in 2008. The new administrations occasionally incorporate alternative policies, not following a homogeneous and well-designed programme. Clearly reflecting the contradictions of this process, transnational or national extractive production companies have also been at the centre of this scenario. Moreover, in countries such as Argentina and Brazil, the promotion of industrialisation results, paradoxically, in an economy re-primarization. One of the reasons for this lies in the peripheral condition of these economies.

A key element of the new scenario is the role of the State: the market ceases to be “the great regulator and distributor” (Vilas 2011: 68). This can be seen in different dimensions. In the international sphere, it is a stage where the search for autonomy is prioritised, through its own regional form of insertion promoted by different regional

integration organisations, such as the Alianza Bolivariana para los Pueblos de Nuestra América and the Unión de Naciones Suramericanas. The response to the Free Trade Area of the Americas proposal at the 2005 Summit of the Americas or the processes of external debt relief point towards this direction.

Another dimension includes processes of redistribution, democratisation and inclusion. Democratising and inclusive education policies, universal redistribution programs, an active role in job creation, recovery and/or expansion of social security, incorporation of historically marginalised groups, among others, become the norm in most countries of the region. These processes were accompanied by a favourable context. The evolution of the emerging economies, particularly China and India, causes a rearrangement of the terms of trade, which again favour the region in its peripheral condition. Goods allowing for foreign exchange creation register strong rises in prices (oil, soybean, copper, meat, among others). In this way, the conditions for profit accrual by private companies in Latin American countries are reset, favoured by the new governance. The policies of industrial development, redistribution and inclusion needed surpluses that were being generated, to a large extent, from economic activities related to the exploitation of natural resources. This process entailed the recovery of large companies (extractive and industrial, inserted in the global productive chain), the agricultural export sector and the middle and upper classes.

The neoliberal crisis did not lead to a new paradigm. More than a programme, it is about a series of ideas that derive in public policies. The new vocabulary integrates concepts such as post-developmentalism, “Buen Vivir” notion, colonialism, neo-developmentalism, twenty-first-century socialism, plurinational states, among others. The authors exploring the first three terms (Gudynas 2011; Svampa 2010; Lander 2011; Escobar 2010) recognise that, despite certain continuities with the development model (extractivism, industrialisation, extensive crops, post-neoliberalism) the new wave of socialist or national-popular governments are not monolithic governments and that they have multiple internal strains, which must be exploited by social movements and organisations promoting a paradigm shift. Some authors maintain that social organisations and movements are “the great protagonists of this new cycle; through their struggles and demands, even by insurrectionist practices, they managed to open the public agenda and fit new issues in: the claim against the violation of the most basic rights, the question of natural resources and indigenous autonomies, the crisis of representation of existing systems, thus contributing to legitimizing other ways of thinking about politics and social relations” (Svampa 2010: 4).

The transformations of the first decade of the twenty-first-century spawned political, social, cultural and economic stresses. Coupled with this, the last great crisis of capitalism initiated in 2008 in the centre and then transferred to the emerging economies, and the weakening of the terms of trade (particularly the price of oil) reactivates latent conflicts and jeopardises the alliances granting governance to the political system. Discourses that advocate a neoliberal state are resurfacing. The type of State needed by politics that promote an international insertion oriented to the development of the export sector is different from that required by a model oriented to financial capital and commodity exports (Evans 1996).



The decisions made by governments begin to be resisted by sectors with ample power resources (media, large transnational or local companies integrated into the global economy, industries linked to the production and/or commercialisation of commodities). Starting in 2009, clouds appear on the horizon of the process that emerged in the light of the neoliberal hegemony crisis. These governance downturns are becoming stronger in Argentina, Venezuela and Brazil. The changes of administration in Argentina (2015), Brazil (2016) and Ecuador (2017), added to the crisis in which Venezuela is immersed, show a return to neoclassical conceptions of statehood configuration.

At the international level, the model based on hemispheric integration, alignment with the USA and the foundations of the 1990s open regionalism is once again present. The Pacific Alliance, imbued with neoliberal thinking, brings together several countries in the Pacific region (Chile, Colombia, Mexico and Peru) and attempts to gain presence and acceptance in those countries that opted for international insertion forms that sought to expand international autonomy and that are now in crisis.

To conclude, the change of era that began in the first decade of the twenty-first century was not implying a homogeneous programme but rethinking and resignifying the modes of statehood and region development, fundamentally against the neoliberal experience. In this sense, the experience of national-popular or left-wing administrations shows that the State was able to materialise, for several years, coalitions that granted governance to this scheme. The states did promote social, economic and cultural transformations, with differences of degree and scope, but all of them intending to include the popular or marginalised sectors. On the other hand, this process reminds us that the states of the region are inserted in a global economic order that not only draws limits to the concrete transforming processes but also to the way of thinking about those transformations.

### ***3.2 Dimension Under Analysis: Four Emblematic Cases***

In the previous sections, the main global economic perspectives and their approaches to Nature were discussed, as well as the emergence in South America of a different way of understanding the relationship between economy and Nature. On the other hand, a historical description of political and economic processes in the region in the last decades was provided aimed at observing the ruptures and continuities in economic policies that prevailed from the last decades of the twentieth century to the present. This allows us to examine the four case studies taking into consideration their anchorage in political and economic macro processes. The choice of cases is based on the following: i. the tensions related to the exploitation of natural resources and the economic logics in dispute can be observed; ii. the four countries undergo changes in their executive power during the analysis period, which reflect changes in their economic policies; and iii. the constraints placed on the South American countries due to their peripheral situation in the international scenario.

### 3.2.1 Ecuador: Yasuní-ITT Initiative

During the presidency of Rafael Correa (2007–2017), principles of “Buen Vivir” were included in government policies: 2009–2013 and 2013–2017 National Plans for Buen Vivir. Likewise, the 2008 constitutional reform promoted Nature as a subject entitled to rights. In this context, the Yasuní-ITT (Ishpingo-Tambococha-Tiputini) Initiative is an attempt to bring these principles into economic logic, while it exposes the complications of implementing “Buen Vivir” policies in peripheral economies. It is worth highlighting how significant is the oil resource in Ecuador, which accounts for around 35% of the total income of the country.

The area where the Yasuní-ITT Initiative deploys has unique features: i. it is one of the areas with the greatest biodiversity in the world; ii. it is adjacent to communities of self-excluded indigenous peoples, i.e. that opted to remain outside the jurisdiction of the Ecuadorian State; iii. it is an area where multiple institutional frameworks coexist, in some cases overlapping, and with goals that are not always complementary, namely: area declared a Biosphere Reserve by the United Nations Educational, Scientific and Technological Organization (UNESCO); the Napo River riparian area, under the jurisdiction of the Intangible Zone and its buffer zone; National Park, Indigenous Areas; Blocks where the space for oil extraction is delimited; and the Province of Orellana.

The National Plan for Good Living 2009–2013 (2009) considered the Yasuní-ITT Initiative as a “comprehensive strategy that, supported by fair payment schemes for the ecological debt, points towards a profound change in the view of the interrelations between society and the environment” (Senplades 2009). To achieve this, a trust fund was set up through which the international community should contribute at least 50% of the value of the non-extracted oil. In a peripheral economy strongly dependent on the oil resource as foreign exchange generator, prioritizing the preservation of biological and cultural diversity—one of the axes of “Buen Vivir”, at the expense of oil exploitation (and involving the international community in this decision) constituted an alternative and novel strategy at the international level. It should be noted that local movements and various international actors (national administrations, international agencies and international non-governmental organisations) accompanied the launch of the project.

In mid-2013, four years after the initiative takeoff, the Ecuadorian government announced complications in obtaining external financing, which reached 1% of the target. As a result, the possibility of extracting oil in the ITT Yasuní area is once again being considered. The Executive Branch based its decision on the need for such funds to improve the living conditions of the population (El Universal 2014a). Part of Ecuadorian society reacted negatively to this change. The YASUnidos movement managed to unite the opposition sectors and began a national campaign to reverse the measure by means of a popular consultation, but it failed to gather the required number of signatures to thrive. The movement denounced obstacles on the part of the authorities in the process of collecting and counting signatures. The Llanchama indigenous community expressed they felt “threatened and invaded” as the consensus to carry out the hydrocarbon exploration and exploitation was not

respected (El Universal 2014b). Likewise, the conflict escalated to international level after Germany questioned the end of the Initiative. Notwithstanding these contrary repercussions, Correa's government granted the state company Petroamazonas the licenses to develop oil exploration and extraction and approved the required environmental impact reports. In the meantime, the proven reserves in the ITT block went from 920 million barrels to 1672 million, a 42% of the country's total reserves. The change of administration in 2017 implied a political break with the previous government but did not change the extractive trend in the Yasuní area.

### 3.2.2 Colombia: Mining in the Quindío

Located in the Central Cordillera of the Colombian Andes, the Quindío Department is located in the heart of the country's coffee-growing area. The coffee growing axis was declared a World Cultural Heritage Site during the 2011 35th session of UNESCO's World Heritage Committee. The decision states that the region "Is an exceptional example of a sustainable and productive cultural landscape that is unique and representative of a tradition that is a strong symbol for coffee growing areas worldwide (...) It reflects a centennial tradition of coffee growing in small plots in the high forest and the way farmers have adapted cultivation to difficult mountain conditions." There are also other protected areas such as the Cocora Valley, within Los Nevados National Natural Park. That same year begins a debate around the possibility that the mining industry will develop in Quindío. This department has mineral reserves of gold, zinc, platinum, molybdenum and copper, and construction materials, among others. The economic performance of the region in recent years favoured the study of production alternatives; its share in the overall national economy changed from 7.1% in the 1960s to 4.1% in the first decade of the twenty-first century. Quindío, on the other hand, witnessed an 2.3% economic growth in 2001–2010 while at the national level the growth was 4.1% and that of Caldas and Risaralda—the two neighbouring departments of the coffee growing axis, was 3.8 and 4.1, respectively. While in these the manufacturing industry and services have the highest growth, in Quindío it is tourism, together with services (Valencia et al. 2013).

It is in this context that the permits granted to mining companies by the national government in the department of Quindío become relevant. The mining–energy sector is considered by President Santos' Administration among the "growth locomotives" in rapid expansion in relation to other locomotives such as agriculture, although the sector must take into consideration issues related to sustainable development (Executive Summary of the 2010–2014 NATIONAL DEVELOPMENT PLAN). According to María Isabel Ulloa, Vice Minister of Mines (El Tiempo 2015), in 2015 there were 77 mining titles in force throughout the Quindío territory. Of these, 34 account for trawling materials, 38 to gold and precious metals and 5 to other materials, covering some 44 thousand hectares and representing 23% of the total department area. The report also pointed out that three companies concentrate 95% of the titled area: Anglo Gold Ashanti, 83%, Oro Barracuda S.A.S., 6.7%, and Sociedad Anglo American Colombia Exploration S.A., 4.4%. The advance of mining caused opposing

reactions from local governments and sectors of civil society in the Quindío Department. The pressures regarding the development of mining included heterogeneous demands, jurisdictional issues, environmental advocacy, defence of culture and traditional productions of the area, among others. Two judgments passed by the Constitutional Court of Colombia are in line with those. Judgments C-123/14 and T-446 grant sub-national jurisdictions competence in relation to land planning for productive use. The second of the judgments granted the Municipality of Pijao in Quindío the power to carry out a popular consultation in order to decide whether or not to approve the establishment of the mining industry and became a witness case for the rest of the municipalities of the Department and the country. The National Administration and mining entities, such as the Colombian Mining Association, argued that these measures create legal uncertainty and have a negative impact on the flow of Direct Foreign Investments, labour sources and State income in the form of royalties. Therefore, there is a conflict between extractive mining and local communities that reflects the neoclassical view of the national government.

### 3.2.3 Peru: Mining Venture Minas Conga, Cajamarca

In the province of Cajamarca, located in the homonymous region in northern Peru, the company Minera Yanacocha SA operates as a consortium of national and foreign companies, with five mining operations in the province (Carachugo, Maqui Maqui, San José, Yanacocha and La Quinua). The shareholding is composed as follows: 51% Newmont Mining Corporation (USA), 43% Grupo Minero Buenaventura (Peru) and 5% International Finance Corp. (World Bank) (Kuramoto 2000; Chacón 2003). On the other hand, the company promotes itself as the main gold extractor in South America guided by the principles of environmental sustainability and social responsibility. The reforms of the regulatory framework in the 1990s in economic matters, in general, and mining, in particular, intended to attract direct foreign investment and develop the mining activity, and favoured the growth and consolidation of the company. In this context, geological studies begun in the area in 1984; the Conga Project Environmental Impact Study is approved in 2011 (after several public hearings between March 2010 and October 2011). A 5 billion dollars investment is expected for the exploitation of gold and copper deposits in the provinces of Cajamarca and Celendín (Blanco 2013).

In order to extract the metals, pits had to be opened in lands close to ponds, which implied putting them at risk and the removal of tons of rock in the intervention areas. The existing ponds in the Chailluagón, El Perol, Alforjacochoa, Lucmacocha, Mishacocha areas and the Azul or Cortada ponds were included in the project with the risk of losing the water cycle in the region and then the alternative activities of small farmers (historical inhabitants of the region) (Blanco 2013).

The area is inhabited by communities of indigenous peoples, who denounced that the mining company had acquired land from the area at very low prices. After the approval of the projects, the inhabitants began to organise themselves. The popular movements came into conflict with the company, and for several years, there were

demonstrations against the business, which on various occasions ended with people being injured and detained.

Since the launch of the project and the environmental impact reports in 2010 to December 2011, the company tried to obtain the support of the villagers at various dialogue tables, failing at different times.

The movements opposing the project gain strength and support throughout the process. Not only do they file actions in the courts of Cajamarca, but they also submit notes and claims to the World Bank, considering that this organization holds 5% of Yanacocha's share capital. Finally, in 2012 the activities are interrupted and the possible execution is postponed to date.

As for the position of the different levels of government, they have fluctuated. The Cajamarca Region Government has expressed its objection to the project, led by Gregorio Santos (governor in 2011–2014 by the *Movimiento de Afirmación Social*), one of the most radical opponents to the project: "All the mining projects in the headwaters of the basin, which are about to be executed, are unfeasible because they seriously compromise access to the region's water resources. That is MAS's immovable position, not only valid for Conga but for any other initiative" (El Comercio 2014).

In 2014, after the change of administration in the province, the Mayor Manuel Becerra Vilchez of the *Fuerza Popular* party pronounces in favour. While Alan García's national administration (2006–2011) was in favour of mining, Ollanta Humala (president 2011–2016) expressed himself against it during his campaign, but once in the presidency, his position becomes softer. Current President Kuczynski (2016–2018) promotes mining projects with foreign investment.

### **3.2.4 Argentina: Large-Scale Surface Mining in Iglesia Department, San Juan Province**

The Iglesia Department, located northwest of the Province of San Juan and part of a region of over 37,000 km<sup>2</sup>, has deposits of gold, copper, lead, silver, zinc, as well as industrial minerals and rocks. There are numerous mining projects in the area, the most significant being Pascua Lama and Veladero, both linked to the Canadian company Barrick Gold and promoted by the governments at national, provincial and local levels. Pascua Lama is a binational project that also includes the Atacama Region (Province of Huasco, Chile) while Veladero is located entirely in Argentina. Both sites are more than 4,000 m a.s.l., in areas with glaciers which are essential for human development in the north of the province, where average annual rainfall is less than 200 mm. This is a recharge area for Las Taguas River, tributary of the Jáchal River in Argentina and of Del Estrecho River on the Chilean side. The Iglesia Department borders to the East with the Jáchal department; the main communities are in the Jáchal River Valley and develop agricultural activities from the use of meltwater. Also, the Chilean area involved in the Pascua Lama project includes territories belonging to Diaguita indigenous communities.

In 1993 and 1994, Argentina began a new phase in its mining policy by modifying the regulatory framework for this activity. Provincial control of subsoil resources, fiscal stability, tax relief and export benefits are among the main points. This new scenario led to the transformation of mining business in the Province of San Juan, which ceased to be a small-scale local industry and was now targeted towards large international investment ventures. For this province, the announcement of the Pascua Lama Project in 2000 and the beginning of exploitation in Veladero in 2005 took place in a context of crisis of its traditional activities—the wine industry and agriculture, which reinforced the transition towards a extractive, agricultural export and tourism model.

Barrick Gold's agreement with the national and provincial governments, supported by the political leadership of Iglesia and Jáchal departments constituted a solid block that, underpinned by the media, managed to obtain endorsement for mining from the majority of society. Only in Jáchal, a town of around 10,000 inhabitants, a group was made up of small rural farmers, merchants and state employees, with a significant presence of women teachers and housewives, who since 2004 opposed large-scale open pit in the region. Known as the Asamblea de Jáchal, they organised to object the undertakings of Barrick Gold in the area: Pascua Lama and the nearby Veladero mine, only 8.5 km away. The assembly carried out different demonstrations in vehicles and on foot for several kilometres, roadblocks that were harshly repressed filed different legal actions against the company and promoted measures claiming for a referendum in Jáchal.

In Chile, the opposition to Pascua Lama was also significant; farmers of the Huesca valley and the Diaguitas Huascoaltinos indigenous community succeeded in having the first Environmental Impact Assessment (EIA) dismissed in 2001. Among other modifications, the original project implied the dismemberment of the glaciers and their transfer in blocks to nearby sectors in the cordillera. Once the process for a second EIA started in 2005, Barrick Gold began a long series of actions to reach agreements with farmers and the Chilean government, disbursing a large flow of funds in the region for transportation infrastructure or water use. However, the Diaguitas Huascoaltinos people were not included in the negotiations even though, according to Chilean legislation, they owned the territory. Faced with an explicit position of the government to support the initiative, they resorted to national and international alliances with other environmental movements that, with a very aggressive communication strategy, gave this conflict global visibility. In Argentina, Asamblea de Jáchal actions took on national importance from 2015, when the first spill of cyanide solution in the Jáchal River occurred, later be followed by another in 2016. These spills meant for the company the payment of 11 million dollars in fines, although its 2016–2017 biennial production was of around 1,308 million dollars.

A Chilean Court ordered the cessation of the project in 2013 alleging imminent environmental damage to the Estrecho River water resources and after years without being able to advance the company announced its definitive abandonment of Chile in 2018, although it ratified its intention to continue the Argentine side. Here, despite the repeated spills denounced by the Asamblea de Jáchal, the provincial justice system replied requesting reports, so the mining company remained active until 2017, when

there was a third spill in Veladero. At that point, the Court requested the cessation of business in March and lifted the sanction in June.

### **3.2.5 The Application of Different Perspective to the Case Study**

The Yasuní-ITT initiative is the most emblematic given that since its inception, it has been thought in terms of “Buen Vivir”, whereas the case of Peru is based on a neoclassical idea: it is the social movement that organises itself and manages to stop the movement with “Buen Vivir”-related notions (implicitly). In Argentina, the government tries to implement Keynesian measures where, faced with the need to generate foreign currency, mining is regarded as an opportunity, while Colombia follows neoclassical principles, by not considering the possibility of resource depletion nor assigning a specific role to the State beyond the granting of permits for extraction; in the same way, the general presentation of the case follows cost-price criteria.

## **4 Conclusions**

In the last decades, the Latin American countries were constituted in scenarios that register ruptures and continuities. Those are related to the implementation of different economic models, the traditional economic perspectives “outward growth”, or based on the domestic growth and state-oriented, or when these perspectives are incorporated parameters of alternative currents such as “Buen Vivir” or the bioeconomy. These models show different ways of thinking the economy–Nature relationship, and the tensions derived from it, since although alternative economic policies were carried out, these, being framed in models with traditional economic logic, put manifest the contradictions but do not become overcoming strategies, the economic processes are not ahistorical.

This chapter shows how the different ways of thinking and building the economy–Nature relationship, from the economic tradition, are based on assumptions that contain the limitation of economics as a discipline to incorporate the Nature and their resources as an inseparable element of the productive process. In the same vein, shows the limitation to explain the damage that production causes to the environment.

This work has reviewed the central economic theoretical perspective to understand the conceptualisation of the relationship between the economy and Nature. We conclude that the neoclassical tradition does not explicitly examine this relationship; it incorporates the environmental consequences of production from their distinctive reductionism, by assigning a cost to damage. Keynesianism follows the neoclassical logic. Both schools propose the possibility of sustainable economic growth employing technology without considering biospheric limits, which fails to give a logical response to environmental damage as this dimension is ignored from the basis of economic analysis. In the same way, economic models consider that resources are exclusively available for economic use, not taking into account that these resources

fulfil other functions in the reproductive cycle of life. We can not avoid asking yourself where this inability of the economic sciences come from, whether it is an intrinsic limitation of the discipline or responds to the context of the dominant thought.

Bioeconomics breaks with traditional economic schools. It incorporates the notion of environmental limits, that is, the possibility of resource depletion. However, this perspective has not been able to position itself as part of economic thought, remaining within critical thought or outside the economic discipline.

The South American thought, from the “Buen Vivir” perspective, changes the focus of the discussion by including the rights of Nature. In this way, a critique of the current situation goes beyond economic issues, considering them inseparable and indistinguishable from political, social and cultural dimensions.

Based on the economic criticism in Table 2, where the analysed categories in each of the cases are made explicit, and it is evident that regardless of the theoretical framework of the cases and the vision of economic growth that these show, the public participation and social movements around the use of natural resources can be decisive for the form of exploitation that is finally defined.

The cases studied from the proposed dimensions show that they can be approached from different economic perspectives; as time passes, the cases are crossed by various problems and positions of the different stakeholders that may get different conceptual economic elements of the economy–Nature relationship to change or coexist. As in the case of the Yasuní-ITT Initiative, proposed by the government as a case of “Buen Vivir” and the rights of Nature, but it cannot be sustained over time in the face of the government’s need to increase foreign currency. The Conga project is the opposite case, as the public resource management supports it but resisted by the inhabitants, who organised and managed to stop this business.

The model of international insertion of the countries for the cases analysed prevents changing the logic of the traditional view of the economy–Nature relationship. However, there are known experiences at regional scales where it has been possible to establish models for the use of resources within the framework of Buen Vivir, which leads us to ask ourselves what the emerging conditions are in the scale of national and international governance that they prevent these initiatives from prospering.

On the other hand, in a scenario of global change, where the effects of climate change and the depletion of natural resources will act as increasingly essential conditions for the development of emerging economies, it will be essential to explore the different rationalities that appear as alternatives to a dominating vision impossible to incorporate the environmental dimension in a broad sense to the economic analysis. In this sense, it will be essential to observe how the ideas of good living evolve in the Latin American development models and whether they succeed in crystallising an overarching proposal or are neutralised by the global system as other initiatives that attempted to internalise environmental costs.



**Table 2** Analyses the cases from each of the six dimensions presented in Table 1

	Yasuní-ITT	Mining in the Quindío	Mining venture Minas Conga, Cajamarca	Large-scale surface mining in Iglesias Department, San Juan
Anthropological conceptualisation	<i>Homo Naturalis</i> The idea in this case was to make a change from a respect for Nature and the indigenous peoples who live there	<i>Homo economicus</i> Resources must be exploited in order to increase consumption	The case from the public policy is within the <i>homo economicus</i> notion; advocacy by the inhabitants and the social movements manages to make a change of paradigm to a <i>Homo Bioeconomicus</i> scheme	<i>Homo economicus</i> . Resources must be exploited in order to increase consumption. Mining is the central axis of the province's reconversion project
Epistemological principle	The aim is to change the economic logic both in productive activity and in generating foreign currency	Anthropocentrism. Traditional schemes are followed	Traditional view (anthropocentric), both by the company and the national government, whereas the peasant movement implicitly speaks of natural man, ancestral customs and respect for Nature	Anthropocentrism. Traditional schemes are followed The environmental rationality of the Jáchal community detaches from that logic

(continued)

Table 2 (continued)

Economic growth	Yasuni-ITT Before starting the resource exploitation, other economic criteria are sought; growth based on resources is not the priority	Mining in the Quindío The national government maintains that non-renewable mining sectors are the driving force behind growth	Mining venture Minas Conga, Cajamarca The companies and the government hold a neoclassical view while the popular movement (intuitively) is sustained by the rationale of Bioeconomics and “ <i>Buen Vivir</i> ”	Large-scale surface mining in Iglesias Department, San Juan The need to strike a balance between the balance of payments and the generation of foreign currency is an incentive for the government to grant permits and for the mining sector to collaborate in the growth process. The discourse of the provincial government justifies the need for an “environmental sacrifice” because of lower relative wealth in terms of natural resources in the national context
The production function	It is not explained, as production is not the priority The State intervenes in the business determining public policy, priorities and identifying actors	Extracting the resource thanks to investments. The focus is on the importance of the investment amounts It grants permits, with low regulation; it is the same State that sustains the idea of growth based on the resource		
Role of the State			It is limited to granting permits Little regulation of the company in other exploitations	The State, in its national, provincial and local levels, is the main promoter of extractive activity. The new activity is built on the pre-existing power relations; they resort to the logics of place domination (continued)

Table 2 (continued)

View on Nature	Yasuni-ITT Nature as a legal subject. It is questioned not only who pays the cost of extraction but also how this affects the lives of the people living in the region	Mining in the Quindío Local communities intend to maintain coffee production and Nature reserve areas	Mining venture Minas Conga, Cajamarca People's movements claim the importance of respecting Nature, not only from the point of view of resource conservation, but the natural context; local ponds determine lifestyle	Large-scale surface mining in Iglesia Department, San Juan The vicinity of the city of Jachal to the river of the same name appears as a factor determining the population's opposition to the project, leaving the productivity logic and prioritising environmental integrity
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It is important to highlight that the information below is an interpretation of the information available, intended for this paper  
*Source* Prepared by the authors

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# Chapter 9

## Synergies and Trade-Offs of National Conservation Policy and Agro-Forestry Management Over Forest Loss in Argentina During the Last Decade



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**Abstract** One reason for the decline of natural forest is that many ecosystem services (ESs) are usually not priced and values were only considered provisioning services. Argentina enacted the National Law 26,331/07, which regulates protection, enrichment, restoration and management of native forests and its environmental services. The objective is to determine the ecological and sociopolitical factors that influence the dynamics of forest cover loss before and after the law implementation and discuss the effectiveness of conservation and forest management policies. Satellite images, national ordination, forest regions maps and other variables were combined in GIS with national databases (social, agriculture, industry) to determine the evolution of potential drivers of forest changes. The main potential drivers were: (i) population

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growth, (ii) road density, (iii) crops area, (iv) livestock and (v) fires. Payment of incentives by government cannot fully stop the deforestation but decrease the forest loss rate. New approaches must be considered to built-in flexibility actions according to local conditions and constraints, which are influenced by social and economic contexts. Thus, it is necessary to establish new regional policies associated with the factors linked to the loss of forest cover, in the search for sustainable management alternatives that combine economic and conservation proposals.

**Keywords** Ecosystem services · Drivers of change · Sustainable management · Soybean crops · Law 26,331/07

## 1 Introduction

Argentina is characterised by a great diversity of climates and environments that favoured the establishment of different productive initiatives related to agricultural and forestry activities based on exotic species (cattle, extensive crops and forest plantations). When these productive initiatives are based on goods and services provided by the natural ecosystems, positive synergies can be achieved allowing effective conservation management proposals. However, there are often trade-offs between production and conservation that lead to changes in land use cover over time (Luque et al. 2010). Argentina bases its economy in the production of agroindustrial commodities for export. The expansion of livestock keeping and agricultural fields generated changes in the structure and assemblage of typical species in natural ecosystems, leading to an artificialization of the natural landscapes (e.g. monocultures for agriculture or forestry production) and local species extinction. Recently, new alternatives have been proposed that combine economic and conservation purposes in the same area (e.g. Lindenmayer et al. 2012). However, this new management perspective has not affected the artificialization of the natural ecosystems in Argentina.

These synergies and trade-offs of land use generate higher controversies in the society, which demands a well-being based on productive activities (e.g. provision ecosystem services), but also claim for the benefits of other ecosystem services (e.g. regulatory, support, or cultural ecosystem services) and biodiversity conservation (Martínez Pastur et al. 2017, 2018; Turkelboom et al. 2018). To find a solution for these trade-offs, many governments established a dialogue among the different actors of the society and generated regulatory mechanisms to promote the provision of ecosystem services of regulation and biodiversity conservation (Saarikoski et al. 2018; Engel et al. 2008; Zheng et al. 2013). In this context, the National Law 26,331/07 was promulgated in Argentina, and it was named as “Minimum Budgets for Environmental Protection of the Native Forests”. This law involves many challenges: (i) changes in forest management and forest cover proposed by the owners must be complemented by a social awareness (e.g. protection of natural environments classified as high conservation value); (ii) modifications in the original forest cover must be accompanied by the proposal of new practices that must be in accordance



with the law (e.g. silvopastoral systems instead of forest removal and pasture implantation); (iii) changes in the forest cover imply several administrative restrictions; and (iv) the policies must be designed for the long-term, so the proposals must be solid and resilient to the socio-economic changes over the years.

This chapter presents a brief description of the promulgation and implementation of the National Law 26,331/07 in Argentina. Also, it presents the changes in forest cover that occurred during this process and the effects of the law enforcement. Finally, it describes the synergies and trade-offs among the agro-forestry management proposals over the forest loss in Argentina during the last decade.

## 2 National Law 26,331/07

The first available information of native forest area of Argentina corresponded to the National Agricultural Census of 1937 (MAyDS 2017), which indicated the existence of about 37.5 million hectares. In the First National Inventory of Native Forests in 1998, specific data were available about the surface of native forest at national, regional and provincial levels for the first time, which were monitored along the years until today (MAyDS 2017). During this inventory, the Application National Authority (ANA) surveyed 31.4 million hectares, but the forest cover continuously declined until today (27.2 million hectares in 2016). The loss of forest cover represented a continuous process since the first census, due to the native forests were considered a barrier to agricultural and urban development, and forest removal was in many cases favoured by public policies that encouraged the expansion of agriculture. Deforestation also implies the loss of biological diversity and several ecosystem services, as well as the displacement of local and aboriginal communities (Luque et al. 2010).

This continuous forest loss generated an increasing concern in groups linked to the environmental conservation. Miguel Bonasso, Journalist and Writer, propose the first draft of a law for native forest protection, supported by several environmental NGOs that increased the social interest about excessive forest loss. In this framework, a debate was generated between Greenpeace, the Argentine Forestry Association (AFoA), FundesNOA and Vida Silvestre, considering the spirit of another National Law (13,771/48). Consequently, the Argentinean government enacted the National Law 26,331 for the Environmental Protection of Native Forests in 2007, whose main aim is to promote the conservation of native forests through land planning. The law defines the minimum environmental protection budgets for the enrichment, restoration, conservation and sustainable management of the native forests, using as a frame the environmental services that the forests provide to the society (MAyDS 2017). The objectives are detailed in the article 3: (i) to promote the conservation through the land-use planning process (LUPP) and regulate the expansion of the agricultural frontier as well as any change in land use; (ii) to implement the regulations and controls to decrease forest loss, promoting the maintenance of the native forest cover; (iii) to improve and maintain the ecological and cultural values in native forests that benefit the society; (iv) preventive principles must prevail in the proposals,

maintaining the native forests for the environmental benefits that they provide; and (v) to encourage the activities of enrichment, conservation, restoration and sustainable management of native forests. National Law 26,331/07 requires to all the provinces to develop a Land Use Planning Process (LUPP) (article 6) to create consensus about the environmental valuation of native forests in a participatory fashion. Also, it creates the National Program for the Protection of Native Forests (PNPBN) (article 12) and the National Budgets for the Enrichment and Conservation of Native Forests (FNECBN) (article 30), to compensate and promote the proposed activities in the forests. Moreover, it establishes the needs of conservation or sustainable management plans before any intervention on native forests (MAyDS 2017). Also, the law defines as ANA to the Ministry of Environment and Sustainable Development of Argentina and as local authorities to the organisms that each province designates for its implementation (article 10). The National Law was regulated by the Decree 91 of the National Government in February 2009, more than one year after it was sanctioned.

### 3 Land-Use Planning Process (LUPP)

National Law 26,331/07 (chapter 2 of the law) and its regulatory Decree define the concepts, terms, criteria and actions related to LUPP. A period of one year was defined to achieve this task (article 6), and the regulatory Decree established an obligatory LUPP update every 5 years maximum. Beyond the established deadlines, and due to the complexity of the participatory processes, few provinces achieved the tasks on time. The first province to legislate its LUPP was Salta (December 2008) and the latter Buenos Aires (December 2016) (Table 1). Although the 23 provinces currently have LUPP laws, the ANA has not accredited some of them due to technical problems (MAyDS 2017).

The distribution of the forest area, the connectivity, the link with existing protected network areas, the biological values, the conservation status, timber potential, the potential for agricultural sustainability, watershed conservation, indigenous and local community uses were the main criteria defined in the law for the LUPP categorisation, for which three categories were defined (article 9): (i) red (high conservation value forests for ancestral uses, gathering of non-timber forest products, scientific research, conservation plans, ecological restoration); (ii) yellow (medium conservation value forests for sustainable productive activities and tourism under the guidelines of management and conservation plans); and (iii) green (low conservation value forest where land-use change is allowed).

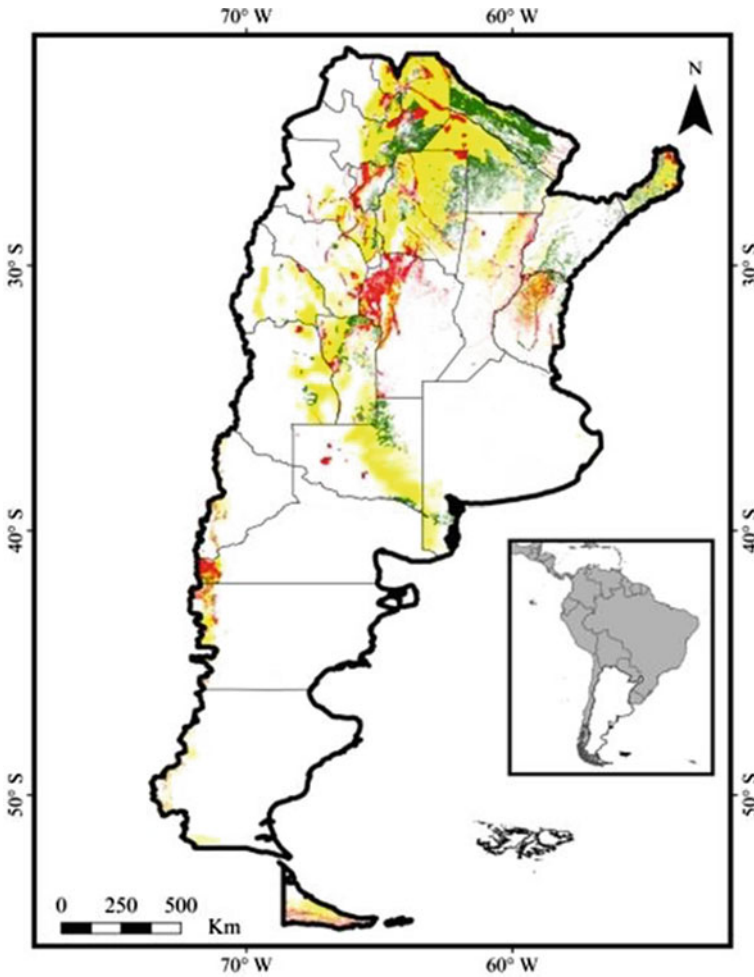
The consultation process with the society leads to define the conservation value of the forests for each province in each of these three categories. As a result, 53.6

**Table 1** Province regulations and its updating for the land-use planning process (LUPP)

Province	Provincial law	Date	Actualisation	Update
Buenos Aires	14,888	21/12/16		
Catamarca	5311	09/09/10		
Chaco	6409	24/09/09		
Chubut	XVII-92	17/06/10		
Córdoba	9814	05/08/10		
Corrientes	5974	26/05/10		
Entre Ríos	10,284	28/03/14		
Formosa	1552	09/06/10		
Jujuy	5676	14/04/11		
La Pampa	2624	16/06/11		
La Rioja	9711	01/09/15		
Mendoza	8195	14/07/10		
Misiones	105	02/09/10		
Neuquén	2780	09/11/11		
Río Negro	4552	08/07/10		
Salta	7543	16/12/08		
San Juan	8174	11/11/10	1439-L	18/07/16
San Luis	IX-0697-2009	16/12/09		
Santa Cruz	3142	17/08/10		
Santa Fe	13,372	11/12/13		
Santiago del Estero	6942	17/03/09	3133	23/12/15
Tierra del Fuego	869/12	25/04/12		
Tucumán	8304	24/06/10		

Source M<sub>A</sub>yDS (2017)

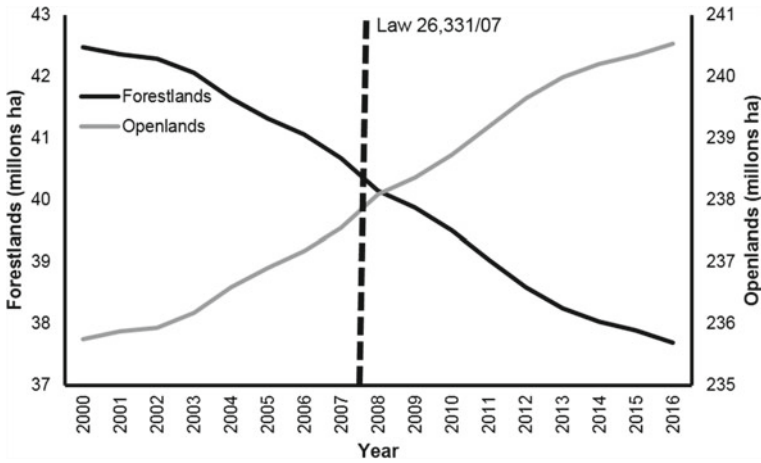
million hectares were declared by the provinces (Fig. 1), where 10.4 million hectares (19%) were red, 32 million hectares (61%) were yellow, and 10.5 million hectares (20%) were green (M<sub>A</sub>yDS 2017). Consequently, 81% of the area covered by native forests was declared as valuable to be incorporated into the productive matrix of the country, which constitutes the most important challenge of the law. Within the framework of article 33, the provinces sent to the ANA the corresponding LUPP (Table 1 and Fig. 1). This ordination process was conducted for all the provinces during 2009–2016. The process of updating and progressive adjustment of LUPPs started again during 2015.



**Fig. 1** Land use planning process (LUPP) proposed for Argentina according to the information and legislation provided by the provinces (Table 1)

#### **4 Changes in Forest Cover of Argentina Within the Framework of the Implementation of the National Law 26,331/07**

In order to understand the success of the law, it is necessary to analyse the observed changes in forest cover. For this, we analysed the evolution of forest cover (2000–2016) by region and province, within the categories defined by their LUPPs. Analyses were carried out on a geographical information system (GIS) based on products available in the Web, uploaded by the provinces and the Ministry of

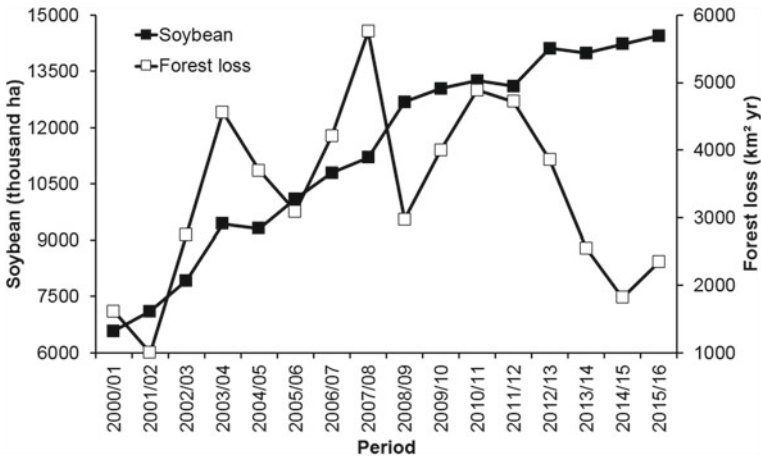


**Fig. 2** Changes in forest cover and openlands of Argentina (period 2000–2016), before and after the implementation of the National Law 26,331/07

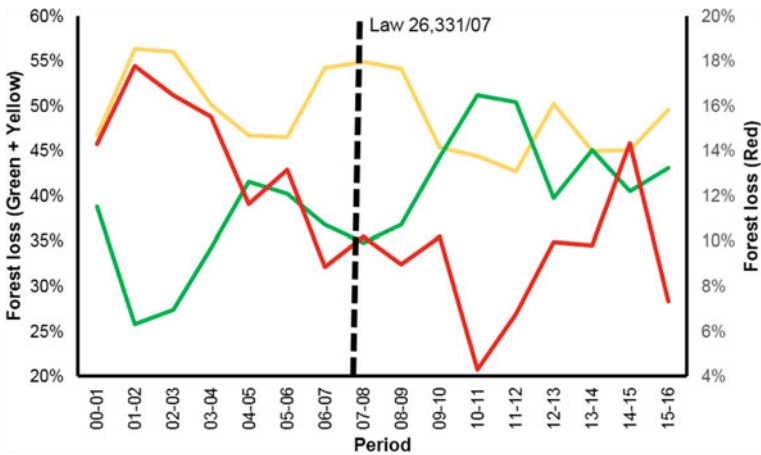
Environment and Sustainable Development of Argentina. We combined these shapes with raster data of loss and gain of forest cover (<https://earthenginepartners.appspot.com>). At country level, there is a continuous loss of forest cover for the analysed period, from 42.4 to 37.7 million hectares (Fig. 2). The rates of gain varied between 240 and 450 km<sup>2</sup> year<sup>-1</sup>, while losses varied between 1,000 and 5,750 km<sup>2</sup> year<sup>-1</sup>. The gains are associated with recovery of the native forest after natural (e.g. windthrows), anthropogenic disturbances (e.g. regeneration growth after harvesting) and indirect human effects (e.g. fires). In addition, some gains are due to exotic forest plantations for commercial or other purposes (e.g. windbreak plantations to protect crops).

The gain in forest cover maintained an approximate rate of 400 km<sup>2</sup> year<sup>-1</sup> for 2000–2016, with a decrease in 2009–2012, which could be explained by the different rates in the harvesting of forest plantations. The gains in forest area due to forest plantations with exotic species do not compensate the loss of most of the ecosystem services related to deforestation of native forests; e.g., plantations may increase some ecosystem services (as the volume of harvesting for industrial uses in timber saw or pulpwood) but may affect negatively other environmental services. In contrast, cover loss showed different rates, with an increase from 2000 to 2008 when National Law 26,331/07 was promulgated. The maximum deforestation rate was reached when the law was promulgated (5,756.7 km<sup>2</sup> year<sup>-1</sup>), and although the loss rates decreased on time until 2016, they did not reach the minimum levels observed in 2002 (Fig. 3).

Another way to analyse the success of National Law 26,331/07 and the implementation of the LUPPs is through the percentage of the different categories (green–yellow–red) in the annual loss of forest cover. In this analysis, we only considered the losses occurred within the LUPPs reported by the provinces (e.g., plantations or native forests that have not entered in the LUPP are not included). The highest



**Fig. 3** Cultivated area with soybean in Argentina and forest loss (white points belongs to right axis in  $\text{km}^2 \text{ year}^{-1}$ ) for the period 2010–2016. Sources MAyDS (2017) and <http://ide.agroindustria.gob.ar>



**Fig. 4** Changes in forest cover (period 2000–2016) and forest loss percentage of each LUPP category at country level

percentage of losses were observed in the yellow (42–56%) and green (26–51%) categories, compared with the red category (4–18%) (Fig. 4).

The promulgation of the National Law 26,331/07 has not fully modified the rates of forest cover loss in the yellow category, with an evident increase in the green category rates. However, a decline in the red category was observed for the period 2000–2011, followed by an increase for 2011–2016 period. These results showed a partial arrangement of the forest areas where total (green category) or partial removals (yellow category) were conducted, which temporarily appear as forest losses and can

underestimate the present analysis. Other harvestings that also reduce significantly the forest cover (e.g. thinnings for silvopastoral purposes) may recover after some time, or if they are very intense (e.g. silvopastoral systems proposed for Chaco and Formosa), may continue the loss of cover due to windthrows of the remaining trees. Other forest losses in the red forest category may be associated with natural or anthropic impacts such as fires. However, beyond these considerations, it was observed that the implementation of the National Law 26,331/07 has not been able to reduce the loss rates in forest areas of higher conservation value (red category), although the loss rates observed during 2000–2004 decreased.

These trends and magnitudes changed when the different forest regions proposed by the “Unidad de Manejo del Sistema de Evaluación Forestal” (UMSEF 2014) were considered. The Andean-Patagonian forests presented losses that range from 20 to 40 km<sup>2</sup> year<sup>-1</sup>, with some maximums (2011–2012 and 2014–2015) that can be related to fire events or other natural phenomena (e.g. windthrows or volcanic eruptions). The Espinal region had significant gains in forest cover that sometimes exceed forest losses (e.g. 2000–2003 and 2014–2016), which varied around 90–175 km<sup>2</sup> year<sup>-1</sup>. However, the losses showed a growing trend from 2000 to 2014, presenting a decrease in deforestation rates only during the recent years. The Monte region also presents greater increases in forest cover than losses, except for three of the analysed periods (6–7 km<sup>2</sup> year<sup>-1</sup>), with an increase in recent years (2012–2016). The losses were very variable (2–12 km<sup>2</sup> year<sup>-1</sup>), with two strong peaks observed in 2004–2005 and 2012–2014. The Chaco region has low rates of recovery (55–90 km<sup>2</sup> year<sup>-1</sup>) compared to the deforestation rates, which reached their maximum during the discussion, sanction and first years of implementation of the National Law 26,331/07 (2000–4000 km<sup>2</sup> year<sup>-1</sup>). This loss rate decreased in recent years (2013–2016), but did not reach the minimum observed in 2001–2002. The region of Misiones Rainforest presented greater increases in forest area (45–190 km<sup>2</sup> year<sup>-1</sup>), which far exceed the losses (50–260 km<sup>2</sup> year<sup>-1</sup>) for the period 2000–2007. The general tendency showed that loss of forest cover increased over time. This output was influenced by forest plantations of exotic species (e.g. *Pinus* representing 80% and *Eucalyptus* representing 7% of the total plantations that occupy about 3700 km<sup>2</sup>) (Izquierdo et al. 2008). The region of the Bolivia-Tucumán Forests presented small gains in forest cover (10–20 km<sup>2</sup> year<sup>-1</sup>) compared to deforestation rates (125–926 km<sup>2</sup> year<sup>-1</sup>). The rates of deforestation remained constant during the discussion, sanction and first years of implementation of National Law 26,331/07, but a maximum was observed during 2007–2008 period, which can be related to an increase in the removal of forests associated with the proximity of the moment of sanction of the law. Although in recent years (2014–2016) there has been a downward trend in deforestation rates, reaching the 2000–2002 values, it represents huge areas of forest loss compared to other forest regions (120–140 km<sup>2</sup> year<sup>-1</sup>).

The tendencies described at country and forest region levels maintained the same trends and magnitudes when the different provinces were considered. However, an analysis by province is of interest due to particularities related to the implementation of the provincial policies, or due to some regional economies or contrasting social realities.

In the southern provinces (Neuquén, Río Negro, Chubut, Santa Cruz and Tierra del Fuego), forest area gain is very low (<0.13% of the total forest of each province). The loss rates are generally lower than 0.15%, except for exceptional events that were mostly related to fires that affected large areas of forests, e.g. (i) in Neuquén, 20 km<sup>2</sup> for the period 2013–2014 (0.21% of the forest loss); (ii) in Río Negro, 12 km<sup>2</sup> for the periods 2001–2002 and 2011–2012 (0.24% of the forests); (iii) in Chubut, the three largest events corresponded to 2014–2015 (243 km<sup>2</sup>, 2.59% of the forests), 2011–2012 (28 km<sup>2</sup>, 0.30% of the forests) and 2012–2013 (20 km<sup>2</sup>, 0.21% of the forests); (iv) in Santa Cruz, 37 km<sup>2</sup> for the period 2011–2012 (1.13% of the forests); and (v) in Tierra del Fuego, the 2007–2012 period is remarkable, with loss rates of 13–23 km<sup>2</sup> year<sup>-1</sup>, representing 0.13–0.22% of the forests.

In the provinces of the centre of the country (Mendoza, San Luis, San Juan, La Pampa, Buenos Aires and Córdoba), forest gains rarely exceed 0.13% of the total forest of each province, with the exception of Buenos Aires, which was around 0.24–0.35%. However, the rates of forest loss were variable according to the province. In Mendoza, annual losses were close to 1.0 km<sup>2</sup> year<sup>-1</sup>, except for 2012–2013, when it reached 2.35 km<sup>2</sup> (0.31% of the province forests). San Luis presented important loss rates reaching in some years more than 6% of the total forests, e.g. 2007–2008, year of promulgation of the National Law 26,331/07, and 2009–2010, year of the promulgation of the provincial law IX-0697-2009. In San Juan, the loss rates were low, less than 0.20%, the highest rate (1.0 km<sup>2</sup> year<sup>-1</sup>) occurring during the period 2013–2014. La Pampa presented variable trends in forest losses (<2.0 km<sup>2</sup> year<sup>-1</sup>), but increased after the promulgation of the provincial law 2624 (6.8, 6.5 and 12.3 km<sup>2</sup> year<sup>-1</sup> for the periods 2011–2012, 2012–2013 and 2013–2014, respectively) reaching values of 0.3–0.6% of the total province forests. Buenos Aires had variable rates of loss (0.1–1.5% of the total forests) which represents between 8 and 95 km<sup>2</sup> year<sup>-1</sup>. Finally, Córdoba presented an increased loss of its forest cover (between 1 and 2%, close to 150–300 km<sup>2</sup> year<sup>-1</sup>), but in recent years it decreased after the enactment of the National Law 26,331/07 and the provincial law 9814, reaching a loss of about 0.2% of the forest cover for the period 2014–2016.

In the northwest provinces (La Rioja, Catamarca, Tucumán, Salta, Jujuy and Santiago del Estero), the forest gain is very low (<0.06% of the total forests of each province), with the exception of La Rioja that presented 0.20–0.30%. Forest loss rates are highly variable in percentage and magnitude according to the considered province. La Rioja presented forest loss rates lower than 0.5% of the total forests, except for 2006 and 2010, when National Law 26,331/07 and provincial law 9,711 were sanctioned (7–13 km<sup>2</sup> year<sup>-1</sup>). Catamarca presented different patterns of forest loss (from 160 to 7 km<sup>2</sup> year<sup>-1</sup>), with a continuous decrease from 2000 to 2016 (from a maximum of 1.7–0.1% of its total forest cover). In Tucumán, there is a sustained forest loss (0.4–1.5%) with maximums that exceed 100 km<sup>2</sup> year<sup>-1</sup> during 2003–2004, 2007–2008, 2010–2011, 2012–2013, where the second and third periods were coincident with the sanctions of the National Law 26,331/07 and the provincial law 8304. Salta is one of the provinces with greater forest loss, observing a gradual increase of rates for the periods between 2000 and 2008, when National Law 26,331/07 and the provincial law 7543 were promulgated. The maximum of losses



were 2,148 km<sup>2</sup> year<sup>-1</sup> (3.2% of the province forests) and maintaining a high rate (close to or greater than 1%) until recent years (2014–2016) when it drops to <0.6% (about 330–370 km<sup>2</sup> year<sup>-1</sup>). Jujuy also presented high loss rates between 14 and 63 km<sup>2</sup> year<sup>-1</sup> (<0.7% loss in relation to the total forest cover), with the presence of two maximums (>110 km<sup>2</sup> year<sup>-1</sup>) during the periods 2009–2010 and 2012–2013. These maximums occurred after the sanctions of the National Law 26,331/07 and the provincial law 5676. Finally, Santiago del Estero is another of the provinces with the highest deforestation rates, both in magnitude (250–1855 km<sup>2</sup> year<sup>-1</sup>) and in percentage (up to 3.0% annually respect to the total forest cover). The loss rate increased along the years and then gradually decreased to date.

In the north-eastern provinces (Santa Fe, Entre Ríos, Corrientes, Misiones, Chaco and Formosa), the forest gain was variable according to the considered provinces. Chaco and Formosa presented lower gain rates (<0.02%), Entre Ríos and Misiones intermediate values (0.2–0.8%), while Santa Fe and Corrientes presented values close to 1% per year. The loss rates were also variable in percentage and magnitude according to the province. Santa Fe presented a constant loss rate of 1% (approximately 140 km<sup>2</sup> year<sup>-1</sup>), while in Entre Ríos it is less than 0.3% (<50 km<sup>2</sup> year<sup>-1</sup>). Corrientes also presented a stable loss rate of 0.5–1.0% (90–175 km<sup>2</sup> year<sup>-1</sup>). These provinces showed a combination of loss of native forest cover (e.g. extraction of firewood) and commercial plantations (mostly *Pinus* and *Eucalyptus*), which is also showed in the gain rates due to new plantations. Chaco and Formosa were very different, where losses were directly related to the advance of the agricultural frontier. The loss in Chaco was variable, between 55 and 515 km<sup>2</sup> year<sup>-1</sup>, representing between 0.1 and 1.0% of annual forest cover loss, with the presence of an unusual increase (2010–2012) in the years after the sanctions of the National Law 26,331/07 and the provincial law 6409 (>900 km<sup>2</sup> year<sup>-1</sup>). Formosa deforestation presented annual rates of <1.0% (40–440 km<sup>2</sup> year<sup>-1</sup>), with an increase after 2009–2010 (years of the sanctions of the National Law 26,331/07 and the provincial law 1552) reaching more than 700 km<sup>2</sup> year<sup>-1</sup> of forest cover loss. During the last years (2013–2016), the loss rates returned to the previous values, but maintaining higher values (200–400 km<sup>2</sup> year<sup>-1</sup>) compared to other provinces.

## 5 Investments Made by the National Government in Management and Conservation Projects of Native Forests

The interest in the concept of payment for ecosystem services (PES) increased during the last decade, both for scientists and managers, due to its greatest advantages to connect natural ecosystems and society (MEA 2005; Swallow et al. 2009; Reyers et al. 2013). Also, PES allowed the integration of ecological, sociocultural and economic topics, giving a framework that supports future legal policies and guidelines (de Groot et al. 2010; Chan et al. 2012; Martínez Pastur et al. 2016). Usually, ecosys-

tem services were evaluated through their monetary valuation (e.g. cubic metres of timber for the sawmill industry), where non-monetary provision services have been not considered (e.g. non-timber forest products for family consumption, firewood by local inhabitants) as well as those regulatory, supporting or cultural services (e.g. water basin protection, pollination, recreation, archaeological heritage, scenic beauty, CO<sub>2</sub> capture and storage). In this sense, the payment to owners for the conservation of this ecosystem is valued by the monetary and not by the non-monetary services. We can consider that PES generates a new paradigm in the ecosystem valuation, where natural areas should be valued, both by the monetary and non-monetary services that it provides to the society.

The first approach of conservation both in biodiversity values and in the provision of ecosystem services was based on the preservation of wild or natural environments within reserves. This strategy creates a division in landscape management and planning: (i) within the reserves where the inalterable nature of the ecosystem was promoted, and (ii) outside reserves where transformation to maximise provisioning services is feasible to implement (Swallow et al. 2009). However, this strategy was ineffective to conserve the provision of non-monetary ecosystem services and all the biodiversity at a regional level, and fails to protect the species for which many of these reserves were created (Lindenmayer et al. 2012). Argentina, like many other countries, has based its conservation strategy on the creation of National Parks located in remote or border areas (Hopkins 1995; Izquierdo and Grau 2009; Swallow et al. 2009), while the rest of the landscape is under a continuous process of deforestation and land-use change. This process generates a significant decrease of the natural ecosystem areas, affecting original communities (Boletta et al. 2006; Gasparri and Grau 2009; Cáceres 2015).

The main drivers of changes on the native forest ecosystems were the intensive agriculture and crops with high value in the international markets (e.g. soybean), fires due to human activities, increase of livestock pressure due to the advance of agriculture (e.g. displacement towards marginal forest areas), forest plantations with exotic species and the increase of the human population (Grau et al. 2005; Zak et al. 2008; Seghezze et al. 2011; Hoyos et al. 2013). The decline of these natural ecosystems is related to the undervaluation of the main ecosystem services that they provide (regulation, support and culture), especially for policymakers (Swallow et al. 2009). In this sense, PES is an effective mechanism to transfer non-monetary valuation of ecosystem services within a financial market, through incentives to local actors (governments, institutions and private sector, which make decisions about native forests) to maintain the provision of those services over time. This mechanism allowed the achievement of these goals, integrating them in the same proposal both for conservation and socio-economic development purposes (Engel et al. 2008; Zheng et al. 2013). This strategy allowed the development of multipurpose in situ objectives for the ecosystems under management.

In this international context, the National Law 26,331 (November 2007) was enacted to regulate the protection, enrichment, restoration, use and management of native forests and the environmental services that they produce (Seghezze et al. 2011). This law finances actions to strengthen the institutions and forest producers

**Table 2** Budget assigned (2010–2016) by the National Government to the National Law 26,331/07

Year	Budget
2010	300,000,000 \$ (74,812,968 US\$)
2011	300,000,000 \$ (69,444,444 US\$)
2012	300,085,190 \$ (60,992,925 US\$)
2013	253,000,000 \$ (38,744,257 US\$)
2014	247,043,707 \$ (28,792,973 US\$)
2015	246,450,000 \$ (18,350,707 US\$)
2016	265,009,000 \$ (16,258,221 US\$)
Total	1,911,587,897 \$ (307,396,495 US\$)

In Argentinean, pesos and dollars (value of December 31 of each year)

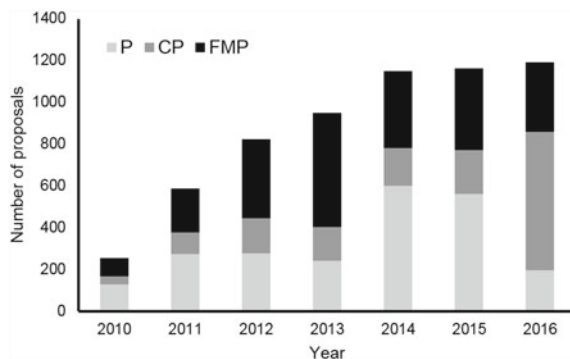
Source MAyDS (2017)

(provincial governments, institutions and private sector) to ensure and maintain the provision of ecosystem services over time. This payment includes: (i) to limit the land-use change in the native forestlands, (ii) to conduct sustainable management practices and (iii) to increase biodiversity preservation areas within the matrix of the productive landscape. There is a lack of this type of initiatives in the World, and it is of interest to understand how these investments have been implemented within the framework of this National Law, and to analyse the impact of this initiative.

The Argentinean national government has assigned annual fundings for the implementation of the National Law 26,331/07 (Table 2), mainly invested by: (i) National Fund for the Enrichment and Conservation of the Native Forests (FNECBN) created by the article 30, and (ii) the National Programme for the Protection of the Native Forests (PNPBN) created by the article 12; but also for financing the (iii) Experimental Programme of Management and Conservation of the Native Forests (Res. SAyDS 256/09), and (iv) the implementation of the first LUPP across the country. While the funds allocated to PNPBN were used by the national government (22% of the funds allocated during the period 2010–2016), FNECBN funds (78% of the funds allocated during the period 2010–2016) were distributed among the provincial forest authorities (30%) and projects (70%) (MAyDS 2017). It must be mentioned that provincial and municipal governments can also apply to the national funds, and then, a large percentage of these funds have being allocated to public institutions and not the private sector. For the fund distribution among the provinces, the Federal Environment Council of Argentina (CoFeMA) has defined a methodology that considered the area of native forests of each province, the relationship between the previous forest area and the total area of the province, and the conservation categories established according to the article 32 (MAyDS 2017).

There is a strong variation with a downward trend for the period 2010–2016, between 247 and 300 million AR\$ (Argentinean pesos) per year. And this variation is quite significative if it is presented in United States dollars (USD) (75–16 million USD per year). Among the funds arrived at FNECBN, approximately

**Fig. 5** Number of formulation projects (P), conservation (CP) and sustainable forest management plans (FPM) per year (bars) during 2010–2016. *Source* MAyDS (2017)



30% was allocated to the provincial forest authorities (427.4 million AR\$ for the period 2010–2016) and the rest to the projects (1413.1 million AR\$ for the period 2010–2016). The projects can be classified into three types: (i) formulation plans (e.g. elaboration of proposals for management and conservation without concrete actions in the forests), (ii) management plans and (iii) conservation plans (37, 25 and 38%, respectively, of a total of 6,122 annual projects financed between 2010 and 2016) (MAyDS 2017) (Fig. 5). Formulation plan receive 50% of the total funds. Thus, while 294.7 million pesos have been allocated for formulation plans (period 2010–2016), 690.9 million pesos represented actions for sustainable forest management in the territory (43% for conservation plans and 57% for forest management plans). Beside this, the number of granted projects increased progressively from 2010 to 2014 and stabilised in the subsequent periods (2014–2016) reaching to approximately 1200 projects per year.

The investment made since the enactment of the National Law 26,331/07 was unprecedented in Argentina, and there were few initiatives that can be compared in other countries of the World (Costanza et al. 1997, Swallow et al. 2009; Gómez-Baggethun et al. 2010, Farley and Costanza 2010). Although these actions cannot stop totally forest loss, they helped to reduce the deforestation process in the last 30 years. At a country scale (see Figs. 2 and 4), there is a tendency to decrease the deforestation rate (approx. from 5000 to 2000 km<sup>2</sup>) and an increase in forest gain (approximately 250–400 km<sup>2</sup>), which can be correlated with the number of projects financed per year.

The financing received by the forest institutions, both at national and provincial level, generated a change in the perceptions of communities that living in the forests and using the forest products, as well as ranch owners about the native forest, based on the presence of technical professionals in the field and the extension actions. Also, there are plans that combine multiple objectives. We have seen that several funds have been allocated to improve the management and administrative structures related to management of native forest (excluding the National Park Administration that already had their own financing). However, one question remains unsolved: Are payments made to the forest owners effectively PES? To be considered a PES, the payment

must finance concrete actions for forest management, as compensation for effectively improved the provision of ecosystem services (monetary and non-monetary provision services) or as a compensation for losses in the economic benefits for expanding conservation or improving sustainable management practices? In the payments of the National Law 26,331/07, the formulation plans cannot be fully considered as PES, due to the fact that the activities and payments are not real actions into the forests. Besides this, most of the actions included in the payments were invested to improve the timber production (e.g. increase the growth rates), thinnings for silvopastoral purposes, or for fences to manage livestock production increasing conservation and provision of some ecosystem services.

This approach to ecosystem management at landscape scale began 30 years ago (Swallow et al. 2009) with the following objectives: (i) to generate more effective biodiversity conservation beyond the natural reserve networks, (ii) to increase the community participation in the management, conservation and rural development proposals and (iii) to create job opportunities for the rural population. Worldwide, the main constraint for these initiatives is the financial sustenance in the medium and the long term, which rarely coincides with the expectation of the community and managers (Swallow et al. 2009; Gómez-Baggethun et al. 2010). PES emerged as an alternative to solve these shortcomings, and it became the most powerful tool to implement these proposals. In this sense, the main strength of PES is to legitimise the people rights who live in the natural landscapes (both for management and conservation purposes) and receive the payments for conserving the provision of the ecosystem services on time (Ferraro and Kiss 2002; Swallow et al. 2009).

For this reason, the payment programme established by the National Law 26,331/07 does not comply with several of the suggested principles for PES initiative and should be modified towards their main principles. In few words, the payments of the National Law 26,331/07 should cover not only the improvement of monetary provision services, and it also should compensate other services (e.g. provision of non-monetary services or conservation forests categorised as red) according to the predisposition to implement these actions by the community, as well as the identification and presentation of the ecosystem services to the society that receives the benefits (Patterson and Coelho 2009; Zheng et al. 2013).

Finally, we conclude that, like any other process, longer periods are needed to assess the effectiveness of the implemented actions. Although at the beginning of the process (before, during and immediately sanctioned the national and provincial legislations), the reaction of the agricultural sector generated a strong negative impact on forest cover, after generated the payments and incentives the tendency of the indicators improved. It is difficult to quantify how much of this decrease is due to the payments, and how much is due to the restrictions imposed by the legislation itself.

## 6 Synergies and Trade-Offs of Monetary Activities that Influence Over the Persistence of the Native Forests

Argentina based its economy in the primary industry, mainly in agricultural products (crops and meat). This strategy generated a rapid development of those areas with greater agricultural potential, and those areas with low potential in marginal regions remain unattended. This development was related to the population growth and infrastructure (e.g. routes) that affected the continuity of the natural ecosystems. For example, urban centres required more materials such as lumber and timber wood from forests, and the accessibility generates greater impacts over the biodiversity, both directly (e.g. hunting or extraction of non-timber forest products) and indirectly (e.g. invasion of exotic species). Likewise, livestock and farming also increase, either due to the proximity of cities or to accessibility, or by a displacement of activities with greater profitability (e.g. soybean crops). Another activity is the forest industry, based on exotic species under the supposition that they grow faster, which it is often not true, and due to the greater acceptance of the species in international markets (e.g. *Pinus* or *Eucalyptus*). Finally, higher human presence in the natural ecosystems drives fires or increases land-use conversion (e.g. removal of woody biomass and implant pastures for livestock). Here, we related the forest loss cover described before with some drivers, and try to understand the synergies and trade-offs generated with the ecosystem services provision of the native forests. We analysed official data on agriculture, livestock and forestry, and data of forest loss cover across Argentina

The selected drivers strongly varied among the different regions and provinces: (i) population increases in the less developed areas (e.g. Patagonian provinces), while regions with lowest changes in human population are those with good agricultural development or industry (e.g. Santa Fe, Corrientes, La Pampa and Entre Ríos). (ii) The highest route density was observed in provinces such as Misiones, Tucumán and Jujuy, related to forest loss and degradation of natural ecosystems. (iii) The greatest area of crops is found in the central Argentina (Buenos Aires, Santa Fe and Córdoba) while in other provinces the crops presented a scarce development (e.g. Patagonia and north-eastern territory). When we analysed the changes (before and after the promulgation of National Law 26,331/07), we observed a great variation between provinces related to the forest loss cover at a regional scale. For example, some provinces in central Argentina (Buenos Aires and Córdoba) increased their crop area by 21%, which indicates that many of the fields used for livestock were converted to crops. Then, this livestock was moved to marginal sectors of lower productivity but with higher indices of naturalness. Likewise, other provinces presented unusual increases of crop areas, e.g. San Luis (131%), Santiago del Estero (68%) and Salta (29%), which was associated with deforestation due to the advance of the agricultural frontier. (iv) Livestock presented the same pattern, where largest producers are also in the central Argentina (Buenos Aires, Santa Fe and Córdoba) and showed changes in the activity before and after the enactment of National Law 26,331/07 (−0.9, −1.9 and −22.0%, respectively). Other provinces also presented a retraction of livestock activity, but associated with other economic drivers or business oppor-

tunities (e.g. La Pampa, La Rioja and Río Negro). Similarly, other provinces showed greater changes associated with the livestock displacement from central Argentina, such as Salta (67%), Santiago del Estero (30%), Tucumán (27%), Misiones (24%), Formosa (22%) and Jujuy (20%). There are other reasons that explain the increase in livestock production (e.g. recoveries after natural disasters such as the Hudson volcano activity or reconversions from sheep to cattle as in Southern Patagonia), e.g. Santa Cruz (38%), Chubut (29%) and Tierra del Fuego (29%). (v) Harvesting of timber products from native forests showed a strong retraction during the recent years comparing data before and after the enactment of the National Law 26,331/07 ( $-27\%$  in average), including the largest producers (Misiones, Santiago del Estero and Córdoba). However, the timber products increased in those regions with greater forest loss rates destined to crops and livestock production, e.g. Salta (26%), Jujuy (10%) and Formosa (5%). (vi) Fire occurrence in forests is quite common in some provinces and much more sporadic in others always related to human activities (e.g. Southern Patagonia). The provinces with the highest incidence of fires for the studied period were La Pampa, Mendoza, San Luis and Río Negro. (vii) Finally, forest plantations with exotic species can be found in few provinces (mainly in Corrientes, Misiones, Neuquén and Chubut) and not greatly increased during the last years.

Not all the drivers explained the forest loss cover, being the soybean crops a good proxy for the studied period (Grau et al. 2005; Carreño et al. 2012). The forest loss at country level and the area of soybean crops did not present a significant correlation ( $0.27, p = 0.305$ ) represented by two periods, one where it accompanies the deforestation processes (2000–2012) and another where it dissociates (2012–2016) (Fig. 3). Several provinces follow this pattern: (i) Buenos Aires ( $0.42, p = 0.101$ ) with the two described periods with a slightly displaced (2000–2014, 2014–2016), and which strongly influences the pattern described for all of Argentina due to sharing most of the total area planted; (ii) Córdoba is similar ( $-0.49, p = 0.050$ ) with a positively correlated period (2000–2007) and negatively correlated period (2007–2016); (iii) Entre Ríos also showed a similar trend ( $0.49, p = 0.050$ ) with a positively correlated period (2000–2013) and negatively correlated period (2013–2016); and (iv) San Luis ( $-0.09, p = 0.739$ ) with a positively correlated period (2000–2010) and negatively correlated period (2010–2016). There is a second group of provinces, where the land pattern cultivated with soybean and the forest loss is coincident and positively correlated: (i) Chaco ( $0.37, p = 0.148$ ); (ii) Corrientes ( $0.49, p = 0.040$ ); (iii) Jujuy ( $0.56, p = 0.022$ ); (iv) Salta ( $0.45, p = 0.070$ ); (v) Santa Fe ( $0.28, p = 0.283$ ); (vi) Santiago del Estero ( $0.20, p = 0.443$ ); and (vii) Tucumán ( $0.27, p = 0.302$ ). Finally, a third group of provinces has a more erratic correlation when we compare these two factors, such as Catamarca ( $0.25, p = 0.339$ ), Formosa ( $0.03, p = 0.902$ ), La Pampa ( $0.36, p = 0.167$ ) and Misiones ( $-0.71, p = 0.002$ ).

Therefore, it was possible to identify the provinces where the advance of soybean crops had influenced the forest loss during 2000–2016. The conflict between the expansion of plantations with exotic forest species and the native forest occurred mostly outside the studied period (e.g. decade from 70s to 90s) (Grau et al. 2005; Carreño et al. 2012), as it occurred previously with other crops (e.g. sugar cane or beans in northern Argentina) (Aguerre and Denegri 1996; Gasparri et al. 2008). In

this sense, it is necessary to understand that a trade-off varies over time. We can remark that it is necessary to conduct studies that identify the drivers to elaborate specific policies to mitigate the potential negative impacts. Likewise, it is also clear from the analysis that the drivers that affected the forest cover are moving from agricultural–livestock areas to the peripheries. For this reason, the factors that occurred in the central area of Argentina (core of the agricultural zone) can affect other less productive provinces.

## 7 Conclusions

The National Law 26,331/07 constitutes an unusual legal norm for a country in which the use of natural resources for productive purposes was prioritized without limitations along its history. This generated different reactions in the society, and the national and provincial authorities had to adjust their structure and operations for successfully implement the law along the country. It is not possible to relate the application of the law to the stop of the deforestation processes; however, we can relate this process to a decrease in the forest loss rate. Still, we do not know if in the future the price in some crops can press again over the forests with the consequent deforestation. The national law, through their instruments (e.g. LUPP), achieved the effective ordination of the new agricultural production initiatives, limiting their operations to those areas classified as green. Besides this, an intense debate was installed in the society, as a result of which many sectors were able to increase their knowledge about native forests and their importance as producers of ecosystem goods. However, the implementation of the law was not perfect. It is very important to detect the points in which the process of approval of plans was delayed or paralysed, and it is necessary to remove those bottlenecks and achieve times compatible with the expectations of the producers.

The native forests of Argentina presented significant changes in their forest cover during the last years. These changes were influenced by the promulgation of the National Law 26,331/07 and the associated provincial legislations, and change on time according to the LUPP that were made in each province. Sometimes deforestation rates increased prior to law enactments, and in others, the new legislations did not change forest loss rates. However, over the years there was a decrease in deforestation rates that can be associated with the results derived from the investment in management and conservation plans financed by the National Law 26,331/07. In this sense, the effectiveness of the payments made for the native forests resulted in a useful tool to reduce the conversion rates, but this tool did not stop the deforestation process completely. On the other hand, some causes of forest loss may be due to natural factors (e.g. landslides, windthrows) or derived from human actions, both indirect (e.g. fires) and directly related to productive activities. These factors varied among the provinces, mainly associated with population density, agricultural activity and livestock, which is also related to the fires and harvesting. In the particular case of soybean crops, they can explain most of the deforestation in many provinces and



can be associated with some periods, decreasing in significance during the last years (2012–2016).

In few words, the lack of knowledge about the social actors, the land tenure problems, technological developments and the biophysical status of the forests determined that very few plans, once the law was applied, were destined for logging and that the majority of the proposals were to improve livestock in marginal areas. In this chapter, we described the impacts produced by the trade-offs that exist in the different land uses, between native forest and other productive activities, as well as quantify the damages and benefits of the implementation of the National Law 26,331/07. It also highlighted the need to promote initiatives such as LUPP and the payment programmes for the provision of ecosystem services in the long term. Finally, these analyses and discussion reveal the need to establish regional policies associated with the factors linked to forest loss looking for sustainable management alternatives that combine economic and conservation proposals.

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# Chapter 10

## Climate Change: Paradoxes in the Implementation of Agreements and Protocols in Latin America and Brazil



Daniel Cenci

**Abstract** Climate change is one of the greatest threats to the quality of life and human rights for present and future generations. Global protocols and agreements, built to deal with the consequences of climate change, as well as, in the Brazilian case, have not taken into account the urgency to fight the causes ranging from consumption patterns to the degradation of ecosystems resulting from the industrial model and such as deforestation, drought, rising sea levels, forced migrations, rising temperatures, impacting food production, food security, and general living and health conditions. The difficulty of resilience imposed on ecosystems may be the harbinger of the environmental collapse that humanity must face in the political sphere to promote the qualitative leap in the model of development and promotion of sustainability.

**Keywords** Environmental governance · Sustainability · Global warming

## 1 Introduction

### *1.1 Climate Change, Life Quality for Sustainability of the Common House*

Among the significant changes experienced at the end of the twentieth century is the accelerated stage of globalisation. More than the internationalization and achievements of previous centuries, this new stage of the turn of the century presents in a first moment, changes in the creation of large-scale systems, and with profound transformations in the local systems, reaching the personal dimension as soon as the horizons are redefined by a perspective of experiences and world culture.

According to Lipovetsky (2011), culture world means the end of the traditional heterogeneity from the cultural sphere and the universalisation of mercantile culture,

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operating from the spheres of social life, modes of existence, almost every human activity. With the culture world, the culture of the technoscience of the market, the individual, the media, the consumption, is disseminated throughout the world. It is in this new perspective that new global problems emerge in fields such as ecology, migrations, economic crises, terrorism, misery, identity, beliefs, crises of existential senses, among others.

Ideas for global governance have been part of the agendas since 1919–1920 at the Peace of Versailles, with the attempt to unite nations through the League of Nations as well as the need of establishing some controls in the trade field, such as the GATT case, created in 1947, the General Agreement on Tariffs and Trade (Veiga 2013). In the second post-World War II period, multilateral agreements have been multiplied, with the objectives of rebuilding the countries, with the focus on peace and development. Conferences and agreements are pursuing the focus on *development* which is limited to issues such as poverty eradication; in other words, it was a model of economic development with future sustenance, and reinforcing the role of the United Nations (UN) as the main responsible organ for the management of international interests, along with the international financial system, as well as the World Bank and the International Monetary Fund.

In more recent times, events of the international community for the conservation of the Environment have been frequent. Veiga (2013) in just seven years, between 2005 and 2011, 22 agreements, 59 additives and 10 protocols were signed. The diplomatic corps has been called to attend events on an average of 8 times each year (information available in [www.uoregon.edu](http://www.uoregon.edu)).

The environmental issue is not something that could exhaust political reading at the local level. More than other times, the globalisation process induces local policies, destroying the concrete experiences of the development from the cultures sustained by solidarity, communitarianism, respect for the environmental conditions as surroundings that are able to generate the survival and developmental conditions through the perspective of the present and future generations and the planet as a common home.

The new arrangements of economic power in the international sphere continue with high rates of exploitation of the nature, as if there was the possibility of finding countless water resources, forest soils, mineral wealth, from oil and iron to riches that had led to the plunder of the early colonisation, such as gold, silver, and wood. The new practices of exploitation of the land impose relentless destruction in a short time, by the adoption of techniques of high productivity that compromises the soil structure, water, and forests. Therefore, it is the devastation of natural wealth and the balance of ecosystems, never recorded in human practices. Such a model has adverse effects such as the death of biodiversity. It is a lifestyle based on consumption and extractive production, an equation whose natural capacity, the planet no longer supports.

The alternative path to a sustainable world requires thinking about the philosophical, scientific, technological, and political elements that guide life in today's contexts. Not only as productive practices or ecological phenomena, but to reposition human presence, to reconsider the elements that give support to anthropocentrism, happiness

oriented by consumption, the possibility of living well with less consumption, the practices that allow the reuse of materials and all practices that press for the extraction of non-renewable natural wealth, to adopt sustainability practices, generating a virtuous chain of renewable uses in the different fields, from cleaner energy to less polluting practices, with the awareness that existence in itself causes impact.

This means that the fair and ethical access to the ecologically balanced environment requires a review of the distribution of wealth, for a fairness relation. Nevertheless, it is not believed that the world will be greener, more ecological, more sustainable, without a broader change in social and cultural relations which might overcome the binomial domination and dependence. The paradoxes of poverty and wealth, shortage and hyper-consumption, ignorance and knowledge, comfort and necessity, misery and opulence, development and underdevelopment.

The development of new theories in the current context, whose content points out to the decline, to the reduction of consumption, to the reorientation of the development model, to prosperity without growth, to wellness. They need to be oriented to those who live in the 'north' or 'upstairs', or does not know the difficulties faced in the 'south' or the 'downstairs', the particular African and Latin American realities that are defined even below of what is considered to be poverty.

## ***1.2 The Environmental Debate and International Governance***

Brazil has a significant presence in the international environmental debate and had also important moments referring to the articulations and international conferences. According to Veiga (2013), in 1968, Sweden and the Nordic countries proposed an international conference on the environment coordinated by UNESCO. It was followed by the United Nations Conference on the Human Environment held in Stockholm in 1972, the first and most important conference on environmental issues, which generated the Stockholm Declaration, a document with 26 principles that highlights, among other things, the importance of states and international organisations to protect the environment. The central countries emphasised aspects such as species preservation and the need to reduce environmental pollution, the emerging and peripheral countries feared that environmental regulation would jeopardise their economic growth.

Tension led the UN Assembly in 1983 to establish the World Commission on Environment and Development. Four years later, the Commission presented a report which established the concept of sustainable development and became known as the *Brundtland Report or Our Common Future*. In this report, the Commission took care of balancing ecological concerns with the economic growth needed to reduce poverty. After the Stockholm Conference, twenty years went by before the Conference on Environment and Development which was also called the Earth Summit and Rio 92, in the city of Rio de Janeiro. Brockmann (2013) recalls that the convocation of

the Conference from many important scientific discoveries in the 1980s, such as the one summoned to address the ozone hole issue in Antarctica, the growing evidence of climate change and the accumulated data on the loss of biodiversity. Thus, the conference marked a crucial moment in the attempt to reach a consensus capable of reconciling interests among countries.

The Earth Summit was of particular importance to non-governmental organisations (NGOs), while the Agenda 21 established that commitment and genuine participation of non-state actors are critical in achieving sustainable development goals. Finally, in 1993, as a result of this conference, the United Nations Commission on Sustainable Development (UNDP) was created within the framework of the UN, with the attributions of encouraging and accompanying the implementation of Agenda 21 and the Declaration of Rio de Janeiro.

The World Summit on Sustainable Development held in Johannesburg, in 2002, aimed to propose actions to accelerate and to strengthen the principles discussed in Rio de Janeiro in 1992, and resulted in two documents: the Johannesburg Declaration and the Implementation Plan. The Plan reaffirms its commitment to the objectives of the United Nations Conference on Environment and Development.

The Rio + 20, a meeting that took place in Rio de Janeiro, hosted in 2012, the United Nations Conference on Sustainable Development, held 20 years after the United Nations Conference on Environment and Development, Rio 92. This meeting of 2012 was aimed at renewing political commitment to sustainable development and its key themes as a green economy in the context of sustainable development and poverty eradication; institutional structure for sustainable development. A total of 188 UN member states participated in the event, where the dialogue for sustainable development took place, aimed at the participation of civil society through the elaboration of recommendations on priority themes related to sustainable development, to be sent to the heads of the states and governments who were present at the meeting.

The Summit of the Peoples was an event that also took place at Rio + 20. It was organised by civil society entities that considered the official proposal of the conference to emphasise the insufficient green economy to address the social and environmental problems faced by humanity. The actions of the Summit were organised from three principal axes, which aimed to denounce the structural causes of the crises, to propose solutions and new paradigms of the peoples, and to stimulate organisations and social movements to articulate post-conference struggle processes. At the end of the conference, the document entitled *The Future We Wanted* was created. For Leff (2001), the current ecological crisis for the first time is not a natural change; it is a transformation of nature induced by the metaphysical, philosophical, ethical, scientific, and technological conception of the world; that is, a crisis provoked by human behaviour.

The United Nations Environment Program (UNEP), established in 1972, has made progress with legal and institutional frameworks, with the technical capacity to address environmental issues at the global, regional, and national levels. International summits and conferences were held, and multilateral environmental agreements were adopted to determine the course of action on environmental degradation and the use of natural resources. The effective implementation of these agreements involves a

complex and fragmented development of international environmental governance with a large number of institutions working within or outside the UN (2017).

The attributions distributed among institutions of several spheres and segments and the difficulty of coordinating activities and financing the international context take place at a national level where environmental issues are treated with great difficulty concerning the integration of economic and social aspects and the adequate management of natural resources and the environment.

The UNEP works with member countries to build a strategic and responsible approach to meet accorded environmental priorities. Its objectives are: catalysing and coordinating international efforts, seeking the implementation of internationally accorded objectives and supporting processes of environmental governance; supporting national, sub-regional, and regional environmental governance processes and institutions; to seek coherence and articulation of mandates within the United Nations System, ensure stable, adequate and compatible financing with environmental demands and challenges; establishing a robust, coherent, and credible scientific basis to support decision-making processes; facilitating the transition to a global green economy.

The current awareness of the need for prevention/precaution and awareness of the degradation of the segmented environment in various countries has helped to recognise that there is only one environment on planet Earth and that the only way to achieve reasonable regulation would be to unite in an international normative system (Soares 2003). This scenario places the international union and its concern with the environmental scenario and the search for balance in the management of environmental issues.

We hold, in one hand the perception of the common house that is the planet Earth and the certainty that all the created impacts are distributed by the planet, and on the other hand, the recognition that the changes in the ecosystems resulted from the human action, constructing the denominated crisis of the anthropogenic age, that is, the one that the human being has altered, and continues to deepen the crisis, so substantially, even compromising human existence and many other species living on Earth. These two axes justify and require joint global action as a 'sine qua non' condition to promote the necessary changes and capable of establishing the changes towards an ecologically balanced environment, fundamental to the healthy quality of life.

### ***1.3 Brazil in the International Environmental Governance***

The United Nations has been considered fundamental to global governance since the end of World War II, which has established itself as an intergovernmental organisation of universal scope including many governance issues. Among its concerns is the environment, always taking into account existing programmes and programmes within the UN. Brockmann (2013) affirms that:



Conscious that the Earth is our common home, and that everyone should take the part of our responsibility before it, it is all too urgent that we make democracy and independence of the United Nations something that truly makes sense, the place where we listen to the opinions of everyone and where those opinions really are in the decision-making process without anyone being excluded.

In order to follow the implementation of the Agenda 21, starting with the Rio 92 Conference, the CSD, Commission for Sustainable Development, UN (2015) emerges. This committee is responsible for giving policy guidance on initiatives, promoting debate and also guiding partners for sustainable development among the various actors.

In addressing policy initiatives, the Commission has assumed an essential role in environmental areas not managed by a specific convention. The commission does not oblige the States to act and does not have the command of its financial resources, and its delegates come from the ministries of the environment of participating countries. Environmental agreements help solving environmental problems so that an agreement can be reached (there are more than 500 international environmental agreements).

The Commission on Global Governance defines governance as the totality of the many ways in which individuals and institutions, public and private, manage their common problems. It is an ongoing process by which conflicting or different interests can be accommodated, and cooperative action can be done.

Discussions on “governance” approach a consensus when the right to citizen participation is placed in situations that affect their lives. Participation is essential to political discourse in democratic societies. Leff (2012) points out that:

The sociological analysis of environmental knowledge leads us to discern the coherence between explanatory, evaluative and prescriptive statements of environmental discourse, its processes of production and meaning, social mobilisation, political change and productive reorganisation. In this way, the links between knowledge and production of the construction of environmental rationality are established.

Decentralisation and citizen participation can bring solutions to local problems. It would be necessary to take into account the particularities of each case, since democracy can put at stake institutions and NGOs, which are called representatives of social sectors, with some of them being able to articulate directly with international institutions and large companies.

The global challenge is the sustainability of democracy. It is essential to consider the political dimension of the State reform, which implies a bureaucratic rupture and openness to the participation of society, which advocates new styles of public management, through the strengthening of connections of the State with its representative society and institutions, as well as the incorporation of new mechanisms. According to Santos (2012), in the past, man has chosen from nature those parts or fundamental aspects to the exercise of life, valuing, differently according to places and cultures, the natural conditions that constituted the material basis of the existence of the group. A more critical look at the debate on governance today is that the environmental debate has become an economic concept.

Globalisation processes change traditional roles in the actual scenario of the world in order to make them autonomous. In this sense, discussions on governance imply the consideration of new actors in the world affairs, proposing that non-state actors, especially NGOs, take essential place in the world public space, raising new social demands. It must be recognised that there is a lack of articulation so that the dialogue between actors cannot take place in an effective way concerning its application.

The Brazilian case is emblematic because, on the one hand, the country is a signatory of multiple bilateral, multilateral agreements, signatory of protocols, and treaties referring to the environment. On the other hand, internally, the policies have not taken into account the goals regarding the reduction of practices adopted or allowed in the development model, especially agricultural production.

It is insufficient for a country to be a signatory to world documents on issues such as human rights, peace, caring for people, and the environment if these issues are not internally worked as structuring elements of society as a whole. Therefore, any initiative in the sense of environmental protection is undermined, if it is not debated, clarified, informed to the community and with it to structure the appropriate public policies of preservation, protection, and care, both internally and externally.

The role of the State in governance, in arguing that the imperatives of establishing a system of world governance, should not override the prerogatives of the State as a supranational decision, highlighting the risks involved in consolidating the democratic process, particularly for peripheral countries.

Therefore, in order to consolidate a system of democratic world governance, political and economic precedence, it will be necessary in the construction of the world public space, strengthening of civil societies in the international arena should not occur to the detriment of national States and government institutions. The increasing number of issues with implications across borders makes international coordination necessary for the conduct of environmental problems as the recognition of ecological interdependence between continents that requires collective actions in the socio-economic, political, and environmental dimensions.

It is a problem that defies the borders and sovereignty of the States because for the environment, there are no borders. This observation can be seen from the analysis of some environmental elements present in public policies such as the Atlantic Forest that extends through 17 Brazilian states and also Argentina and Paraguay. Climate change has been widely discussed and has illustrated an essential example of the global nature of environmental issues since compelling large States sign the Kyoto Protocol; there are still records of releases of toxic gases into the environment. The increase in the ozone hole and its control serves as an example of the need for action. Brockmann (2013) highlights that,

[...] we must never forget that Mother Earth can live without us while we cannot live without her. If in the field of Human Rights respect for life is the greatest of our duties, this must begin with respect, love and care for Mother Earth.

The global environment leads to conflict, as regards the dispute over resources, or the constraints it imposes regarding productive technologies and land use, and the forms of consumption adopted by rich countries, such as the conflicts in Africa

with disputes over territory, oil and even over water. We can also mention conflicts triggered by environmental disasters, in which ambition for economic power speaks louder.

Estenssoro Saavedra (2014) states that although the idea of environmental crisis, supported by studies and discourses which to an important extent come from the natural sciences, such as ecology, as well as environmental and Earth sciences, among others, they don't refer to a phenomenon originated not only from natural but also from social causes and it is responsible for the conduct of modern man, that has been generated by the industrial civilisation, and it has become common to affirm that the environmental crisis is from anthropogenic causes. The different human groups and/or societies that inhabit this planet do so in very different conditions and, therefore, represent the global and local environmental reality differently, which results in proposals of the solution with varied emphases.

The Rio 92 addressed global environmental problems, and the Environmental Education Treaty for Sustainable Societies and Global Responsibility was developed, which mentions principles and a plan of action for environmental educators, establishing a relationship between public policies of environmental education and sustainability. It can be said that, with this, the participatory processes in the promotion of the environment focused on its recovery, conservation, and improvement, as well as for the improvement of the quality of life are emphasised.

The Summit on Environment and Development in Rio de Janeiro 92 made clear that there were different perspectives to analyse an environmental crisis that had been generated by the central powers or the First World; that is, Rio 92 was a significant milestone in the political struggle, such as overcoming the global environmental crisis in a fair way for all human beings on the planet, realising that it is time to move from words to action, and that ultimately, the great international actors have always favoured their interests trying to get maximum profit with the lowest possible cost, and that in this equation the Third World and Latin America and the Caribbean are still in the place of the weak and disadvantaged in the world, according to Estenssoro Saavedra (2014).

Economic institutions, according to the Brazilian NGO Forum, have destabilised economic structures in many developing countries through credit and loan conditions, which would have contributed to environmental degradation and social exclusion.

According to the Brazilian Forum of NGOs, in order for international economic institutions to adopt policies that respect the UN's environmental guidelines, it is necessary for each member state to create internal conditions of the commitments and to strengthen formally and effectively the conditions of governance in the actions of the various agencies and instances of the UN system.

In this sense, the Global Environment Facility was created to act as the principal international funding mechanism for projects and programmes that protect the environment in developing and transition countries. The World Bank is the principal partner in the management of this fund. However, it relies on the collaboration of other institutions, which operate in the area of scientific supervision, and supports the fulfilment of the obligations assumed in environmental conventions and the creation of capacities to implement them. However, on the other hand, private

companies correspond to actors whose interests are directly affected by environmental regulation.

Environmental negotiations at the international level link the private sector through associations. Business associations occur with the preparation of reports and the cooperation of national delegations, where it is important to emphasise that participation occurs only when there are tensions, with the defence of collective interests. With this, it may be said that the socio-environmental responsibility of the organisations deduces that the responsibility that pervades organisations and is present in the discourse and the practice.

Given the international framework of the negotiations, Brazil's debate and positioning and performance in what was the first significant protocol on climate change, the Kyoto Protocol, should be placed. Created to be a significant global agreement to take action against climate change, there were soon significant declines, as in 2001, when the US government announced its withdrawal from negotiations, as was the case with other countries around the world.

Brazil had incorporated the Kyoto Protocol by Decree No. 5.445, on 12 May 2005, to the United Nations Framework Convention on Climate Change opened for signature in the city of Kyoto, Japan, on 11 December 1997. It was for the occasion of the Third Conference of the Parties to the United Nations Framework Convention on Climate Change (Brasil, Decree No. 5445, 2005), ratified on 23 August 2002 and effective as of 16 February 2005.

It is important to highlight the central aspects for Brazil that were brought to the debate at that time in the Kyoto negotiation/ratification process (1996–2004) guided by a definition of national interest based on five main dimensions. Among the themes, it is essential to highlight the right to development as a fundamental component of the world order, establishing harmony with the structuring elements of Brazilian policy, internal and external articulating a vision of development committed to sustainability and environmental preservation, promoting respect for the environment, environment through policies at the different governmental, local, state and national levels.

The financing of mitigation policies is another factor of great importance for Brazil, since it holds large portions of the world's biodiversity, and at the same time, it threatened by global climate change. It is the responsibility of the developed and large equatorial countries that cause the emission of greenhouse gases, to finance the actions and projects that are focused on environmental protection. This policy emerged with the pretension of being a reference for the world in the Brazilian protagonism for the protection of the natural wealth, especially spreading the policies that allowed the deceleration of the deforestation in the country. In this sense, the internationally proposed policies were strongly questioned, since international regulation on forests was conceived as interventionism in national sovereignty.

From the document *Our Common Future*, built in 1972, through Agenda 21, built in 1992 by Rio + 20, with the document *The future I want*, until the Paris Agreement, we can see a change in the central feature of documents, presenting a vision that goes beyond economic and environmental themes, reaching social and broader issues related to the human being itself, as well as addressing issues related to gender, disabilities, and vulnerability. This aspect of the social area of the proposals

is more in line with the problems faced by the countries at the present time, showing that the Paris Agreement is broader than Kyoto, since there are no explicit gender issues, with people with disabilities and the empowerment of women, among others, with strong social characteristics.

Regarding environmental issues, the Paris Agreement refers internationally, the allocation of resources to meet the goals of the Paris Agreement for Brazil, it is directly related to the problem of deforestation, which is extremely serious, since they follow armed confrontations, deaths of environmentalists and workers, especially those who carry out activities in a sustainable way, with the objective of environmental preservation and sustainable management of forest resources, affecting measures related to carbon storage in the forest area and productive systems of agroforestry. It is a model of production, of life, of existence, concerning the environment and that denounces the paradoxes and negative impacts of the model of monoculture, of extensive production.

Violence imposes the “law of silence” in the middle of the Amazon region, an area that should be specially protected by the Brazilian government and the commitments of environmental policy made under the Paris Agreement, formalised by the National Congress’s approval on 12 September 2016, which means the ratification of the process of the Paris Agreement. On September 21, the instrument was delivered to the United Nations. As a result, Brazilian targets were no longer intended and became official commitments. However, the factual reality has been far from the commitments assumed.

Through Ordinance No. 373, dated 19 September 2018, establishing a procedure for systematising and assessing information on authorised areas of vegetative suppression by Brazil’s Nationally Determined Contribution to the Paris Agreement, there is a prospect of improved controls and suppression of forests. However, the threats are re-emerging from the political changes that Brazil has been facing, whose speeches have receded to the point of considering the closure of the Ministry of the Environment, such activities being under the auspices of the Ministry of Agriculture, which has repeatedly favoured the expansion of deforestation in favour of the expansionist agricultural model.

In its paragraph 65, the Paris Agreement states the need for coordination of resources and strategies for “rapid and continuous support to developing country Parties” (United Nations in Brazil 2015). In the case of current policies, Brazil continues with intense conflicts. On the one hand, the government externalises a discourse on the fulfilment of the goals of the Paris Agreement, about the policies for the reduction of fires. On the other hand, there is progress in deforestation and conflict, both with residents and large landowners, especially in the Amazon. According to a report by the Ministry of the Environment, available at its website, the figures are alarming, both due to the growth of fires, the main emission factor of greenhouse gases, and the increase in violence in the countryside. With the advancement of agricultural practices of soybean cultivation and pasture for livestock raising, the burnings advance as a practice of agriculture, legitimised by the discourse of the need for food production.

After a peak of fire in 2004, there was a significant drop until 2007, when an increasing curve of emissions began as a result of the fires, boosting indexes again,

a result of deforestation encouraged by the substantial increase in the prices of meat and soybeans that has already produced an increase in emissions in 2008 compared to 2007, but still at a much lower level than the peak of 2004. Calculations of Brazilian emissions are among the most complex among large emitters because of the high proportion of carbon dioxide derived from deforestation.

Viola (2009) points out that Brazil has a unique profile of emissions since approximately 50% of the emissions are derived from deforestation in the Amazon and the Cerrado, something unusual for middle- and high-income countries. This profile is due to a low-carbon energy matrix, with a high proportion of hydroelectric power generation, and to the growing importance of biofuels, particularly by the substitution of gasoline for ethanol.

From the policies proposed by the governments Fernando Henrique Cardoso and Lula, there are no significant differences regarding the numbers of deforestation. In both the Amazon Cooperation Treaty in Brazil's regional international policy, it did not get the deserved importance. On the other hand, it is estimated that approximately 80% of the Amazon deforestation is illegal, which would allow a short-term impact if the laws were effectively enforced.

In a recent action by the monitoring agents of the Chico Mendes Institute for Biodiversity Conservation (ICMBio), which operated inside the Itaituba National Forest 2, in the municipality of Trairão (PA), they were threatened by a group of residents. The group burned a bridge and fired shots to scare the agents. There were also attacks on a team from the Brazilian Institute for the Environment and Renewable Natural Resources (Ibama) the next day, in the city of Buritis (RO), 338 km from Porto Velho. All information is available on the Ministry of Environment website. The response of the Ministry of the Environment reaffirms that "the inspection teams remain in the field and will continue with the operation to combat deforestation", the minister assured, noting that, even with the attacks, the work was not suspended, as well as reported that there will be a police reinforcement to ensure the enforcement actions.

The second report of the year 2017 set the record for the highest number of murders of environmentalists in the world, at least 207 in 22 countries. Moreover, Brazil continues to lead the death toll, according to the report of British NGO Global Witness released on July 24. In the world, the average was four murders a week. Brazil accounts for 57 of the violent deaths against environmentalists, which represents more than 25% of the world total, with more than one murder per week.

#### *1.4 Some Lights and Axles of Sustainability*

Brazil has produced, through the Ministry of the Environment, an Action Plan for Sustainable Production and Consumption, which aims to promote policies, programmes, and actions that promote sustainable production and consumption in the country. The proposal focuses on six main areas: education for sustainable consumption; retail and sustainable consumption; increased recycling; sustainable public procurement; sus-

tainable buildings and environmental agenda in public administration. This latter programme encourages the incorporation of sustainable attitudes into the routine of the country's public agencies.

Despite the absence of budgets for further dissemination of the stock plans, the proposed axes are echoed by a significant number of companies and managers, who seek to make local policies effective. In the same sense, a sustainable production and consumption project proposes an applied holistic approach to minimise the negative environmental impacts of production and consumption systems, while promoting a better quality of life for all, stimulates sustainable management and use efficient use of resources and inputs. This initiative also seeks to foster the generation of decent jobs and fair trade relations.

There are also programmes of a social nature, but with environmental concern, such as the experiences of urban agriculture, which in some municipalities is articulated as an important experience in income generation, solidarity economy, food security, guaranteeing sufficient food for participating families and food security, understanding the difference in terms of the fact that, while the latter takes care of the quantities and sufficiency of food, it takes care of the quality of the food, confronting the production model with high technology, especially chemical, which often compromises nutritional quality, or to prevent the frequent denunciations of intoxications due to the presence of pesticides, herbicides, fungicides, insecticides, among other products used in the preparation of seeds and soil for planting.

In this field of urban agriculture together with the solidarity economy, they articulate groups that manage to survive with better dignity, compared to the capitalist model of production and consumption of products. The approximation of the two dimensions gives a greater density and possibility of constructing, in the first moment, an economy that builds itself with autonomy, albeit with limited ability to generate wealth, but with a high capacity to distribute income and quality of life. Analysing these dimensions of the innovative capacity of an economy, on the one hand, peripheral, but with a significant socioeconomic impact, also leads to the theme of environmental sustainability, from the recognition of subjects, through responsibilities as citizens and reaching the dimension of care for the environment natural with environmental systems and biodiversity.

This new vision allows us to envision new practices in a world of healthy, moderate, fair, clean, and equitable consumption. Such changes require a new communitarian vision, or the resumption of community experiences of responsibility, social, economic, and environmental.

However, such initiatives occur in isolation and are difficult to consolidate, especially by the hegemonic policy pursued by macro-systems of production and trade of products, produced by high technologies and offered in combos that integrate production, marketing, and consumption.

In addition to solidarity initiatives in the economic and social spheres, various civil society initiatives seek to contribute to the conservation of natural resources and ecosystems, dissociating economic growth from environmental degradation.

Brazil has developed internal projects aimed at Latin American integration, ranging from the construction of highways and ports to proposing social projects to be

financed through funds from emerging countries, focusing not only on income and financial exploitation but also on social issues. Samuel Pinheiro Guimarães points out that Brazil has sought to play its role concerning Latin American countries, with cultural integration, defence of peace and development (Guimarães 2006), as well as to change traditional relations of disputes among the countries of the region, to propose a new integration agenda.

However, there is intense pressure from outside the region on the policy of countries, promoting boycotts and counteracting such movements. There is a definite interest in developed countries, especially the USA, in fragmenting and weakening Latin American relations. The recent interference in the internal political processes, in favour of the neoliberal parties, represents the Latin American political moment, with substantial impacts on the internal policies of the countries and as a region.

## 2 Final Considerations

The debate brought up leads to some crucial reflections on Latin American environmental geopolitics, such as the construction of an effective regional environmental governance system that dialogues with a global system capable of ensuring the participation of actors representing the different interests involved when the theme is the protection of the environment. A system of socially constructed governance and its ability to respond to the environmental challenges that threaten the planet, because the systems currently in existence demonstrate that they are not able to cope with the of the environmental issue at a global level.

An analysis of the Brazilian society mentions the necessity of the participation of the actors formally organised through NGOs, citizens' societies, and public power, all important actors in the society. The demands of participation of international forums need to be reviewed in order to make possible the action of new social movements as well. Concerning participation in environmental governance, special attention must be given to the legitimacy of the actors' intentions, which cannot be separated from the reference of social responsibility.

A significant advance in the content of the markedly ecological debate prevailing in the 1970s and 1980s, to a content that advances to the social, economic, and political fields, initiating new languages, ecopolitics and socio-environmentalism, socio-biodiversity, loading in their content commitments that are not only ecological, allegedly apolitical and identified with the Eurocentric discourse, but also entering into the field of political disputes that also advance from the debate on man and the environment to a new guise of politics, democracy, sustainable development, and environmental justice.

The perceptual discrepancy persists in relation to the central axis that should move the debate, since on the side of governmental policies the concept prevails that the problems reside in the field of economy and production, represented by the discourse of the green economy, while in the opposite field, the centrality is given in the social, academic, ecological, and part of the political field, in the perception that it



is a question of policies of distribution of production and, therefore, of guaranteeing access to wealth and well-being with perspectives of care with the environment and sustainability.

The mobilisation of economic groups at the global level, such as the G20, denotes the focus of the effective concern of global powers, from the governments of the most developed countries, or of the economic groups. For this field, there are mobilisation, budgets, agendas, while for the themes of the environmental crisis, the construction of a sustainable society, there is a vacuum, a lack of budgets and actions. On the one hand, the blazing speech of the urgency to take action and, on the other hand, the endless contingency of resources and changes that never happen. The persistent problem in economics and politics also seems to manifest themselves through an ethical and moral choice.

Policies continue to support agricultural models of ecosystem destruction, the concentration of production and wealth, investment in the interest of large international economic groups. Traditional communities and cultures that are neglected and relegated to the oblivion and property of their lands, their cultural practices, their beliefs, their culture, their social survival system, imposing social, economic, cultural, and existential invisibility.

The political fragility that has hampered dense actions in Latin America demands new postures to make sustainability possible. To define its priority, nucleus is the equilibrium of the environmental, economic, and social fields, respecting the ecosystems and understanding that man is part of it, valuing the economic and social systems of traditional cultures, with the multiple dimensions of life and overcoming the historical gap of social inequality.

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# Chapter 11

## The Conservation of Biodiversity: Argentina and Chile at the Commission for the Conservation of Antarctic Marine Living Resources



**Cristian Lorenzo and Gabriela Roldán**

**Abstract** The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) accepts proposals presented by its international membership for the designation of Marine Protected Areas (MPA) in waters surrounding Antarctica. Since CCAMLR's inception in 1982, only two MPAs have come into effect so far to protect Antarctic marine resources. In 2017, Argentina and Chile submitted to CCAMLR a joint preliminary proposal for the designation of an MPA in Western Antarctic Peninsula and the Southern Scotia Arc region, an area of high traffic and long-term political contestation. This paper provides an insight into the political scenario unfolding that resulted in the joint proposal. Based on the qualitative work of document analysis, the conclusions of this research indicates that Argentina and Chile's condition as Antarctic claimant countries and original signatories of the Antarctic Treaty is critical to this analysis. Both countries have long-term policies and a strong scientific and logistics presence in Antarctica. We also found the predominance of bilateral cooperation between both countries, including the Antarctic matters. The establishment of a new MPA in Antarctica pushed by Argentina and Chile suggests that they are also a source of international prestige and leadership. The purpose of this article is to contribute to the understanding of the political discussions involved in the protection of the Antarctic environment.

**Keywords** Antarctic governance · Antarctic science · Foreign policy · Antarctic peninsula

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## 1 Introduction

In 2009, the Commission for the Conservation of Marine Antarctic Resources (CCAMLR) established a Marine Protected Area (MPA) in the South Orkney Islands Southern Shelf. Seven years later, the Commission designated a second MPA, in the Ross Sea. Since then, they have not designated new ones. CCAMLR members are discussing proposals to have further MPAs in waters surrounding Antarctica. One into the Weddell Sea, other into East Antarctica and another into the Antarctica Peninsula and Scotia Arc region. This chapter focuses on the latter. Argentina and Chile worked together and submitted a preliminary proposal at the CCAMLR Annual Meeting in 2017 (Ministry of Foreign Affairs and Worship 2017a). This work addresses the following question: Which are the reasons that explain the joint submission of Argentina and Chile?

We found useful insights for addressing the overarching question of this research. Österblom and Olsson (2017) note that CCAMLR members perceive MPAs as lacking incentives to promote an active collection. According to Brooks and Ainley (2017), the concept of “rational use” of MPAs has different interpretations within CCAMLR parties. This point expresses the complexity of the negotiations. Brooks and Ainley (2017) let us know the confrontation within CCAMLR members’ perceptions about the desired intensity of fishery activities in Antarctic waters, as well as the level of conservation and preservation of its ecosystems. Recent research also suggests that a strong relationship between territorial claims and the spatial distribution of Antarctica’s Protected Areas (Hughes and Grant 2017). And finally, we found that scholars have observed an overlapping of competencies between CCAMLR and the Protocol on Environmental Protection to the Antarctic Treaty (popularly known as the Madrid Protocol), particularly in the creation of MPAs, which was called “imbroglio” (Cordonnery et al. 2015).

The present work used a qualitative methodology. It includes data sources from official documents published by Argentina and Chile’s governments, CCAMLR official publications and specialised literature on MPAs and the CCAMLR Convention. The information collected was analysed employing an inductive approach. It recognises the importance of descriptions in political science (Friedrich 1968) to organise the findings and fit them with explanations. Systematic historical observations let us developing new propositions in the study of international relations (Duroselle 1998).

This chapter presents the reasons to understand the joint submission of Argentina and Chile at CCAMLR to designate a new MPA in the western Antarctic Peninsula and Southern Scotia. First, the countries’ participation within the framework of the Antarctic Treaty System (ATS) as claimant countries and original signatories. Both countries have long-term policies and a strong scientific and logistics presence in Antarctica. Second, the framework of bilateral cooperation between Argentina and Chile since the 1980s, and the renewal interest on further Antarctic cooperation. Lastly, we suggest that the international prestige and position of leadership that both countries regain with the development of new environmental management instruments, such as an MPA.

## 2 Antarctic Claimant Countries and Scientific Presence in Antarctica

In this section, we address this statement: Argentina and Chile are Antarctic claimant countries, with a scientific presence in Antarctica. In 1959, amidst the political tensions of the Cold War, twelve countries signed the Antarctic Treaty: Argentina, Chile, Australia, Belgium, France, Japan, New Zealand, Norway, the Union of South Africa, the Union of Soviet Socialist Republics (USSR), the United Kingdom (UK) and the United States of America (USA). Seven of these countries (Argentina, Chile, New Zealand, Australia, Norway, France and UK) have placed territorial claims over sectors of Antarctica, while the USA and the former USSR reserved the rights to make territorial claims in the future. It is important to note that article IV of the Antarctic Treaty does not resolve the legitimacy of Antarctic sovereignty. Instead, it manages the political implications by neither accepting nor denying these assertions of Antarctic sovereignty, and reassuring claimants and non-claimants that no action in Antarctica will merit further claims or change of pre-existing claims. Moreover, the Antarctic Treaty is the keystone for the ATS, which is composed by (1) the Convention for the Conservation of Antarctic Seals (CCAS), (2) the CCAMLR and (3) the Madrid Protocol. Together, these international agreements contribute to the management and environmental protection of Antarctica and the surrounding oceans.

Argentina and Chile are Antarctic claimant countries and original signatories to the Antarctic Treaty. Both countries have a long-standing association with Antarctica and have developed infrastructure to support their Antarctic scientific programmes. The Council of Managers of National Antarctic Programs (COMNAP) published the Antarctic Station Catalogue (2017), which compiles the Antarctic infrastructure and capabilities to support the science of all existing National Antarctic Programmes (NAPs). Specifically, Argentina and Chile have a strong presence in Antarctica. They manage thirteen and nine research stations, respectively, some of which are year-round facilities and others are open seasonally (see Tables 1, 2 for details).

Tables 1 and 2 provide a comprehensive list of Argentina and Chile's infrastructure in Antarctica. They show that both countries have long-term interests in the polar region and have heavily invested in maintaining a substantial science programme and permanence in Antarctica. Also, both countries have their research stations strategically within their territorial claims. The development of Antarctic infrastructure should not distract countries from the focus on maintaining a robust scientific programme since this is the goal of the ATS and the reason for maintaining a Consultative status at the negotiating tables of Antarctic management. Science should continue to be at the forefront of national Antarctic activities and must be the driver of every decision-making process within the framework of the ATS. Argentina and Chile should aim at strengthening too their mutual scientific collaboration in Antarctica and enact on the signed accords, given the existence of many Antarctic bilateral agreements between them. To go a step further, the question that arises is which are the main political agreements that frame the relationships between Argentina and Chile?

**Table 1** Research stations of Argentina in Antarctica

Facility	Name	Latitude	Longitude
Year-round	Belgrano II	77° 52'26''S	34° 37'40''W
	Carlini	62° 14'27''S	58° 40'01''W
	Esperanza	63° 23'50''S	56° 59'54''S
	Marambio	64° 14'50''S	56° 37'39''W
	Orcadas	60° 44'25''S	44° 44'24''W
	San Martin	68° 07'47''S	67° 06'10''W
Seasonal	Brown	64° 53'43''S	62° 52'13''W
	Camara	62° 35'38''S	59° 55'09''W
	Decepcion	62° 58'36''S	60° 42'02''W
	Matienzo	64° 58'55''S	60° 04'25''W
	Melchior	64° 19'54''S	62° 58'58''W
	Petrel	63° 28'42''S	56° 13'57''W
	Primavera	64° 09'35''S	60° 57'25''W

Source Own elaboration based on COMNAP (2017)

**Table 2** Research stations of Chile in Antarctica. Risopatron (Latitude: 62° 22'17''S. Longitude: 59° 42'53''W); and Yelcho (Latitude: 64° 52'55''S. Longitude: 63° 35'03''W)

Facility	Name	Latitude	Longitude
Year-round	Frei	62° 12'00''S	58° 57'48''W
	O'Higgins	63° 19'15''S	57° 53'59''W
	Prat	62° 28'43''S	59° 39'48''W
Seasonal	Carvajal	67° 45'38''S	68° 54'53''W
	Dr. Guillermo Mann	62° 27'00''S	60° 47'00''W
	Gabriel Gonzalez Videla	64° 49'25''S	62° 51'26''W
	Professor Julio Escudero	62° 12'57''S	58° 57'35''W

Source Own elaboration based on COMNAP (2017)

### 3 The Predominance of Bilateral Cooperation

The bilateral cooperation is the predominant pattern of the relationships between Argentina and Chile. We observed four aspects of this bilateral cooperation in Antarctic matters: the idea of the South American Antarctica, the role that the UK played in recent times concerning Argentina and Chile, the current Antarctic agenda between the governments of Argentina and Chile and finally, the underpinnings of the current Antarctic cooperation between both countries. Regarding the geopolitical idea of a South American Antarctica, Argentina and Chile signed a Joint Declaration on the South American Antarctica in 1947 (Declaración Conjunta relativa a la Antártida Sudamericana 1947). This accord was signed at the time of tensions rising over the

overlapping of Antarctic territorial claims that involved Argentina, Chile and the UK. The South American Antarctic Declaration recognises the South American countries' Antarctic territorial claims, but rejects those laid by the UK. Despite their political agendas, Argentina and Chile identified at the time that there were similarities to their Antarctic ambitions and agreed (i) to have a deeper scientific understanding about Antarctica conducting joint explorations and research; and (ii) to take advantage of the richness in the region. They also agreed on working together to reach a solution related to the territorial delimitations of the South American Antarctica (*Declaración Conjunta relativa a la Antártida Sudamericana* 1947).

The idea of South American Antarctica seems to have perpetuated through time. We can take an example from the late 1990s to support this statement. In 1999, the presidents of Argentina and Chile, Carlos Menem and Eduardo Frei Tagle Ruiz, respectively, met in commemoration of the 40th anniversary of the Antarctic Treaty and, coincidentally, the centenary of the presidential meeting of the Strait of Magellan (Chile) by the then heads of both states. The 1999 meeting was followed by a visit to the Antarctic Peninsula, and the signing of a Joint Declaration in Ushuaia (Argentina) (*Declaración Presidencial Antártica* 1999). Both countries reaffirmed the importance of CCAMLR within the ATS and confirmed the support of Chile in the nomination of Buenos Aires (Argentina) for the establishment of a permanent Secretariat to the Antarctic Treaty, a motion that had been discussed for many years and frequently rejected by the UK. In further meetings, both presidents discussed including the provision of legal frameworks to have closer collaboration between the two countries' Antarctic agencies. Furthermore, Argentina and Chile explicitly included considerations of operating joint scientific stations in Antarctica (*Declaración Conjunta de los Presidentes de la República Argentina y de la República de Chile* 1999). The examples provided before offer a historical background to the bilateral cooperation between Argentina and Chile in the Antarctic context that consolidated a successful international relationship between neighbouring countries.

With regards, the second aspect of the predominance of bilateral cooperation, the UK signed a Memorandum of Understandings (MoU) with both countries. On 12th and 13th September 2016, Sir Alan Duncan, Minister of State at the Foreign and Commonwealth Office of the UK, visited Argentina, during the administration of President Mauricio Macri. In Buenos Aires, Duncan agreed in a Joint Declaration with the Argentine Vice Chancellor Carlos Foradori to let Argentina and the UK, having regular high-level meetings. They also agreed about different issues in their bilateral relations. We note that in Antarctic matters, they agreed to promote the scientific cooperation, involving both scientific agencies devoted to the Antarctic region (the IAA and the BAS).

This Joint Declaration is highly controversial at the national level in Argentina because it is related to the Malvinas Islands. See Merke (2018) to illustrate the existence of different perspectives in national politics in Argentina around the Malvinas. Recently, the Government of the Province of Tierra del Fuego appointed Jorge Arguello—an Argentinean diplomat—to be the representative of the province at international forums. At the same time, the government of this Southern province in Argentina insisted to the Ministry of Foreign Affairs to have a representative to

attend the Argentine/UK South West Atlantic Fisheries Scientific Sub Committee meetings (MERCOPRESS 2018b). Special consideration was included on the intention to promote joint activities at CCAMLR (Ministerio de Relaciones Exteriores y Culto de la República Argentina 2017).

Some months later, Argentina and Chile signed a Memorandum of Understanding (MoU) on Antarctic Scientific Cooperation. It shows the intention of both states to increase cooperation between their respective Antarctic departments: IAA and the INACH (Ministerio de Relaciones Exteriores y Culto de la República Argentina 2017). On 17 January 2017, Chile and the UK signed a Statement of Antarctic Cooperation. Chile and the UK decided to open a channel of negotiation of issues of mutual interests in three contexts: the Antarctic Treaty Consultative Meetings (ATCM), sessions of CCAMLR and meetings of the Scientific Committee for Antarctic Research (SCAR). More specifically, both countries decided to promote different levels of scientific cooperation between each other for the next five years (2017–2022), involving the Antarctic agencies in both countries, the INACH and the British Antarctic Survey (BAS) (Chile and the UK Statement on Antarctic Cooperation 2017).

Despite the mentioned role played by the UK, the cooperation between Argentina and Chile was a predominant pattern. With regards to the third aspect of the bilateral cooperation between Argentina and Chile in 2017, Argentina released a document listing vital facts to take into consideration to understand bilateral cooperation in Antarctic matters. It was in the context of the bicentenary of the crossing of the Andes by Generals San Martín and O'Higgins (considered the fathers of the nations respectively). It includes:

- Joint declarations signed during the 1940s between Argentina and Chile related to Antarctica (Ruiz Moreno-Escudero Guzmán (1941; Bramuglia-Juliet Gómez in 1947; and La Rosa-Vergara Donoso in 1948);
- Continuous cooperation carried out by the Joint Antarctic Naval Patrol (PANC) in Antarctic waters, since 1990;
- Joint Antarctic inspections conducted at scientific stations in Antarctica during 2016 and 2017;
- Scientific cooperation at CCAMLR to designate a MPA in the area of the Antarctic Peninsula (2018);
- The existence of a mechanism of biannual political coordination between the Antarctic departments of the respective Foreign Affairs Ministries, since 2012;
- The Memorandum of Understanding on Antarctic Scientific Cooperation (2016).

We also found that in 2017, Argentina and Chile governments coordinated the bilateral agenda around the following topics: the joint proposal for the establishment of a new MPA in Western Antarctic Peninsula and Southern Scotia Arc at CCAMLR; the joint inspections in Antarctic bases and the assessment of the implementation of the MoU (Ministry of Foreign Affairs and Worship 2017b).

Moreover, the last topic: the underpinnings of the current Antarctic cooperation between both countries. In 1984, Argentina and Chile signed the Treaty of Peace and Friendship (Tratado de Paz y Amistad 1984). This Treaty stopped military confrontation over the international borders of these countries, a conflict that was escalating

since the 1970s fuelled by their military governments. In 2009, Argentina and Chile signed the Treaty of Maipú to strengthen bilateral relationships (Tratado de Maipú de Integración y Cooperación entre la República de Chile y la República de Argentina 2009). Both international agreements are the cornerstone of modern Argentina and Chile's bilateral relationships. Within this framework, it is possible to recognise many instances of discord between the two nations. Lorenzini (2017) observed some cases in this regard during the 2000s, such as the provision of natural gas to the southern regions' crisis, the Apablaza case, and problems with Chile's commercial air carrier operating from Argentina's central airport, and commercial restrictions in exports of Chilean products into Argentina. Those cases show the existence of disputes between the two neighbouring countries within a framework of bilateral cooperation.

In summary, we found that Argentina and Chile cooperate in Antarctic matters in a framework in which the cooperation is the dominant pattern. Besides, both states cooperate with the UK separately, a state with an overlapping Antarctic claims to the South American pretensions. It is then remarkable that the Antarctic, being a place for peace and international cooperation, it also enables rival states to work together achieving a dynamic political equilibrium.

#### 4 MPAs as a Source of International Prestige

In this section, we suggest that the closeness between the governments of Argentina and Chile with NGOs favoured the establishment of new MPAs that represented a source of international prestige to both countries. We found two ways that let us know their interactions. The first one was through the organisation of international events specialised in MPAs. In September 2017, the Ministry of Environment of Chile and the International Union for Conservation of Nature (IUCN) organised the International Marine Protected Area Congress (IMPAC 4). This dual organisation of meetings like this highlights the close relationships that governments, like Argentina and Chile, maintain with environmental NGOs. It also indicates the complexity of public and private interests involved around the designation of new MPAs off the Antarctic Treaty. The event above-mentioned was supported by several organisations, many of them with international interests, such as The Pew Charitable Trusts, Waitt Foundation, Packard Foundations, Wildlife World Fund (WWF), Food and Agriculture Organization of the United Nations (FAO) and l'Agence Française pour la Biodiversité (Ministerio del Medio Ambiente del Gobierno de Chile 2017). During the Congress, the Chilean Foreign Affairs Minister, Heraldo Muñoz highlighted the importance of new MPAs for his government: "(...) we are going to reach 1,600,000 mts of MPAs, one of the biggest in the world (...) We are going to have more MPAs that the extension of territory in our country" (Ministerio de Relaciones Exteriores del Gobierno de Chile 2017). In the same event, the President of Chile, Michelle Bachelet, also highlighted the recent creation of MPAs at the "Archipiélago Juan Fernández" and the "Parque Marino Nazca-Desventuras" (Bachelet Jeria 2017). Chile highlighted its international profile, showing the abundant nature that belongs to this



country, a state that is too present in the ocean, and the existence of international interests that supported the conservation efforts done by the government.

The second way was through the publications of articles in national newspapers, written by international specialists in MPAs and biodiversity conservation. Here is an example that consolidates this statement. In December 2017, Clarín—a prominent Argentine national newspaper—indicated in an article written by a national Antarctic conservationist expert (Wegner 2017) that in the last two years, Argentina seemed actively engaged and increased its Antarctic leadership by submitting a joint proposal along with Chile to create a MPA in the Western Antarctic Peninsula. The article recognised the crucial role of Antarctic agencies in Argentina, the Ministry of Foreign Affairs and Worship and the IAA, who participated in the discussions on new MPAs at CCAMLR. This public recognition on Antarctic affairs by an Argentinean national newspaper is not very common; in fact, it reflects on the interests for forging a strategic partnership. This publication reveals the interest of international NGOs around MPAs in Antarctic waters that currently coincides with Argentina and Chile foreign policy towards oceans around the Peninsula Antarctica. The ideas expressed into the mentioned article are connected with an environment discourse of NGOs for long-term marine conservation (The Pew Charitable Trust 2017). What does it mean?

The Antarctic and Southern Ocean Coalition (ASOC) submitted a document in September 2016 to CCAMLR. It argued that CCAMLR should adopt a representative system of MPAs (ASOC 2016). From the ASOC perspective, MPAs are conservation and biodiversity protection tool and not a fishery management tool that may apply within the Convention Area. Regarding that CCAMLR did not achieve the objective of having a representative system of MPAs by 2012, ASOC noted some critical points in MPAs discussions at CCAMLR that may affect future talks, such as the decrease of MPAs size, MPA durations and the review process entailed (ASOC 2016). It is important to note that ASOC is promoting a vision of conservation of marine ecosystems in Antarctic waters that—partially—coincides with the interests of Argentina and Chile of having a new MPA near the Antarctic Peninsula. This case of MPAs shows us the importance of the international and national dimensions of politics.

Both examples may sound different, but they coincide in influencing the opinion and ideas of the citizenship of Argentina and Chile about the international role of each country concerning MPAs and biodiversity conservation. It also suggests a clear message to the international community about their international role as a country, in a world concerned about the effects of global change. Finding another similarity is possible. The idea of prestige and leadership is built on the underlying idea of sustainable development. Since the Brundtland Report (United Nations 1987), the concept of sustainable development refers to the “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations 1987). This idea still influences the agenda of the international community. In September 2015, the 2030 Agenda for Sustainable Development, agreed by world leaders at the United Nations Sustainable Development Summit, concluded creating seventeen Sustainable Development Goals (SDGs)

for sustainable development. One of these objectives refers to the conservation and the sustainable use of ocean, seas and marine resources. United Nations (UN) countries are expected to have developed science-based management plans for the oceans by 2020 (United Nations 2015). The framework of the sustainable development concept suggests the existence of an international opportunity for Argentina and Chile to achieve more influence in the international level through the establishment of new MPA within the Antarctic Treaty System, but not exclusively.

## 5 Concluding Remarks

Over the last decade, discussions around the establishment of new MPAs in the waters around the Antarctic continent have become politically relevant. The goal of this paper is to understand the meaning of the submission of a preliminary proposal by Argentina and Chile delegations at CCAMLR, promoting the designation of a new MPA in the western Antarctic Peninsula and the Southern Scotia. This chapter provided three reasons to understand the situation mentioned.

We found it is essential to consider the position of Argentina and Chile as claimant countries within the Antarctic Treaty System and their long-term scientific presence in Antarctica through the development infrastructure to support their Antarctic scientific programme. Furthermore, we found the existence of the predominance of bilateral cooperation between Argentina and Chile, and in particular, a framework of Antarctic cooperation between both countries. In this regard, we presented our pieces of evidences related to four aspects: the idea of the South American Antarctica, the role played by the UK in recent times, the current Antarctic agenda between the governments of Argentina and Chile and the underpinnings of the current Antarctic cooperation between both countries. And we also presented our pieces of evidence that suggest that the closeness between the governments of Argentina and Chile with NGOs favoured the establishment of new MPAs, which represented a source of international prestige to both countries.

Given the growing global importance of the designation of new MPAs, worldwide and particularly in Antarctica, it seems it will be calling for still closer cooperation between Argentina and Chile at the CCAMLR forum. Besides the ecological benefit of an MPA in the waters around Antarctica, it is worth remarking that the establishment of new MPAs is undoubtedly a matter of international politics. Despite the importance of developing actions that attempt for the better conservation of marine biodiversity, geopolitics will continue to rule the relationships between Antarctic countries.

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