The reconfiguration of the hydrosocial territory of the peninsula of Santa Elena, Ecuador

A threat to ancestral land

Margherita Scazza

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Supervisor: Gery Nijenhuis

Second reader: Femke van Noorloos

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Faculty of Geosciences
Utrecht University
Margherita Scazza
Student number: 4078608
Contact: m.scazza@students.uu.nl – margherita.scazza@gmail.com
Cover picture: Private cultivation in Santa Elena, Ecuador. Photo taken by the author

Preface

"De agua somos.

Del agua brotó la vida. Los ríos son la sangre que nutre la tierra, y están hechas de agua las células que nos piensan, las lágrimas que nos lloran y la memoria que nos recuerda.

La memoria nos cuenta que los desiertos de hoy fueron los bosques de ayer, y que el mundo seco supo ser mundo mojado, en aquellos remotos tiempos en que el agua y la tierra eran de nadie y eran de todos."[1]

Eduardo Galeano
Los hijos de los días

I knew very little of the peninsula of Santa Elena and its history before I decided to undertake this study. My interest and fascination for water, however, have accompanied me during most of my years as a university student. The struggles over the environment and resources, and their innate political essence, have always triggered my curiosity. Water and land are as essential as intertwined, materially and politically. I consequently turned my attention to land governance and struggles when I was introduced to the issue of so-called *land grabbing*. Keen to study the great role played by water in large-scale land investments, I had the fortune to meet Juan Pablo Hidalgo, who involved me in his doctoral work and introduced me to the case of the peninsula of Santa Elena, in Ecuador. The study which derived from it aims at uncovering the social dimension of a process that has radically transformed the territory of this region, affecting the livelihoods of its indigenous inhabitants. The first time I visited the peninsula I remained astonished in front of the variation of its landscape: lush and green where the arms of the irrigation scheme could reach, dry and lifeless where they could not. Throughout the three months of fieldwork I spent in Santa Elena, I had the chance to learn about its rich past and the complexity of its present. Complex and multifaceted is in fact the reality I have been observing, characterised by a great variety of contradictions and visions that frequently come into conflict with each other. For this reason I could have easily prolonged my research for months, if I had not to respect university requirements. It took me a great effort to try to approach the issue with objectivity, considering the great political meanings with which is loaded. Probably for this reason, I came to realise that impartiality might not always be the key to a successful study, and that we, as researchers of ecological struggles, should not consider ourselves as detached

[1] "*We are made of water.*

From water life bloomed. Rivers are the blood that nourishes the earth, and of water too are the cells that do our thinking, the tears that do our crying and the recollections that form our memory.

Memory tells us that today's deserts were yesterday's forests and that the dry world knew well enough to stay wet, in those remote days when water and land belonged to no one and to everyone."

observers. My desire with this thesis is to help clarifying the current situation of land and water struggles in Santa Elena, providing insights into broader issues of water governance and infrastructure development.

I wish to thank Juan Pablo Hidalgo Bastidas, who has supervised my work in Ecuador and who provided me with precious support and inspiration. A sincere thanks goes to my university supervisor Gery Nijenhuis, whose guidance has been essential for my academic growth during the past two years. My gratitude also goes to those who have participated in the study, particularly Tito Villacreces and Efraín Robelly, whose assistance has been vital for the success of the research. Finally, I would like to thank my parents and brother, for always supporting my choices and encouraging me in doing what I like.

Abstract

Large-scale infrastructural projects are source of controversies and opposition all over the world, due to the recognised unequal distribution of the costs and benefits deriving from them. Technological interventions aimed at the domination and appropriation of nature are products of (asymmetric) relations of power, involving actors with different worldviews and interests. The ecological changes caused by the construction of such projects are often reflection of the social relations underpinning them. Water is also increasingly source of struggles and competition, being a precious resource that embodies power relations and dominant 'regimes of truth' while simultaneously constituting and reshaping them. Adopting a political ecologist perspective, this study examines the reconfiguration of the hydrosocial territory of the peninsula of Santa Elena, in Ecuador, resulting from the creation of the PHASE irrigation scheme. Inhabited by the descendants of one of America's most ancient civilisations, who now live organised in *comunas*, this region has suffered from a severe water deficit for more than half a century. In order to increase and exploit its untapped agricultural potential, in the 1980s the Ecuadorian government opted for the construction of a water transfer system and an extensive irrigation scheme. This research retraces the processes which have led to the development of the PHASE scheme as we see it today, while attempting to describe and explain its impacts, particularly in terms of land tenure change and concentration. The communal system is threatened by the fragmentation of its territory caused by a 'land rush' that has left local inhabitants with no access to irrigation. The findings discussed are particularly relevant in view of the technocratic approach of the current Ecuadorian government and of the great number of large-scale hydraulic projects planned for the future.

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Acronyms

ARCA	Agencia de Regulación y Control del Agua
BNDES	Brazil Banco Nacional de Desarrollo Económico y Social
CAF	Corporación Andina de Fomento
CEDEGE	Comisión de Estudios para el Desarrollo de la Cuenca del Rio Guayas y la Península de Santa Elena
CEDEX	Centro de Estudios y Experimentación de Obras Públicas
CNE	Consejo Nacional Electoral
CNRH	Consejo Nacional de Recursos Hídricos
EPA	Empresa Pública del Agua
ERA	Echelons of Rights Analysis
ESPOL	Escuela Superior Politécnica del Litoral
FAO	Food and Agriculture Organization
FCG	Federación Comunas de Guayas
FEDECOMSE	Federación Comunas de Santa Elena
FPIC	Free Prior Informed Consent
GAD	Gobierno Autónomo Descentralizado
HDI	Human Development Index
IDB	Inter-American Development Bank
IDS	Institute of Development Studies
IERAC	Instituto Ecuatoriano de Reforma Agraria y Colonización
IESS	Instituto Ecuatoriano de Seguridad Social
IMF	International Monetary Found
INDA	Institutito Nacional de Desarollo Agrario
INERHI	Instituto Nacional Ecuatoriano de Recursos Hidráulicos

IWRM	Integrated Water Resource Management
JRA	Jaime Roldós Aguilera
MAGAP	Ministerio de Agricultura, Ganadería, Acuacultura y Pesca
MHPs	Multi-purpose hydraulic projects
O&M	Operation and maintenance
PHASE	Plan Hidráulico Acueducto de Santa Elena
PIDAASSE	Proyecto Integral de Desarrollo Agrícola, Ambiental y Social de forma Sostenible del Ecuador
PSE	Peninsula of Santa Elena
SCOT	Social construction of technology
SENAGUA	Secretaría Nacional del Agua
SIPAE	Sistema de la Investigación de la Problemática Agraria del Ecuador
UBN	Unsatisfied basic needs
UNDP	United Nation Development Programme
WCD	World Commission on Dams
WUAs	Water users associations

1. Introduction

Water is a fundamental asset for every individual, it is vital for sustaining livelihoods and affects every sphere of human life. Agriculture, and especially irrigated agriculture, is the sector with the greatest consumptive water use and water withdrawal, accounting for about 70% of total water extracted from rivers and aquifers (Siebert *et al.*, 2013; FAO, 2015). Due to their essential role for food and non-food agricultural production, at local as at global scale, water resources are experiencing increasing pressure and are becoming source of conflicts between actors and sectors which compete for its appropriation. Water distribution is therefore a strategic resource for capital accumulation, and it is simultaneously cause and effect of power structures and relations. Within the agricultural sector this becomes particularly evident when considering large-scale land investments, or so-called *land grabs*, which more often than not are actually water grabs; land without a secure source of water would be of little use for production (Smaller & Mann 2009). Nevertheless, the meanings and the values attributed to water go well beyond its productive use; stepping out of this *commodifying* and *productivist* vision, we encounter a great variety of worldviews and conceptualisations of nature and resources, which often come into conflict with each other. In every human context, relations of power will determine which worldview will prevail and will be able to reshape reality according to its norms and beliefs. Nature and changes induced to it are therefore inherently social and political, as they are always mediated by social relations between actors with different (uneven) resources. This consideration is paramount when studying environmental changes and conflicts for the appropriation of resources. The study hereby presented focuses on the reconfiguration of the territory of the peninsula of Santa Elena (PSE), in Ecuador, conceived as a socio-environmental change induced by the construction of the PHASE irrigation scheme. The creation of this infrastructure, supplied by the Daule-Santa Elena water transfer system, brought about deep changes in the land- and waterscape of the peninsula, as components of its hydrosocial territory. The aim is to describe and explain the processes that underpinned the reconfiguration and its effects, particularly recognised as land speculation and accumulation. The macro analytical lens which was adopted to guide the research and to address its objective is political ecology, an approach that assists in focusing the attention on the broader political and economic structures in which the irrigation scheme is embedded. The hydrosocial territory of the PSE is here conceived as the embodiment of the interaction between the biophysical flow of water and social forces, including human actions and relations, which jointly affect land tenure and distribution (Swyngedouw, 2009; Boelens, 2014; Linton & Budds, 2014). The irrigation scheme is one product of these social forces; through the adoption of the approach of social construction of technology (SCOT), the PHASE is considered as a technological artefact produced through a negotiation between different groups of actors, who were unevenly involved in its conception and development. Technological interventions are often recognised as instruments for human domination of nature and the affirmation of certain regimes of representation, and for this reason they are also intrinsically political. The construction of dams, for instance, is questioned and contested worldwide, particularly in view of the unequal distribution of costs and benefits deriving from them. Likewise, the construction of the PHASE scheme in the PSE has caused a redistribution

of land at the advantage of certain, more powerful actors, while excluding the local indigenous population, organised in *comunas.* The most distinctive trait of this region is in fact the form of social organisation of its inhabitants, who are recognised as direct descendants of the Manteño-Huancavilca civilisation. These entities are characterised by a communal form of land tenure and were estimated to possess approximately 85% of the territory of the PSE before the construction of the irrigation system. However, several studies on the communal system and on the irrigation scheme have recognised the occurrence of a process of property transfer, partly triggered by the construction of the latter, which has significantly reduced the territory owned by comunas (among others Álvarez, 2001; Álvarez *et al.*, 2005; Bazurco, 2006; Espinel & Herrera, 2008; Herrera, 2005; Kuperman, 2014). New actors were attracted to the peninsula by the promise of water and of increased land value, and have gradually acquired the greatest part of land with direct access to the irrigation facilities. This study investigates such process of land redistribution and aims at explaining it by using the approach of political ecology. The work presented aspires to cover an existing research gap on the correlation between the creation of the PHASE system and the disintegration of the communal territory, focusing on the underlying relations of power. Based on the hypothesis of a causal relationship between the construction of the irrigation infrastructure and the unequal redistribution of land, I formulated a research question to address within my research:

How and to what extent did the construction of the PHASE irrigation scheme contribute to the reconfiguration of the hydrosocial territory of the PSE?

To achieve the research objective and answer the main question I have focused on five elements which I considered crucial: the reasons *why* the PHASE was developed, the approach used to design and construct it *(how),* the actors involved in the reconfiguration (*who*), its impacts (*what*) and the response of stakeholders (*how*). In order to collect information on these issues and reconstruct past events I have conducted fieldwork in the PSE for a period of three months, during which I carried out participant observation and interviews with comuneros, public authorities, private landowners and experts. During the fieldwork I have selected five case studies corresponding to five comunas located in different areas of the peninsula, to research the dynamics of the reconfiguration more in detail. The research had a deliberate defined focus on comunas' experiences and perspectives on the irrigation scheme, because local inhabitants were recognised as adversely affected by its construction, which was originally planned to benefit them and secure their livelihoods. In the second chapter of the document I will introduce the wider context of my study, which is especially relevant due to the political discourses adopted by the Ecuadorian government reflecting the desire to propose an alternative and post-neoliberal model of development, paying great attention to sustainable natural resources management and to the plurinational character of the Ecuadorian society. In Chapter 3 I will present the theories on which I have founded the study and the analytical tools and frameworks which I have applied to examine power distribution and struggles. In chapter 4 the methodology, derived from an operationalization of the same theories, is described to give insights into the process of fieldwork, data collection and analysis. Chapters 5, 6 and 7 present the results and findings of the study, starting with a description of the current state of affairs in the PSE with respect to land distribution and existing infrastructure. Chapter 6 provides an analysis of the processes and facts described in Chapter 5,

with particular emphasis on the five case studies and on a set of factors identified as explanatory of the reconfiguration of the hydrosocial territory of the PSE and its outcomes. Finally, Chapter 7 offers an overview of the responses of the different stakeholders of the irrigation scheme to the reconfiguration, including the persistence of struggles between comuneros and private landowners, as well as the unclear stand of public authorities. In the eighth chapter the findings and the analysis previously presented are finally discussed and contextualised within the literature and the broader framework of political ecology. The concluding chapter summarises the findings discussed and provides suggestions for further research, along with a reflection on the limitations and the contribution of the study, which is expected to provide a valuable overview on the dynamics of land and water governance in the PSE during the past two decades. This analysis of the social impacts of the PHASE scheme should inform policy makers in view of the great number of hydraulic projects planned in Ecuador, as well as in other contexts, where irrigation systems are hardly approached as political or problematic.

2. Background of the study

2.1. Ecuador: history and geography

Ecuador is a representative democratic republic located in north western South America, bordering with Colombia to the north, Peru to the south and the east and the Pacific ocean to the west. It covers a territory of 256.370 km^2, including the Galápagos Islands, and it is home to about 15.982.551 people (World Bank, 2014). Until the Spanish conquest in 1533, Ecuador formed part of the northern Inca Empire, which incorporated several indigenous groups. Such ethnical diversity, which grew with the arrival of Europeans, is still reflected in its current population, the majority being mestizo, followed by large minorities of Amerindian, Afroecuadorian and Montubios. It is moreover recognised to host at least 17 distinct indigenous groups and the greatest level of biodiversity in the world in relation to its size, being qualified as one of the seventeen *megadiverse* countries in the world. Even though it is quite small, its territory encloses more than 2000 rivers and streams and can be divided in four main geographic regions, characterised by different climates, flora and fauna:

1. the coast ("la Costa"), with the most fertile and productive land and a large number of fisheries, characterised by a tropical climate with a severe rainy season between the months of February and May;
2. the highlands ("la Sierra"), which correspond to the Andean and Interandean region, mainly populated by the indigenous Kichua population, includes several volcanoes and has a temperate and dry climate;
3. the Amazonia ("el Oriente"), consisting of a vast portion of virgin rainforest and indigenous settlements, is characterised by a humid subtropical climate and it is also home to the country's largest reserves of petroleum;
4. the islands ("la Region Insular"), referring principally the Galapagos Islands, with several endemic species of plants and animals (CIA, 2013).

The entire country suffers from the effects of climate change, such as altered rainfall patterns, particularly the coastal region, which experiences the highest risk of flooding (World Bank, 2013). It is also important to note that Ecuador is historically prone to severe drought as well as flooding, in coincidence with the appearance of El Niño, a periodically recurrent warm ocean current affecting temperatures and rainfall patterns.

Economically, Ecuador is substantially dependent on its petroleum resources, which account for 40% of its exports and approximately 25% of public sector revenues in recent years. The country is also the first exporter of bananas in the world and a major exporter of flowers, cocoa, shrimp, sugar cane and coffee. The agricultural sector employs 28% of the active population, and agricultural land is recognised to cover about 30% of the entire country's territory (although, only 12,6% of this land is irrigated). Industrial production is directed primarily to the domestic market and consists of manufactured textiles, mining, chemical, petrochemical, and oil refinement (World Bank, 2014). Tourism is also a growing source of revenues, partly because of the increasing attention Ecuador is receiving as a destination for residential tourism for North-American retirees.

Between the years 1999 and 2000 the country has suffered from a financial crisis, which caused inflation and the subsequent decision to dollarize. In spite of it, its economy has been performing steadily well, with an annual average GDP growth of 4.3% between 2002 and 2006, which reached 6.4% in 2008. In the same year the new government of Rafael Correa defaulted on the country's sovereign debt (3,2 billion US$) which represented 30% of its public external debt, declaring it illegitimate. Later, in 2009, Ecuador bought back about 90% of its bonds. Since then, the role of China as Ecuador's foreign lender has been growing, replacing international financial institutions, being contracted for oil sales and infrastructural projects financing (CIA, 2013).
In 2013 the country scored a Human Development Index (HDI) value of 0,711, which positions it as the 98th of 187 countries and qualifies it as belonging to the *high development* category. Malnutrition of children under 5 is at 6,4%, whereas the level of literacy among people aged 15 and above is at 93%, with a primary school enrolment rate of 112%. The rate of access to improved water sources is 86,4%, although the differences between urban and rural population are significant. The portion of population living in conditions of extreme poverty has declined of about 17% between 2001 and 2012, when 3.95% of the total population was identified to be living with (or less than) 1.25 US$ a day (World Bank, 2012).

Historically, Ecuador is recognised to be the cradle of one of America's earliest sedentary civilizations, the Las Vegas culture, which settled along its coast between 8000 BCE and 4600 BCE. The rise of Las Vegas culture was subsequently followed by other civilizations which established in the coastal region, particularly between the two provinces of Manabì and Santa Elena. Outstanding is the Valdivia culture, which is the first one of which significant remains have been discovered, and which dates back as early as 3500 BCE. These coastal populations managed to resist to the Inca conquest more sturdily than any other indigenous group in the highlands. The rule of the Inca Empire was however ended by the arrival and the conquest of the Spanish Crown, led by Francisco Pizarro in 1533.
Ecuador gained its independence from Spain, after almost 300 years of subjugation, in 1822; a few years later it separated from Gran Colombia[2], becoming an independent republic through its first constitution in 1830. The following century witnessed a sequence of conservative and more liberal administrations, the most noteworthy event being a so-called liberal revolution, guided by Eloy Alfaro, against conservative catholic governments. This events culminated in a civil war in 1907, and finally led to the achievement of several civil and social rights for the Ecuadorean people as well as the construction of large infrastructure works. Starting in the 1930s Ecuador's political scene was dominated by the figure of José Maria Velasco Ibarra, who ruled the time until his removal with a coup d'état in 1963, which established a military dictatorship. During this regime the country's external debt began to grow, as the government turned to IMF to obtain contingent credits or stand-by agreements in order to repay the previous foreign debt acquired, mainly with the United Kingdom, after independence. The military dictatorship ended in 1979, when the government of president Jaime Roldós Aguilera marked the return to democracy and economic stability. The following governments, however, had to face an economic crisis brought on by the sudden end of the petroleum boom in the early 1980s and by an increasing foreign debt.

[2] The State that encompassed much of northern South America and part of southern Central America from 1819 to 1831.

Consequently, the administrations of both Osvaldo Hurtado and León Febres Cordero turned to neoliberal and free market policies, removing government price controls, devaluing the currency and abandoning most import quotas. Even after abandoning such neoliberal measures, Ecuador's economy could not recover due to the excessive foreign debt contracted with IMF and the World Bank during more than two decades, aggravated by a destructive earthquake which hit the country in 1987. By the end of the 1990s Ecuador found itself in a severe financial crisis, deepened by external shocks such as the occurrence of El Niño in 1997 and a new drop in oil prices (Acosta, 1998). As previously mentioned, in order to react to increasing inflation and currency devaluation, the government opted for adopting the U.S. dollar as the country's official currency. In 2000 social discontent reached its peak, when the population, and particularly the indigenous groups, started a period of protests and marches which culminated in a second coup d'état. President Mahuad was forcibly removed and a military triumvirate took power, before endorsing the presidency of Gustavo Noboa, the ex-vice president (Ciriza, 2000). During his mandate sovereign debt continued increasing, and by 2003 Colonel Lucio Gutiérrez, a member of the military junta which guided the coup, was elected as the new president with the support of leftist and indigenous movements. However his alliance with these groups did not last long and the government soon re-established its close relationship with the United States and the IMF. Accused of corruption and nepotism, the government of Gutiérrez ended after attempting to reform the Supreme Court of Justice to its favour and the consequent eruption of social protests (Lauderbaugh, 2012). In 2005 new elections were announced and brought the ex-minister of finances, Rafael Correa, into power in 2007. This event marked the beginning of a new and revolutionary political era for Ecuador .

2.2. La Revolución Ciudadana: an alternative model of development

The political elections held on the 26th of November, 2006 resulted in the victory of Rafael Correa and its party, Movimento Alianza PAIS, around which it developed a coalition of different social and political movements. The entire electoral campaign of Alianza PAIS had been characterised by strong anti-systemic discourses, guided by a project of radical re-foundation of the State and democratic revolution, the so-called *Revolución Ciudadana* (Citizens' Revolution) (Basabe-Serrano *et al*., 2010). Once in power, the new government of Correa announced the formation of a constitutional assembly in charge of writing a new charter for the country, established on the principles embodied by the president's movement, and on the vision of an alternative and more egalitarian model of development for Ecuador. Correa had always been very critical with regard to both previous administrations and foreign institutions, particularly the ones forming the Washington Consensus. As previously mentioned, he finally refused to recognise Ecuador's sovereign debt as legitimate and rejected it in 2008. The new constitution approved in 2008, commonly referred as the Constitution of Montecristi, and the broader project of Revolución Ciudadana are both founded on principles and values deriving from the concept of *Buen Vivir* and on the democratic ideals that guided the liberal revolution of Eloy Alfaro. The notion of Buen Vivir was restored by both the Bolivian and Ecuadorian governments to serve as the foundation of a post-neoliberal model of development in the attempt of alleviating poverty and creating more equal societies. It is derived from the cosmovision and culture of peoples who inhabited the Abya

Yala (present day America) and has survived through centuries of oppression and colonization. Such worldview does not entail an idea of (linear) development, but rather offers a holistic vision of the objective shared by all human beings, consisting of the pursuit and creation of the, material and spiritual, conditions for achieving and maintaining such Buen Vivir. The term itself is the Spanish translation of the kichwa expression 'Sumak Kawsay', which defines a harmonic coexistence of living beings in respect of their natural surroundings (Becker, 2011). Earth is hence conceived not as an inert object to be exploited and depleted, but as a living subject which sustains the survival and reproduction of human beings and nature. This perspective, implying a less anthropocentric paradigm for development compared to the western one, has been enriched and articulated by the current governments of Ecuador and Bolivia with post-developmentalist tendencies. As argued by the president of the Ecuadorean constitutional assembly, Alberto Acosta, the inclusion of Buen Vivir in the constitution is intended as an opportunity to build a new society, established on civic coexistence in respect of diversity and nature, starting from the acknowledgment of the different cultural values that exist within the country and the world (Hidalgo, 2011). Buen Vivir thus helps in envisioning a plurinational society, where all ethnic and indigenous groups of Ecuador coexist. Other principles deriving from the adoption of such paradigm are solidarity, reciprocity, and a participatory and active citizenship. However, it should be noted, that the society envisioned by Correa and his movement is characterised by an accentuated centrality of the State, as driver of modernisation and in opposition to old imperialistic tendencies (de Sousa Santos, 2014). This ide conflicts with the notion of a plurinational and multi-ethnic society brought about by Buen Vivir; the State conceived in the Citizens' Revolution is an all-inclusive entity that will interrupt élite oppression and neoliberal domination more *on behalf* of the citizens than *through* or *by* them. It is an attempt to regain the regulatory and enforcement capacities of the State, lost a long period of political instability, by making it the sole authority in charge of managing society and its economy (Boelens, 2013).

The results achieved by the government of Rafael Correa, through its three mandates, are however remarkable. Social and economic inequality have been considerably reduced, through a progressive redistribution of wealth and the above described increasing role of the State. Between 2006 and 2014, poverty measured by income (using the national poverty line - 1.89 US$) decreased from 37.6% to 22.5%, whereas extreme poverty (1,25 US$ or less per day) was reduced from 16.9% to 7.7%. Differences between population in the urban and the rural areas are still significant, with some 16% of the population living in poverty (using the national poverty line) in the first and 35% in the latter (World Bank, 2015). A substantial reduction can also be observed with regard to the Gini's coefficient, measuring overall inequality, which between 2006 and 2014 decreased from 54 to 48,7. Once more, however, the rural population carries a heavier burden, as demonstrated for example by the extremely high Gini's coefficient in relation to access to land, 0,81, one of the highest of Latin America (Hidalgo & Laforge, 2011). The government has in effect so far failed to elaborate and approve a new law regulating land tenure and access, which would allow to realize the more equal redistribution of land advocated by the constitution (art. 282), the National Plan for

Buen Vivir and by the law on food sovereignty (Ley Orgánica Del Régimen De La Soberanía Alimentaria[3]).

A noteworthy accomplishment, albeit purely theoretical, is the constitutional commitment, deriving from the integration of Buen Vivir, to the conservation of nature and a sustainable use of natural resources. Ecuador is the first country to have historically recognised nature as an entity with legal personality. Chapter VII of Title II of the new constitution is entirely dedicated to recognition of the Rights of Nature (*los Derechos de la Naturaleza*); article 71 states that: "nature, or Pacha Mama, where life is reproduced and realised, has the right to the full respect of its existence and to the maintenance and regeneration of its life cycles, structure, functions and evolutionary processes". Furthermore, the following articles recognise nature's right to restoration and the commitment of the State to apply precautionary and restrictive measures for those activities that could lead to the extinction of species, the destruction of ecosystems or the permanent alteration of natural cycles (Constitutional Assembly, 2008; Radcliffe, 2012). An exemplary, although unsuccessfully ended, initiative was the plan regarding the conservation of Yasuni Ishpingo-Tambococha-Tiputini oil fields, in the Yasuni National Park in the Ecuadorean Amazon. The initiative, launched in 2007, was aimed at leaving at least 850 million barrels of crude oil in the ground, renouncing to a gain of approximately 7,2 billion US$, in order to protect biodiversity, respect indigenous peoples' territory and combat climate change (Finer *et al.*, 2010). It is estimated that one hectare of this area, considered to be one of the most intact and biodiverse sections of the Amazon Basin, contains more species than all wildlife of North America (Watts, 2013). In exchange for this commitment, the government of Ecuador appealed to the international community and to international environmentalists to raise half of the reserve value by 2023, instituting a specific fund, the Yasuni-ITT trust fund. Unfortunately the international reaction was considerably lower than expected (only 300 million US$ received by the beginning 2013), and president Correa had to take the very unpopular decision of authorising drillings in the area (Watts, 2013).

For Correa's government, breaking with neoliberalism entails reaffirming the state's authority over the economy and investing in long-neglected public infrastructure and social services to reduce poverty and inequity. The government is pursuing a strategy of transformation of its production model by seeking to foster local industry and increase their added value. The initiative involves few strategic sectors and regional plans to achieve objectives of import substitution, enhancement of export products, technological advancement and innovation and environmental sustainability. With regards to the agricultural sector for instance there are a few crops which will be privileged for extensive production, including soy, cane sugar (for biofuels), coffee, cocoa and maize (MAGAP, 2013). Nevertheless, the different indigenous, environmental and labour social movements, which now increasingly oppose Correa's administration, claim that a real paradigm shift, to be achieved through the adoption of a model that does not rely on non-renewable resources and foreign debt, is not being pursued (Riofrancos, 2015).

In terms of social policies the government has implemented effective interventions in sectors such as housing, with the programme Socio Vivienda which provided houses to lower income families,

[3] A law passed in 2009 which seeks to ensure food security, through a redistribution of land and other means of production, the protection of traditional knowledge and small-scale farming.

or public works, investing more than 5.250 million US$ in an extensive road system (1.286 km) and in several airports (Government of Ecuador, 2015; Aguilar, 2012). Moreover, the administration of Alianza PAIS has been engaged in planning and developing a large number of large-scale hydraulic projects, following the footsteps of previous governments, in an effort to increase its (clean) energetic capacity. Such projects have been at the centre of heated debates and criticisms, due to their high cost and the attendant involvement of China as main creditor, as well as their social and environmental impacts.

2.3. Hydraulic projects in Ecuador

Ecuador is well endowed with water resources, to such an extent to be declared "Water Capital of the World" by the Panamerican Health Organisation, due to the fact that it is located at the headwaters of the Amazon basin (Terry, 2007). The available quantity of water within all hydrographic systems of the country is 432 km^3 per year; 24 of the 31 hydrographic systems of Ecuador are located on the Pacific side, whereas the others on the Amazonian one. In 2011 the water capacity stored in reservoirs for hydropower, human consumption, irrigation, flood control and tourism corresponded to 7,69 km^3, through 12 multi-purpose dams. The Daule Peripa dam, located in the west, has a capacity of 6,30 km^3 and in 2011 represented 82% of the country's total capacity (Cabrera et al, 2012; SENAGUA, 2011). Among the four countries of the Andean Amazon region, Ecuador has the second highest number of existing (16) and planned (60) dams, following Peru (Finer & Jenkins, 2012). This proliferation is strictly linked to the increasing need to meet growing energy demands and to diversify away from fossil fuel; up to present about 50% of Ecuador's electricity is produced through existing hydroelectric plants (Ecuadorian River Institute, 2015). The agricultural sector also largely benefits from water extraction, considering that the use of subterranean water for this purpose is limited (FAO, 2015).

There is however evidence that the current planning for hydropower or multi-purpose hydraulic projects (MHPs), particularly in the Andean region, lacks an adequate assessment of potential ecological and social impacts (Finer and Jenkins, 2012). In 1998 the World Commission on Dams (WCD) was formed in an effort to evaluate the impacts of large dams and create a forum through which different stakeholders could confront each other. In 2000, stressing the importance of strategic assessments to minimize environmental and social impacts of new dams, the WCD produced a well-known report in which it documented the existence of over 45.000 large dams, altering more than half of all river systems on the globe and displacing 40 to 80 million people due to dam-related flooding (WCD, 2000). MHPs are consequently source of controversy and social protests all over the world, but for national governments they are still represent a symbol of modernity, development and prestige, besides being the centrepiece of medium and long-term plans to meet future energy demand (McCully, 2001; Finer & Jenkins, 2012). Ecuador has in effect embraced the idea of hydraulic modernization through the construction of MHPs following technocratic and utilitarian principles, in favour of clean energy production, economic development (e.g. increase in agricultural productivity) and industrialization (Swyngedouw, 2007).

The Jaime Roldós Aguilera (JRA) hydraulic project, of which the aforementioned Daule Peripa dam is the central component, is the largest infrastructure scheme so far built in Ecuador and it is considered to be its hydraulic heart. Its geographical scope interests the basin of the Guayas river, the biggest watershed in South America west of the Andes. Its functions include hydropower generation, drinking water supply to different cities and irrigation in a few provinces. Launched in 1982 and financed through a series of loans and credits coming from different international financial institutions, it stands as an emblem of the utilitarian, neo-liberal, modernistic and technocratic principles that have guided Ecuadorian's governments water management strategies.

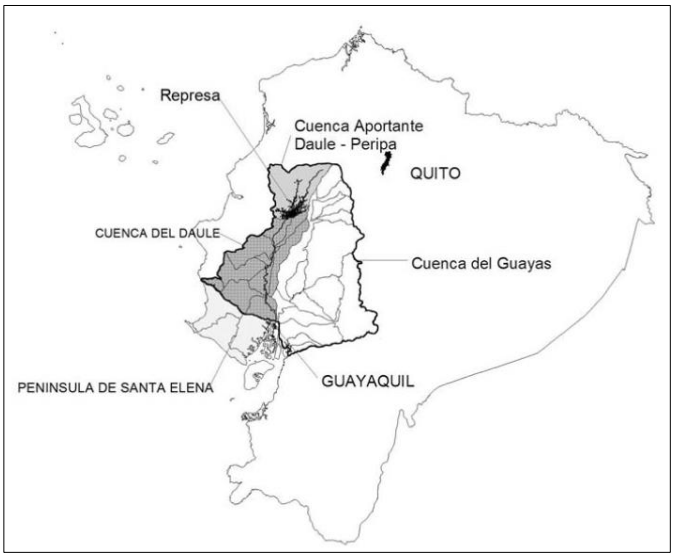


Figure 1: Jaime Roldós Aguilera hydraulic project (Corral, 2006)

2.4. The peninsula of Santa Elena and the PHASE irrigation scheme

As anticipated in the introduction of the document, this study is focused on the development of an extensive irrigation scheme, part of the JRA hydraulic project, in the peninsula of Santa Elena (PSE). I will now briefly introduce the area of study and the PHASE irrigation scheme; however, more on both will be elaborated further, when presenting and discussing the findings of the study.

The PSE is a territory located on the Pacific coast of Ecuador, with an extension of 605,000 ha (6,050 km^2). Since 2007 its territory is divided among two distinct provinces, Santa Elena and Guayas[4], and it has an estimated overall population of 395.807 inhabitants (SENAGUA, 2013).
The peninsula, particularly the western part, is characterised by a dry-tropical, semi-arid, mega-thermal climate. Precipitation is considerably low compared to the rest of the country, ranging from 200 mm p.a. in the driest areas to 600-800 mm p.a. in the rainiest. The PSE and its inhabitants have therefore faced long periods of drought and it is estimated that some 90% of his territory suffers of a significant water deficit (Kuperman, 2014; Herrera, 2005). Such water scarcity was further accentuated by the over-exploitation of natural resources, such as timber for charcoal production and for the construction industry, or by clear-cutting as a security measure in the proximity of oil fields, which led to great deforestation. It is estimated that only 1% of the original forest of the PSE survived, which in turn converted this area in one of the driest of Ecuador (Larrea and Varea, 1997; Herrera, 2005). Due to these climatic and environmental characteristics, the peninsula does not present favourable conditions for agricultural activities, particularly

[4] Before 2007 the entire territory of the peninsula was under the administration of the province of Guayas (29,08%), until a popular referendum determined the creation of an independent province for Santa Elena (Alvarez, 2001).

considering the extended period of drought which began by the end of the 1950s and was interrupted uniquely by the occurrence of the phenomenon of El Niño in 1974 and later in 1997 (Alvarez, 2001). Thus, throughout the course of the last century, the inhabitants of Santa Elena had to turn to alternative activities for their livelihoods, such as fishing or the shrimp industry, or to migration towards big cities, such as Guayaquil.

The most distinctive trait of the PSE however, is the socio-political structure in which its population and land property are organised: *comunas*. The primary feature of these organisations is the collective ownership of land, recognised to be ancestral, based on the longevity of such system. Communal groups are a common form of social organisation in Ecuador and in Latin America; territories organised in comunas can in fact be found in countries such as Bolivia, Peru and Mexico. In Ecuador communal organisations developed in every region of the country, except the Amazonia, where other forms of social organisation are recognisable. The regions with the highest density of comunas are located in the central sierra (Chimborazo and Cotopaxi), but from north to south comunas are relevant political and sociocultural entities (Becker, 1999). Figure 2 depicts the distribution and density of comunas per province in 1973; Santa Elena does not stand out due to the fact that it was incorporated in the province of Guayas which, except in the PSE, did host many communal groups.

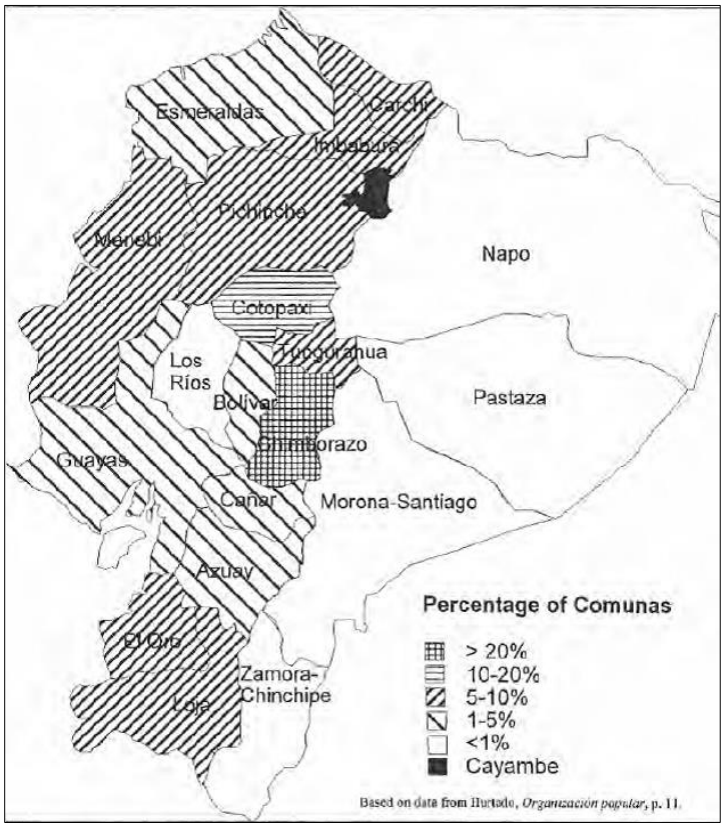


Figure 2: Distribution and density of comunas in Ecuador, 1937-1973 (Becker, 1999)

Comuneros and comunas in the PSE are considered to be the historic derivation of the Manteño-Huancavilca society, as evolved after the colonial era (Alvarez, 2001; Herrera, 2005). A comuna is hence a socio-political unit identified with a particular territory. Each affiliated member is assigned a plot of land by the communal council, through the concession of usufruct rights, in order to build a house as well as to farm or to raise livestock. During the Spanish colonization such territories were converted into reserves (*reducciones*) owned by the crown, where the indigenous inhabitants were allowed to live and use natural resources (Kuperman, 2014). In an attempt to conserve their identity, Santa Elena's native inhabitants adopted few cultural elements of their colonizers (such as monetization, clothing, language and religion), however preserving their main custom: collective territoriality. This was a strategy of adaptation employed to maintain and enjoy the rights they owned as 'indigenous communities' according to Spanish laws (INPC, 2012). Long after independence, in 1937, a Law of

Organization and Regime of the Comunas was published, representing the first juridical acknowledgement of comunas and their lands. With a new constitution in 1998 this recognition was elevated to a higher level of legislation, which prescribed the prohibition of selling or buying communal land (Asamblea Nacional Constituyente, 1998). At present, 87 comunas are established within the total territory of the peninsula.

In view of the agricultural potential of the PSE, in the past referred as the future '*grandero de America*' (America's granary), which was restrained by the lack of water, the government of the military junta of the 1960s opted for the creation of an extensive irrigation scheme, part of the bigger Jaime Roldós Aguilera hydraulic project (Hidalgo & Laforge, 2011; Espinel & Herrera, 2008). Originally conceived in the 1950s, this MHP was completed after about 20 years of expansion and enlargement, in the beginning of the new millennium. Its first and main component, the Daule Peripa Dam, was constructed after a series of preparatory studies conducted by the Commission for the Studies for the Development of the Guayas River Basin (CEDEGE), an agency created in 1965 with the task of assessing the need and the feasibility of the development of an hydraulic system in the Guayas river basin. A number of international consultancy firms, including AGRAR from Germany and TAMS from the US (Tippet, Abett, MacCarty and Stratton), who at the time worked with the World Bank, were also involved in the feasibility studies (Gerebizza, 2009; CELEC EP, 2013).

The construction of the JRA project was enabled by substantial funding mainly coming from three international institutions: the Inter-American Development Bank (IDB), the National Development Bank of Brazil (BNDES) and the Andean Development Corporation (CAF) (Corral, 2006). The Plan Hidráulico Acueducto de Santa Elena (PHASE) scheme was promoted as a project designed to benefit local communities, increasing the agricultural productive potential of their land and therefore expanding their livelihood opportunities and enhancing their food security. The actual outcome produced by the development of such a voluminous system, however, is controversial and evidently not in favour of the indigenous comunas. This study is aimed at shedding light on the reconfiguration of the territory of the Peninsula of Santa Elena, as a result of different processes revolving around the PHASE irrigation scheme, building on the hypothesis that it has caused an unequal distribution in the access to land and water.

3. Theoretical framework

The macro theoretical framework within which this work is positioned is one of political ecology. The study is focused on the sociopolitical dynamics that have caused a physical as much as social reconfiguration of the peninsula of Santa Elena. The modification of the natural land and waterscape of this region, induced by an institutional intervention through the creation of a water transfer system and an irrigation scheme, has led to a transformation in the forms of access and distribution of natural resources. Whereas the reasons why water rights systems and water allocation have been altered might appear obvious, land tenure has also been sensibly affected by the development of the PHASE scheme, due to less evident interests and power structures. The starting point of the research was an analysis of the historical and political processes that have led to the creation of this infrastructure and of the principles that have guided it (*Why was the PHASE scheme constructed* and *Why was it constructed this way?*). The reconfiguration of the PSE can hardly be considered as a purely environmental phenomenon, considering that human intervention has triggered it. Its territory, as it will be explained, is approached as hydrosocial, to emphasize the social essence of water as more than a purely *natural* resource, and its capacity to shape territories beyond their natural characteristics. In this chapter the theories and conceptual tools which have formed the base of the study, including political ecology, social construction of technology (SCOT), and instruments for power analysis, are presented and contextualised.

3.1. Political ecology

Political ecology is a broad field of social sciences concerned with "the study of power relations and political conflict over ecological distribution and the social struggles for the appropriation of nature" (Leff, 2012, p. 5). This approach has developed rapidly within the past three decades; the name firstly coined in the 1970s by authors such as Wolf and Cockburn, it can be broadly derived from distinct disciplines within the fields of geography and anthropology (Bryant & Bailey, 1997; Leff, 2012; Paulson *et al.*, 2003). Whilst some argue that the roots of political ecology are to be found in mid-20th century's ecological anthropology, ecosystems-cybernetics and hazards-disasters research, Bryant and Bailey describe the gradual development of this theoretical approach as distinguishable in two different phases (Bryant & Bailey, 1997; Watts, 2000; Paulson et al., 2003). After the diffusion of neo-Malthusian thinking in the 1970s, concerned with resources depletion and other ecological issues, reactions came from both radical development geography and neo-Marxist theorists who, seeking an appreciation of wider political and economic structures, applied principles of political economy to link environmental changes to social oppression and vulnerability (Bryant & Bailey, 1997; Robbins, 2012). With time, however, the limitations of a narrowly neo-Marxist perspective, such as economic reductionism which neglected other sources of environmental change (and social struggle) and downplayed the agency of vulnerable or powerless groups (e.g. peasants grassroots movements), became clear (Bryant, 1992; Leff, 2012). To overcome this excessive focus on class and economy, in the 1990s scholars including Escobar (1996, 1999), Zimmerer (2000), Shiva (1988), among others, started including other dimensions in

their analyses, such as gender, ethnicity, religion and other theories, particularly post-structuralism and social justice. Political ecology has been increasingly applied to so-called Third World studies, due to the evident incidence of power inequalities originated with colonisation and the consequent magnitude of poverty in developing countries, where it induces environmental conflicts which are predominantly livelihood based. The costs and benefits associated with environmental change are for the most part distributed among actors unequally, reinforcing or reducing pre-existing inequalities, with obvious political implications in terms of the altered power (Bryant & Bailey, 1997).

Essentially, political ecology emerged as an approach in contrast with *apolitical* interpretations of environmental crises and changes, such as arguments of *ecoscarcity* or modernisation, which omit the influence of political and economic forces. Rather than attributing environmental change and struggles to scarcity of resources or to the lack of adequate (*modern*) economic and technological solutions, political ecology attributes them to relations of power acting at various scales and levels (Robbins, 2012). Political ecology furthermore, attempts to overcome the monolithic division between human and natural domains; the two are no longer perceived as separate, but as highly reciprocal and integrated, contrarily to what is done by other strands of thought related to ecology and sustainable development, such as *ecocentrism* and soft sustainability technocratic approaches. Nature is therefore perceived as intrinsically *social*, as constructed rather than given. It is always mediated by structures of power and by the perspective of the analyst, and thus there is no single or objective nature, but a plurality, although one will prevail over the others (Castree, 2001; Budds, 2011; Robbins, 2012). Nevertheless, if the concept itself is approached as socially constructed, one should not omit to consider the influence that biophysical environmental processes have on human activities, also in reaction to social interactions. The relationship society-nature is not a unidirectional process, in which humans interact and modify with nature, but rather a bidirectional interplay, whereby nature is also source of power (Bakker, 2003; Budds, 2011; Leff, 2012). The definitions of political ecology are as many as the authors that work with it and as many as their foci. The most commonly recognised and accepted definition is from Blaikie and Brookfield, who defined it as a combination between "[…] the concerns of ecology and a broadly defined political economy […] encompass[ing] the constantly shifting dialectic between society and land-based resources, and also between classes and groups within society itself" (Blaikie & Brookfield, 1987, p. 17). Nonetheless, the definition which was found to correspond the most to the scope of this study is from Watts, who describes it more broadly as an attempt

"[…] to understand the complex relations between nature and society through a careful analysis of what one might call the forms of access and control over resources and their implications for environmental health and sustainable livelihoods" (Watts, 2000, p. 257).

Political ecology is chiefly concerned with ecological issues of two sorts: environmental deterioration, which entail a negative alteration of nature and ecosystems, such as degradation or depletion of resources, and environmental conflicts, which correspond to struggles and competition between different actors for the access, management and use of such (finite or infinite) resources.

Several notions and analytical instruments introduced by political ecology are employed in this study. So-called 'chains of explanation' are used to identify those contextual forces which create a

structure of outcomes that produce *winners* and *losers* (an unequal distribution of costs and benefits) of an environmental change. These chains are useful for tracing the historical processes, the institutional and legal structures and the socially produced discourses which caused unjust outcomes. Unequal distribution of costs and benefits is also approached through the concept of 'ecological marginalisation', "a process whereby politically and socially marginal (disempowered) people are pushed into ecologically marginal (vulnerable and unstable) spaces and economically marginal (dependent and narrowly adaptable) social positions" (Robbins, 2012, p. 91). Additionally, notions of territoriality and re-territorialisation, conceived in political ecology as the result of the encounter of different environmental and spatial rationalities, are central to this study. Escobar, when observing the strategies employed by the afro-Colombian social movement to reaffirm its cultural identity and its "use-meaning practices of resources", underlines the relevance of territory as a multidimensional space used for the recreation of such identities (Escobar, 1998; Leff, 2004).

3.2. Power-knowledge

The focus of political ecology on the relation between power and knowledge is strictly linked to the idea of nature as 'discursively constructed' and re-created through meaning-giving processes, which in turn affect its material configuration (Escobar, 1999). Powerful actors determine the set of meanings and values which are attributed to reality, including nature. Regimes of representation of nature are therefore regimes of power, resulting from the imposition of one worldview and one knowledge over others, and investigating them implies doing more than an epistemological exercise (Hall, 1990). Drawing upon French intellectuals such as Foucault or Derrida, who insisted on the recognition of power forming the subject as much as much as the subject forming power, political ecologists refer to 'discourses of nature'. These are intrinsically political and influence the perception, the conceptualisation and the 'regimes of truth' with which nature and its relationship with humans are shaped (Castree, 2001; Paulson et al., 2003; Boelens, 2014). Discourses of nature employed by powerful actors do not hide or reveal the truth, but rather create their own; knowledge and language are to be understood as tools that social actors use to rationalise and give meaning to the natural world, which ultimately is a subjective product, consequently internalised and finally perceived as neutral. (Castree, 2001). In a world where "the cultural and biological resources for collectively inventing natures and identities are very unevenly distributed", conflicts over the access and the use of resources that are instrumental to livelihoods and development become the norm (Escobar, 1999, p. 1). This is particularly evident when observing the way in which human societies use science and technology to relate and intervene in the environment, creating many 'artefactual natures' (Demeritt, 1998; Castree, 2001). Technology itself, as it will be elaborated further, is a product of social forces and power relations; the result of a technological intervention and the ecological outcomes therefore cannot be any different than a reproduction of such structures.

An important realisation deriving from this focus on the couplet 'power-knowledge' regards the use of discursive power to legitimise, normalise and justify ecological changes or policies and to facilitate their acceptance by the broader impacted community, particularly in terms of anticipated

social impacts. Discursive power is employed by decision makers to frame debates over environmental configurations that are in favour of their preferences, through a rhetoric of 'greater social good' which attempts to present negative effects as necessary. For instance, to motivate and legitimise ecological changes, such as the creation of large hydraulic projects, centralised States often appeal to urgent and overriding justifications such as food or energy self-sufficiency (e.g. *el granero de America*) or clean energy (Molle, 2009). Additionally, considerations on the construction of nature and knowledge entail a reconsideration of the possible contributions to the debate on environmental change (and crisis) of *indigenous* or *local* knowledges. At times overestimated and romanticised, the merits of local knowledges with regards to alternative paths of (sustainable) development, derived from their greater embeddedness and intimate interaction with the given biophysical conditions, should be at least taken into account (Bryant, 1998). Forms of hybridisation between distinct discourses and knowledges of nature are envisioned as part of broader cultural hybridisations. For social movements attempting to maintain their cultural identity and autonomy, the formation of hybrid natures might constitute an effective strategy to negotiate with powerful actors, incorporating multiple constructions of nature, even those belonging to other systems of values (Escobar, 1999). It is important to emphasise that also this relationship is bidirectional; if power shapes widespread and accepted knowledge, the latter, is key for power legitimation and exercise. Being aware and in control of the meanings attributed to reality means also being able to transform them, affecting reality itself, which is a prerogative of power holders. Foucault describes power, which is not necessarily a negative or repressive force, as omnipresent and as covering the totality of discourses, institutions, social mores and practices on which societies are built (Gaventa, 2003). In order to maintain power, certain actors attempt to control the circulation of information within society, at times exploiting informational unbalances to their benefits or for the reproduction of preferred 'regimes of truth' (Lightfoot & Wisniewski, 2014). As it is widely recognised, information affects decision making in every context of human life; through an analysis of market imperfections and failures, economists Akerlof, Spence, and Stiglitz have theorised Asymmetric Information to demonstrate the role of information in parties' decision-making within economic transactions. Asymmetries in information can be observed everywhere, particularly between those governing and those being governed (Stiglitz, 2002). Individuals' behaviour is strategic and it depends on both quantity and quality of information that can be accessed; allocation decisions are rarely made under conditions of full information, and the outcome is often a reflection of this (Herrera, 2005). Within the field of ecology, this theme has been particularly persistent in relation to the principle of Free Prior Informed Consent (FPIC). Such principle is an international emerging standard which refers to the duty of every State to recognise and guaranty the right of local communities, particularly of indigenous peoples, to participate in the decision making about issues impacting them, their territories and their livelihoods. It applies to a wide variety of contexts and causes, ranging from the creation of nature conservation areas to mining. Scholars focusing on land governance have recognised the influence of asymmetric information on land disputes and so-called land grabs; FAO's Committee on World Food Security describes in a report how "different actors – investors, governments and local people – enter the negotiations with highly asymmetric information and power. Consequently, local people usually loose out, and governments loose both revenue and opportunities to achieve long term benefits for their populations" (HLPE, 2011, p. 12). These considerations are made in reference to land deals usually

concluded between transnational firms and governments, that act on behalf of local communities. Despite this not being the case in the PSE, numerous insights offered by the theory of Asymmetric Information were helpful when researching the dynamics of land concentration.

3.3. Political ecology of water, *hydrosocial* territories and *hydrocracies*

In recent years, all the above described considerations, notions and conceptual tools introduced by political ecology have been applied by scholars to the analysis of water distribution issues, which have emerged as significantly problematic. Water is not only one of the most essential natural resources for human societies' survival, but it is also charged with a wide variety of values and meanings. Access to water itself is source of power; many of the most grand empires of ancient times, such as the Chinese, Mesopotamian, Egyptian, or Maya empires, have managed to maintain their power and systems of production thanks to their ability to enclose water resources and control them to develop large-scale irrigated areas (Molle *et al.*, 2009). Highly strategic and impregnated with power, thus, water is increasingly source of social conflicts and struggles. Concerns about widespread insecurity and scarcity have gained great attention during the past two decades. More attention to issues of power can already be observed in the attitude of international institutions, such as UNDP which in 2006 published a report bringing a title that symbolises the endeavour of overcoming supposedly neutral interpretations of the current water crisis. *Beyond Scarcity: Power, Poverty and the Global Water Crisis* in effect recognises the existence of such crisis, but as one that is socially produced, refocusing the attention on power (UNDP, 2006; Loftus, 2009). Thus, political ecologists emphasise the need of recognising the fundamentally socially produced character of inequitable hydrosocial configurations; problems and conflicts in many cases derive from the lack of accessibility and affordability experienced by (more vulnerable) people, rather than from its missed physical availability (Swyngedouw, 2009). The concept and perception of water scarcity itself, if accepted as manufactured, is exploited by political forces to meet particular interests and agendas, and to legitimise solutions such as top-down, centralised and/or privatised management (Johnston, 2003). The attempt of political ecology is to re-politicise rationalities of water distribution, in function of a broader project for the achievement of a political arrangement that can ensure a hydrosocial environment without injustices and marginalisation (Loftus, 2009). Water is increasingly approached as "a hybrid thing that captures and embodies processes that are simultaneously material, discursive and symbolic" (Swyngedouw, 2004; p. 28). Its configurations result from a complex interplay between biophysical conditions and processes and human actions and relationships, and if the aim is to eliminate situations of scarcity, we will have to consider all these dimensions (Johnston 2003). Waterscapes, just as technological interventions, systems of rights and political discourses, are all instrumental to investigate and understand the way power is distributed among actors within a certain human context (Swyngedouw, 2004; Budds, 2011). Changes in water allocation systems are inherently conflict-ridden, as proved by the protests frequently triggered by water privatisations or the construction of large infrastructural projects such as dams (Bakker, 2003; Nüsser, 2003; Swyngedouw, 2009).

Furthermore, researchers concerned with water distribution and conflicts remind us of the bidirectional relationship existing between power and water flows; Swyngedouw, in his study on the urban development of Guayaquil, in Ecuador, took an historical perspective on the evolution of the city through power and water distribution, demonstrating how the two flows are in fact mutually constitutive (Swyngedouw, 1997; Loftus, 2009). To emphasise the reciprocity and the indivisibility of the two dimensions, the concepts of hydrosocial cycle and environments were proposed by scholars as Swyngedouw, Boelens, Linton and Budds. The latter recognise the hydrosocial cycle, which produce hydrosocial territories, as "a process by which water and society make and remake each other over space and time" (Linton & Budds, 2014, p. 1). Approaches such as Integrated Water Resources Management (IWRM) tend to frame nature and society as two separate domains whose activities and characters have to be *integrated*; Linton an Budds on the contrary introduce a concept to demonstrate how water configurations become produced, and how produced water reconfigures in turn social relations (Linton & Budds, 2014).

The model (Figure 3) is described as an circular iterative cycle, and it is applied within this study to analyse the transformation through which the PSE has undergone. According to its first conceptualisation by Bakker "whereas H_2O circulates through the hydrologic cycle, water *as a resource* circulates through the hydrosocial cycle – a complex network of pipes, water law, meters, quality standards, garden hoses, consumers, leaking taps, as well as rain-fall, evaporation, and runoff. Water is a dynamic resource landscape generated by the processes of imperative in the uneven development of capitalism. […w]ater is simultaneously a physical flow (the circulation of H_2O) and a socially and discursively mediated thing implicated in that flow" (Bakker, 2002, p. 774). Attention is therefore also on the role water plays in the processes of accumulation of capital, for which it is essential, acting as a crucial 'lubricant' for process of economic development and originating socially unjust territories, reflection of such accumulation (Swyngedouw, 2004; Budds, 2011). Hydrosocial territories, as the PSE, are settings in which the physical flow of water interacts with (often diverging) regimes of rights and representation (cosmovisions) and with the attendant discourses (Boelens, 2014; Boelens, 2015). A hydrosocial territory encompasses land, water, and any other resource present on the territory as well as actors, their discourses and social structures. For this reason struggles for water rights involve both the economic and political control over water and the divergent meanings and values assigned to it; they thus occur at a material level in terms of water-use systems, as well as at a more abstract level in terms of cultural definition and political organisation of such systems (Boelens, 2015). Boelens's analysis of water claims and struggles in the Andes provides many theoretical insights for the study of both water and land

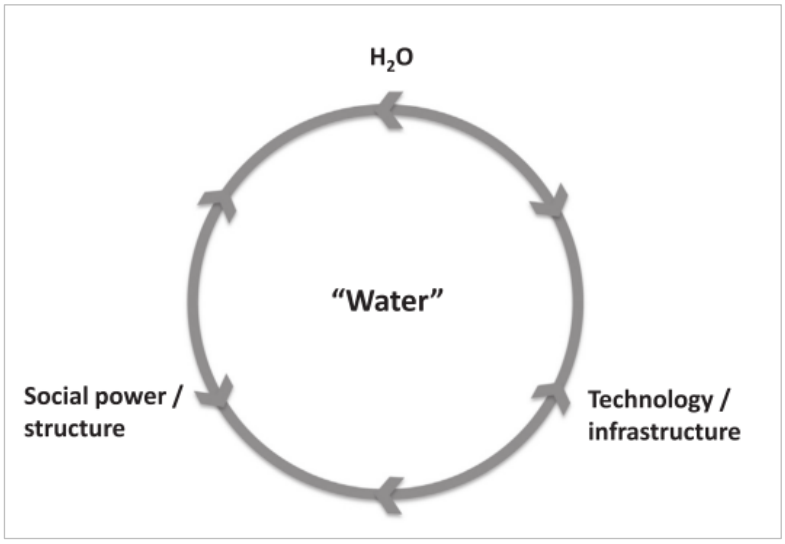


Figure 3: The hydrosocial cycle (Linton & Budds, 2014)

configuration in the PSE. Water and land, particularly when analysing agricultural practices and peasant identities, are deeply intertwined and give origin to parallel systems of rights and values and parallel struggles. Land for agricultural production would be inconceivable and meaningless if it would lack access to a secure water source; water can in effect be seen as both a target and a driver of land investments. Its fluid nature often make it more difficult to grasp its regimes of representation and distribution, whereas for land it is usually easier, particularly because its role in defining identities and in mobilising people is more widely recognised (Mehta *et al*., 2012). Boelens's Echelons of Rights Analysis (ERA), proposed to analyse water struggles and conflicts, is applied within this study to research and interpret struggles over land and water, considered as two inseparable resources, in the PSE. The ERA framework comprises four levels at which struggles take place, and despite it was originally derived from a conceptualisation of water dynamics, land conflicts in the PSE also appear to occur at these four echelons:

1. resources: for the access and use of water, infrastructure and any other resource which is instrumental for water access (e.g. land, money);
2. rules: for the content of rules and rights determining water distribution and allocation and systems management;
3. regulatory control: for the entities who have the legitimate authority to manage and govern water, to define the content of the rules and to enforce them;
4. regimes of representation: the conflicting discourses used to address water problems and to legitimise certain solutions an practices, which are also those devices used to make linkages between human and natural or social and technical, as if they were completely neutral.

Each level is linked to the other, creating a continuum in which struggles over water rights are simultaneously battles over resources and legitimacy, contributing to the recreation of hydrosocial territories (Boelens, 2008; Boelens, 2014; Boelens, 2015).

Probably one of the most emblematic phenomena of hydrosocial configurations causing social and environmental struggles is the proliferation of dams worldwide, because they tend to reflect hegemonic social and cultural priorities, reinforcing the structures that underpin them (WCD, 2000; Nüsser, 2003; McCully, 2001; Finer & Jenkins, 2012). Extensive dam building has started in the second half of the 20th century, in conjunction with an increase in public investments and technological advancements, fuelled by what Scott called 'high modernism' (Scott, 1998). High modernism corresponds to a Western ideological phenomenon, based on great enthusiasm and self-confidence about linear progress, scientific and technical knowledge in function of human mastery of nature, and the ability to establish a rational social order, thanks to the *scientific* understanding of nature. It essentially consisted of the effort of industrialised countries to use science and theory to order and regularize the social world, and to use theories of the future to remake the present, including nature (Scott, 1998; Baghel & Nüsser, 2010). The construction of dams was considerably furthered by an increase in public investments for irrigation systems, which led to the creation of so-called water bureaucracies (*hydrocracies*), spaces in which water is controlled by the State, through a group of technocrats and professionals, as a political strategy for controlling the broader social system (Molle et al. 2009). The arguments identified by Molle, Mollinga and Wester as underpinning the formation of these hydrocracies, also include a particular zeal for 'scientific irrigation', and for the domination and manipulation of nature, through the

realisation of a 'let the desert bloom' utopia and the image of irrigation as 'progenitor of civilisation' conveyed by Smythe (Smythe, 1905; Molle et al., 2009). Dams and multi-purpose hydraulic projects, thus, became symbols of modernisation, national prestige, and of human dominance over nature at global level, due to the penetration of 'high modernism' and more generally the Western rationality of natural resources *management* into development models all around the world (McCully, 2001). By reshaping land- and waterscapes, large hydraulic projects enter the hydrosocial cycle under disguised neutral appearances, even though, as mentioned before, technological interventions are as political as their promoters. They can serve a wide array of functions, ranging from hydropower generation the provision of water supply for irrigated agriculture; throughout Western history they have been perceived as a panacea for social and economic problems, such as food insecurity or energy self-sufficiency, contributing to the rise of an 'hydraulic mission', pursued by states in an attempt to fulfil the envisioned utopias (Nüsser, 2003; Molle et al., 2009). Undoubtedly, dams and hydraulic infrastructures hold merits for their contribution to the increase in production of food and energy as well as for their role in preventing disasters such as floods or droughts. The impacts of large scale hydraulic projects however have been fiercely contested, due to the fact that, as for any ecological change, they tend to distribute costs and benefits unevenly among the actors affected (Roa & Duarte, 2012; Nüsser, 2003). Despite their believed positive contribution to agricultural development, performance reviews of 52 irrigation dams conducted by the World Commission on Dams found significant failures in meeting irrigation targets; it is estimated that the overall contribution of irrigation water to global food production is only of 12 to 16 % (WCD, 2000; Johnston, 2003). Such an unsuccessful outcome is undeniably related to the marginalising effect dams have on certain group of actors, as well exemplified by the events occurred in Santa Elena and by studies on the efficiency of the PHASE scheme conducted by Herrera and Espinel (Herrera, 2005; Espinel & Herrera, 2008). The construction of dams and extensive irrigation systems is also often accompanied by a narrative of underexploited resources and fallow lands, as if those who are already inhabiting them do not exist, confirming once more the rejection of forms of human-nature relationships other than the dominating one (Roa & Duarte, 2012).

3.4. Social Construction of Technology (SCOT)

To analyse the role of technology in producing nature according to a dominant worldview the theory of Social Construction of Technology (SCOT) was also considered as part of the analytical framework of the study. Firstly elaborated by Pinch and Bijker in 1984, this theory is based on the recognition of technology as the embodiment and the product of social structures. Deriving from social constructivism and sociology of scientific knowledge, it studies the development of technology as an interactive process between different social actors (Pinch and Bijker, 1984). The approach is developed through four main components: *interpretive flexibility*, *relevant social groups*, *closure and stabilisation* and *wider context*. The first refers to the fact that technology design is an open process, which could produce different outcomes depending on the social circumstances. The second element, relevant social groups, denotes institutions and organisations within society, as well as unorganised groups of individuals, who share the same set of meanings and interpretations, attached to a specific artefact. Technology development is a negotiation process

over the design of an artefact with diverse social groups perceiving different problems and proposing conflicting solutions. The third component, *closure*, refers to the fact that the design process continues until the controversies emerged because of divergent views of different social groups are solved. The artefact no longer poses a problem to any relevant group of society and it reaches its final form. Finally, the fourth element is probably the most relevant to this study; not originally included in the formulation of the theory, it relates to wider sociocultural and political setting in which technology development takes place (Pinch and Bijker, 1984; Klein and Kleinman, 2002). The original version of SCOT in effect seemed to ignore the influence that societal power relations can have in determining what group is relevant and consequently which meanings prevail on the others (Klein and Kleinman, 2002). Observing the wider context however is essential for a thorough analysis of the causes and the effects of technology development, implying an examination of those (power) dynamics that allow certain groups to guide or participate in the negotiation while excluding others.

3.5. The power cube

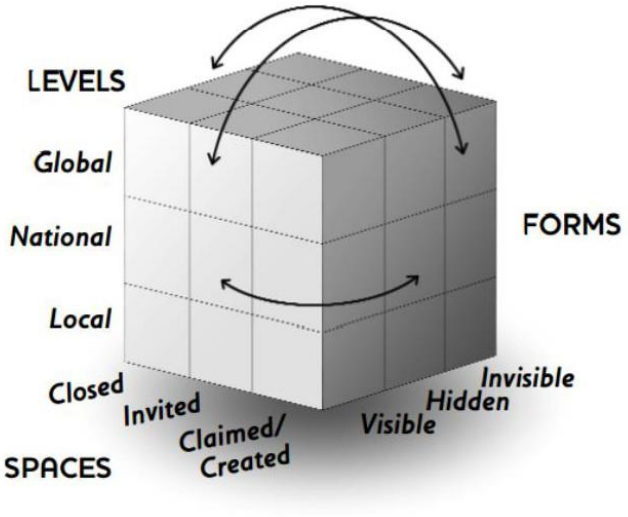


Figure 4: The "power cube" (Gaventa, 2006)

Another analytical tool, also product of a political ecology endeavour, which is helpful to approach the political nature of the reconfiguration of the territory of the PSE, is Gaventa's power cube (Figure 4). This approach to power analysis was developed by John Gaventa within his work on civil society engagement in governance at local, national and global levels for the Institute for Development Studies (IDS). The power cube is a framework created not only for assessing the role of power ('making the implicit explicit') but also for the identification of strategies to foster transformative change and increase citizens participation in decision making (Myhrvold, 2014; Gaventa, 2006). The cube is constituted by three dimensions, including *spaces*, *levels* and *forms* of power, which are not static but interrelated and which are instrumental for understanding the way power is configured and how transformative action could take place. Each of these dimensions was considered in this study and applied during the analysis of the process of (social and environmental) transformation occurred in the PSE as a consequence of the construction of the Daule-Santa Elena water transfer system.

The first dimension, *spaces*, refers to all the "opportunities, moments and channels where citizens can act to potentially affect policies, discourses, decision and relationships that affect their lives and interests" (Gaventa, 2006, p. 26). Such spaces are not neutral, as power relations affect the way their boundaries are established and it is therefore crucial to investigate who creates them, because

they will tend to have more power within them and enjoy them the most. Gaventa recognises three types of spaces for participation:

1. Closed – where decisions are taken by an enclosed set of actors, often élites (of political representatives, bureaucrats or experts) who serve 'the people' without consulting or involving them;
2. Invited – where civil society is invited to participate by different and more powerful actors, public, non-governmental or supranational. These spaces can be more or less institutionalised and are recognised to be increasing in number;
3. Claimed or created – organised by less powerful actors, to support or oppose power holders. Usually they form around common concerns or identities, and are also seen as 'third spaces' where hegemonic power is rejected and challenged (Cornwall 2002).

Secondly, decisions and participation occur at different *levels*, ranging from 'intimate' to more public ones. With respect to the latter ones, they can be divided in:

1. Local
2. National
3. Global

Citizens can act at, although they do not always have access to, all levels of debate, depending on the issue or purpose of the negotiation. Globalisation is recognised to have had an impact on this distribution, shifting many struggles at broader global levels.

Finally, the third dimension concerns the *forms* that power can take; Gaventa and Lukes identified three degrees of visibility of conflicts for power and decision-making:

1. Visible power – corresponds to observable decision-making practices, including formal rules, structures, institutions, authorities and procedures;
2. Hidden power – whereby particular actors are able to control the political agenda and the degree of inclusion (who participates) of decision making visible practices;
3. Invisible power – determines the psychological and ideological boundaries of participation; it influences how people perceive themselves and the world, manipulating their acceptance of the status quo and perpetuating inequalities, due to an internalisation of powerlessness by weaker sections of society.

The last *form* of power described by Gaventa is undoubtedly the most insidious one, once more it highlights how power structures are perpetuated through the imposition of one knowledge and through discourses to normalise it. The power cube framework was useful within this research because it facilitated the identification of those instruments and capacities that comuneros effectively had in order to have an influence on the design and development of the irrigation scheme in comparison to more powerful actors such as public authorities and technocrats.

4. Methodology

The methodology adopted for this study is purely qualitative, the purpose being to "describe and understand social [environmental] phenomena in terms of the meaning people bring to them" (Boeije, 2010). The active role of individuals in the construction of social reality, here framed as hydrosocial territories, is recognised and investigated. Qualitative research is founded on two epistemological perspectives which are strictly inherent to the political ecology lens applied to the study. The first epistemological approach is constructivism, which defines social entities, including constructed nature, as produced by human beings and as charged of certain meanings; the second approach is interpretivism, which analyses the ways in which people construct reality according to those meanings, through the use of norms, language (discourses) and symbols (Boeije, 2010; Bryman, 2012). In this study, both social and political economic processes characterising the reconfiguration of the hydrosocial territory were researched by attempting to reconstruct and understand the behaviours, worldviews and the corresponding discourses of the actors involved. Qualitative methods of data collection and analysis were chosen to achieve the research objectives and question here formulated.

4.1. Research objectives and questions

This research study aspires to achieve the following objective:

Investigate, describe and explain the reconfiguration of the hydrosocial territory of the peninsula of Santa Elena, as a result of the construction of the PHASE irrigation scheme, with a specific focus on the outcome of land speculation and concentration and its implications.

This objective will be addressed by conducting an historical review of the development of PHASE, from both an institutional and social perspective (relationships between actors), in order to be able to recognise the changes that occurred in terms of social structures, land tenure and water rights as well as to retrace their causes.

In order to pursue the abovementioned research objective, a central research question was formulated:

How and to what extent did the construction of the PHASE irrigation scheme contribute to the reconfiguration of the hydrosocial territory of the PSE?

This research question is built on the assumption, derived from both the theoretical foundation of the study and from previous works on the subject, that the Daule-Santa Elena water transfer system has altered the existing hydrosocial cycle of the peninsula, affecting land tenure, water rights systems, and thus indirectly local livelihoods and social structures. Emphasis is on the need to verify this assumption as well as its magnitude, considering that the construction of the irrigation scheme was not the only factor in action and that it is important to distinguish it from others. The impacts of the construction of the PHASE irrigation scheme might in fact not be the only cause of the reconfiguration of the territory, considering that the peninsula and the ommunal

system are embedded in activities and sectors other than agriculture. Moreover, the question implies the intention to explore the approach used to develop the scheme, which means identifying which specific actions of material and discursive character were taken by the responsible actors. Five sub-questions were devised to disassemble the main research question in distinct components corresponding to different focuses:

a. *Why was the PHASE scheme envisioned and designed?*
b. *How was it negotiated, designed and constructed in practice?*
c. *Who were the main actors involved in the reconfiguration?*
d. *What are its impacts in terms of resources distribution and broader social structures?*
e. *How did the different stakeholders react and/or adapt to the new configuration?*

The first two sub-questions relate to the processes which led to the construction of the irrigation scheme, both materially and discursively, and subsequently to the assumed outcome. The historical review conducted refers to a time period ranging from the first preliminary studies and planning in the 1980s to present days. Question *c*. refers to the stakeholders of the PHASE scheme, which are identified through an exercise of stakeholder analysis, as well as to those actors that do not necessarily hold an interest towards irrigation, but that nevertheless have contributed or participated in the reconfiguration (e.g. land registration officers). The fourth question is exclusively aimed at recognising the effects brought about the PHASE, which means defining the reconfiguration in all its aspects and its causal links with the infrastructure, to confirm the assumption of hydrosocial alteration and its incidence (entailing land concentration). The focus is on currently observable and felt impacts, particularly in terms of irrigable land access and use by various actors present on the territory. By researching the effects on *broader social structures* I attempt to identify possible reflections of this matter on domains and arrangements which are not directly linked to the PSE, therefore aside from the communal system or irrigable land. An example of such broader structures could be the governance strategies and the discourses of the government with respect to sustainable development, or the promotion of mega-hydraulic projects at national level. Finally, the last question aims at determining what was the response of the stakeholders (those who hold clear interests in the PHASE scheme and in land distribution) to the reconfiguration, including their various forms of adaptation or opposition.

4.2. Concepts and variables operationalization

The concepts derived from theory have helped in formulating the research questions and were essential for choosing which data collection methods were most suitable to collect information to answer such questions. The notion of hydrosocial territory is used as encompassing the entire territory of the PSE which has been affected by the PHASE irrigation scheme, which means any plot of land with access to the water supplied through the pipes and canals connected to the fist pumping station of Chongón. Through the first part of the research, investigating the roots of the current reconfiguration of the hydrosocial territory I attempted to reconstruct a *chain of explanations* of the present outcome, following the various steps of the creation of the PHASE, since

its first conception to its material construction at the present stage. As briefly illustrated in the theoretical framework, such chains of explanations serve to trace those contextual forces that have an influence on the outcome of a certain ecological change (Robbins, 2012). The historical review presented in the results section of this thesis is the product of such exercise, done in the effort to confirm the hypothesis of the creation of circumstances which were unfavourable to local inhabitants and which subsequently led to unjust outcomes. The hypothesis is here a speculation about a causal relationship between two variables. These two variables correspond to an independent one, which is: *the process of creation of the PHASE scheme was pervaded by unequal power relations*; and a dependent one: *the outcome of the reconfiguration of the PSE is characterised by an inequitable distribution of access to natural resource, particularly land.* The occurrence of this second variable is supposed to be a direct consequence of the incidence of the first, hence signifying that the creation of the irrigation scheme has led to an unfair outcome in terms of land and water distribution. The various concepts and tools provided by political ecology are useful for analysing and testing such relationship and for researching which collateral elements influenced it (e.g. asymmetric information).

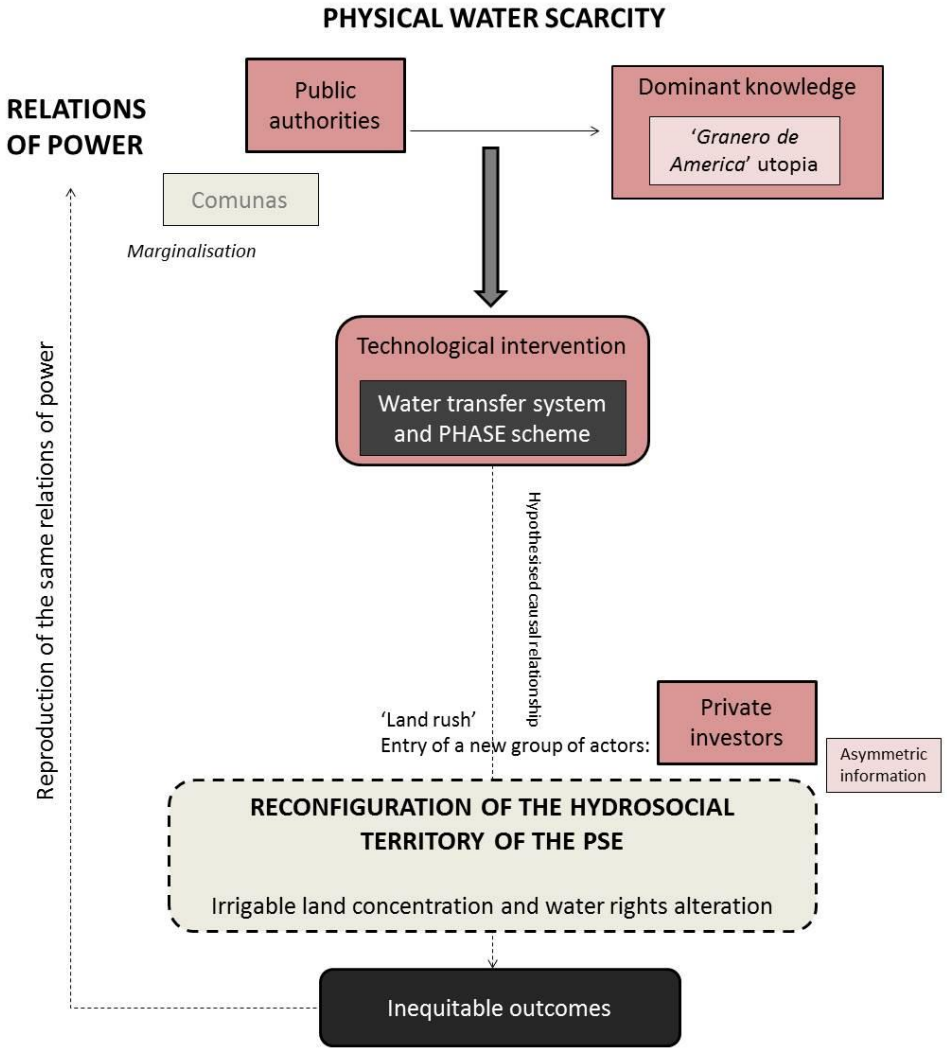


Figure 5: Conceptual model

The conceptual model illustrated in Figure 5 presents the chain of events, starting from a biophysical condition of water scarcity, that led to the hypothesised relationship and the various elements recognised to be influencing it. It furthermore emphasises how such an unjust outcome would in turn affect the same social relations which produced it, renewing the belief that processes of environmental change and hydrosocial cycle are iterative and somewhat circular.

4.3. Sampling

To identify which actors were to be involved and observed in the study, a preliminary stakeholder analysis was conducted; the analysis was further extended to include those actors or organisations that might retain information despite not holding an interest in the phenomenon analysed. The preliminary stakeholder analysis was based on information gathered through existing literature on issues related to the case (Nüsser, 2003; Corral, 2006; Herrera, 2005; Espinel & Herrera, 2008; Castillo, 2003; Álvarez, 2001; Álvarez *et al*., 2005; Kuperman, 2014; Hidalgo & Laforge, 2011) as well as on interviews with scholars and researchers. The phenomenon observed appears to have clear boundaries also thanks to its definite geographical location, corresponding to the hydrosocial territory of the PSE, as previously defined (Reed *et al.*, 2009). Through such analysis and considerations the groups of actors that were recognised to hold a direct interest in irrigation in the PSE are three:

1. Public authorities who constructed, operate and manage the irrigation facilities, which include: CEDEGE (recently dissolved, although its members are now distributed among other organisations), SENAGUA, EPA, ARCA and MAGAP, which holds a stake in the related agricultural use of land and water.
2. Comunas, being the most relevant social institutions in which the indigenous inhabitants of the peninsula are organised, and their federations (FEDECOMSE and FCG), considered as organisms representing them;
3. Private investors, who entered the 'picture' when the process of reconfiguration had already begun, even though their vicinity and capacity to influence decision-makers is thought to be playing a role also during the preliminary phases of design and construction.

The first and the latter groups of stakeholders correspond to what Reed *et al.* define as *key players*, precisely because they not only hold a great interest in the irrigation of land in the PSE, but also because they had influence on its creation and still have it on its use. Comunas, on the other hand, belong to so-called *subjects* as they do have a high interest, but are believed to have little (political) influence, lacking the capacity to impact (Reed *et al.*, 2009).

As anticipated, main stakeholders are not the only actors from which useful information can be obtained or who played a relevant role in the reconfiguration of the hydrosocial territory under study. Another important group includes includes organisations, institutes or scholars that have conducted research on issues related to the PSE and its territory, such as the communal system, the irrigation infrastructures and their operation, the agricultural potential of the region, *et cetera*. Actors who were considered as influential for the transformation of the hydrosocial territory of Santa Elena, although not directly interested by irrigation and land access, are for instance land

registration and cadastre's officers, notaries in charge of validating property deeds and provincial authorities who are responsible for monitoring and developing irrigation and land use plans.

The sampling methods applied in this research varied according to the group of actors interested. Non-probability purposive sampling was used to select key informants among public authorities, scholars and researchers; contact was general established through snowball sampling or personal research on the internet. Informants from comunas were firstly identified through a case study approach and cluster sampling[5]: five comunas were selected after a period of preliminary fieldwork (3 weeks), in an effort to have a more in-depth knowledge of the dynamics experienced by the local inhabitants of the PSE. Their perspective has rarely been taken into account by previous studies on the PHASE irrigation scheme and its results; for this reason, for their strong embeddedness in the territory and for the fact that they are recognised as being adversely affected and marginalised by the outcome of the reconfiguration, I decided to explore their perspective from a closer point of view. As later described in the possible limitations of this study, such a methodological choice has undoubtedly affected the objectivity of the study. However, in line with the considerations brought about by political ecology, and the political essence of the phenomenon observed, this was a pondered and strategic choice which characterised the hereby presented work. The particularity of the study resides in fact in the approach used to frame the changes occurred in the PSE as an explicitly political-ecological reconfiguration, focusing on its hydrosocial territory as main unit of analysis.

The selection of these five comunas was done following a few criteria, including:

- Access to the irrigation infrastructures and location within the scheme, meaning which section of the PHASE the comuna has access to and with which kind of technology is it equipped. I attempted to select comunas served by different segments and technology.
- Province of belonging, Santa Elena or Guayas, in view of the differences entailed by the institutional setting, as well as the different degree of (political) influence received by the closeness to the city of Guayaquil.
- Engagement of the council and the leaders with the federations' agenda, because it was attempted to select comunas with markedly different degrees of involvement and with claims of different entity.
- Comuneros' willingness to collaborate, also in view of a few mobility and access limitations, which will be described further in this chapter.

Additionally, contacts and support given by the two federations were essential for the identification and the initial approach of comunas. Members of these organisations served in effect *as gatekeepers of the gatekeepers*, since they facilitated the first contacts with leaders or other politically active members of the comunas. Once gatekeepers of the comunas were approached, they provided further contacts with community members, which were also pursued by myself individually during field visits. Older community members, individuals with a recognisable involvement in the political life of the comuna (e.g. ex-leaders or members of the council) were approached as preferred

[5] Cluster sampling is a method to sample populations for which there are not lists or frames, in a situation in which the geographical area of study is broad and composed by scattered units (Bernard, 2006). Comunas, as social groups and administrative units can therefore be considered as 'clusters'. These clusters were selected based on a specific set of criteria.

respondents because of their supposedly greater knowledge of the issue and the events studied. Additionally, interviews with comuneros who have sold their land to private investors were essential for the collection of information. To identify the subjects a snowball sampling technique was generally adopted, starting from the aforementioned gatekeepers (comuneros close to FEDECOMSE and FCG). The five comunas which served as case studies in the research are:

- Pechiche
- Cerezal Bellavista
- El Azúcar
- San Antonio
- San Pedro de Chongón

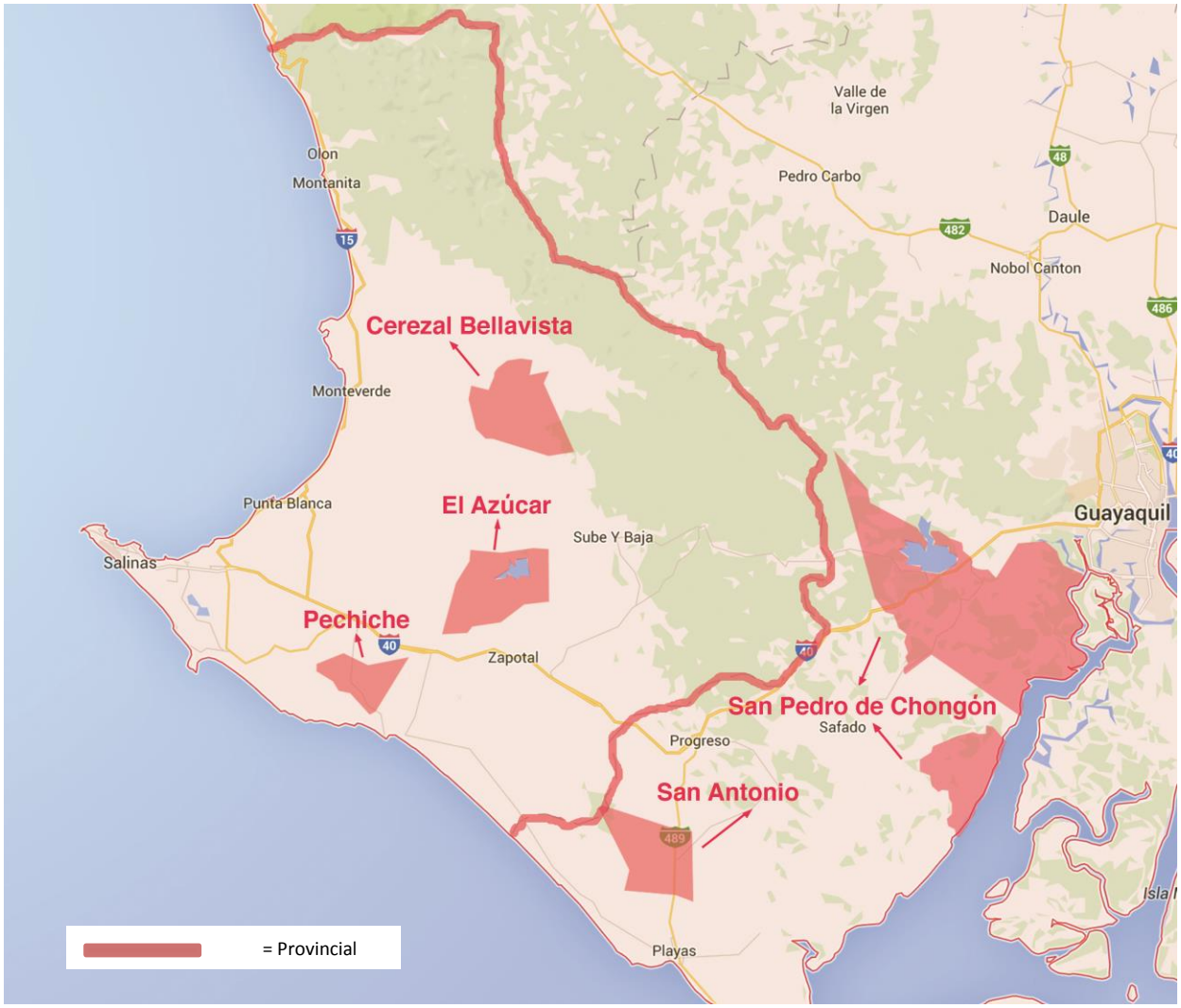


Figure 6: Comunas selected as case studies

The five case studies are not meant to be compared but rather to serve a purpose of generalizability of the results of the research, as it was attempted to select a group of comunas with the greatest variation in terms of the criteria previously listed. The case studies were not intended to provide a particularly in depth perspective on each of the five comunas, but to represent the communal system more in general, as a sociopolitical group of actors, so to offer more insights into the

process of territorial transformation. Figure 6 shows the location of each comuna on the map of the peninsula. Cerezal Bellavista is located in the north and has access to the canal transporting water from the reservoir of Leoncito to the one of San Vicente; thanks to the presence of other sources of water such as underground aquifers, its inhabitants have been able to practice agriculture more intensively than in other areas of the PSE even during the long periods of drought and therefore are quite skilled. The comuna of El Azúcar is positioned in the centre of the peninsula, and it is supplied by the reservoir built in the 1980s by INERHI and by the Azúcar–Río Verde canal; it is undoubtedly one of the comunas which have sold most land, as it will be discussed. Pechiche is also supplied by the Azúcar–Río Verde canal, but it is located more south towards the coast and for this reason its inhabitants have increasingly based their livelihoods on fishing activities. The comunas of Chongón and San Antonio, unlike the other ones, are located within the boundaries of the province of Guayas; the first comuna is supplied water through the homonym dam and through pressure pipes. It is located in close proximity with the city of Guayaquil, to the extent that in the year 1991 it was declared, although it was later reversed, as urban territory part of the metropolitan area. The second comuna in Guayas is San Antonio, it is also in proximity of the coast and it is crossed by the Chongón-Playas canal, connecting the reservoir of Chongón with the one of La Cola, and by a main road. The history of each comuna, in relation to the PHASE scheme and land deals, is described in Chapter 5.

The other group whose respondents were selected through purposive sampling is the one of private landowners. Once the five comunas had been selected and studied, private companies or individuals who acquired communal land in the past (either from comuneros or from other privates who bought it before them) on their territory, were contacted. The response rate and willingness to collaborate of the private enterprises approached resulted to be rather limited. Comuneros or the federations usually held imprecise information on such companies, their headquarters and legal representatives or other contact information; on the internet I was able to find some of this data, but as explained at the end of this chapter, reaching the interested parties revealed to be relatively difficult.

4.4. Data collection methods

The data collection methods adopted for the research are strictly entrenched with the considerations derived from the theoretical framework and a more general understanding of qualitative research. After a literature review, including some of the aforementioned existing studies on topics related to the PSE and the PHASE scheme as part of the broader JRA multi-purpose project, fieldwork was conducted for a period of three months. Data were collected using three types of methods:

- semi-structured interviews
- unstructured interviews
- participant observation

Semi-structured interviews were conducted, in Spanish, with representatives of public authorities and institutions, scholars and researchers, comuneros, and private companies. The guidelines

designed and followed during the interviews can be found in Appendix I; the main themes however included information about facts and events revolving around the construction of the irrigation scheme (dates as well as more technical data on the structures), land sales (extension, procedures, prices and time framework), of land use and current struggles or claims, as well as the legal framework for land tenure and water access. During these interviews I was provided a large amount of collateral documents or literature suggestions on the same topics: academic essays and researches; reports on the construction process of the PHASE, or on its O&M and cost-efficiency which were provided by SENAGUA and MAGAP; copies of land titles obtained from comunas when their property on land was formalised by authorities; copies of sale contracts were obtained from both comuneros and private landowners; copies of lawsuits and trials documents for disputes between comunas and landowners were usually provided directly by comuneros or by the two federations. The majority of semi-structured interviews were recorded and later transcribed, whereas during unstructured interviews notes were usually jotted rapidly, to be later revised and reorganised. Unstructured interviews were carried out only with comuneros and members of the federations during field visits of a duration of two to four days (in each comuna), because of the informal context and approach through which participant observation was possible. This typology of interview, often used in ethnographic research, has the advantage of putting the researcher in a condition of limited control on people's responses, which is useful when trying to detect narratives along with more factual accounts of past events. Unstructured interviews therefore helped in letting respondents express themselves using their own terms, to be able to observe the way in which they recounted events, revealing certain beliefs and feelings, beyond factual information (Bryman, 2012; Bernard, 2006). Interviews were always conducted with a clear plan in mind, and were guided by myself usually starting with the suggestion "tell me what happened when the irrigation scheme was planned and constructed" and through probing (echo probe and phased-assertion probe techniques, among others) (Bernard, 2006).

The total number of interviews (semi- and unstructured) conducted during the fieldwork is 49[6], respectively divided for each group of informants as follows:

- academics and researches: 5
- public authorities and institutions: 13
- Comunas:
    - Pechiche: 8
    - El Azúcar: 2
    - Cerezal Bellavista: 8
    - Chongón: 2
    - San Antonio: 3
- FEDECOMSE: 2
- FCG: 2
- Private enterprises: 4

[6] The informal unstructured interviews included in this number are only those for which I wrote notes, either during the conversation or immediately after; differently, they have been considered as part of participant observation.

Finally participant observation was conducted during my intermittent stays in the comunas or in the main cities of the peninsula (Santa Elena and La Libertad), as I was generally based in Guayaquil. The focus of the observation was on the operation and use of the irrigation infrastructure, as well as on land distribution. I also participated to assemblies and events organised by FEDECOMSE and the Department for Water Resources Management of the provincial government (GAD Santa Elena) during which members of these institutions discussed on themes related to land tenure and reform, water provision, irrigation management and the agricultural capacity of the PSE. Moreover I attended the first International Forum for the Wold Water Day organised by SENAGUA in Quito.

4.5. Data analysis

The secondary data provided by respondents during interviews and meetings were read and analysed during the course of fieldwork, in order to use potentially helpful information to select following respondents or to investigate particular events, domains and issues. Furthermore, as anticipated, interviews were for the greatest part recorded and later transcribed; or when noted, they were subsequently reorganised. Once accounts of all interviews were prepared, they were coded with colours in Microsoft Word, whereby each colour represented a code associated to a topic, a concept or a category of relationship between concepts, repeated in several or all interviews from the same group of respondents. After the coding was completed, results were analysed to identify factual information, which was crosschecked with the one found in the secondary data, as well as patterns and models in the answers provided by different respondents. Documents and secondary sources were essential for obtaining precise information on the PSE and the PHASE project, and therefore to verify the data provided by informants during the interviews, which in a few cases resulted to be inaccurate. Moreover, narratives were detected through an analysis of linguistic and storytelling devices or attitudes used by respondents; this applied particularly for recorded interviews, since it was not always easy to note both content related information and observations on the narratives (the first were deemed to be more important) when not using a recorder.

4.6. Limitations and reliability of the research

A set of limitations is recognised as having interfered with the course of the research as it was originally planned, and as having influenced the results obtained. Firstly, there is the risk of a researcher bias which might have arisen as a consequence of the choice to focus the greatest part of the participant observation and data collection on comunas (as proved by the greater number of interviews conducted with comuneros compared to other actors). This disproportioned emphasis derived from the assumption that comunas were the mostly adversely affected group of actors, and that their particular perspective with respect to the PHASE irrigation system had not been researched before.

Secondly, mobility in the peninsula was considerably limiting for the field work, as I did not have a personal vehicle and was therefore dependent on public transportations, which however did not

reach all the areas included in the study. I have attempted to overcome this limitation by prolonging my stays in the comunas for as many days as possible and by asking the support of local community members. Such limited autonomy in terms of transportation has in fact increased the already great dependency of my work on the aforementioned gatekeepers. In most cases I did not have the chance or the means to enter comunas without the assistance and the agreement of local leaders or other members of the community, also in view of the great extension of these territories. Gatekeepers and their political position have affected the selection process of other respondents within the community, therefore biasing my sample. I was usually introduced and guided in the comuna from household to household in their presence and possibly associated to them. Despite being aware of the possible limitations deriving from this practice, my range of choices was rather limited, as I was a 'guest' in the comunas and I could not fully explore them independently. I therefore adapted to gatekeepers' presence, although trying to remain aware of their political orientation and the perception of the community towards them, and I have managed to conduct a few interviews on my own in the comuna of Pechiche.

A further limitation of the study originates from the unbalanced number of interviews conducted in each comuna. This issue is strictly linked to the previous one and to my dependency on gatekeepers to approach community members. In Pechiche and Cerezal Bellavista I had the opportunity to interview a higher number of comuneros, particularly some who had sold land in the past, whereas in the other three comunas I conducted interviews only with members of the council or comuneros involved with the activities of the federation, hence with a clear opinion against land sales and their legitimation.

With regard to respondents of all sorts, but particularly comuneros, it was observed that they experienced some difficulties in recalling and describing facts and events occurred in the past (for a time span of 25 years more or less). The information provided resulted therefore to be sometimes imprecise and unaccountable; however, the use of more official documents or reports with clear sources helped in resolving this issue and validating certain facts.

Finally, a limitation that has already been mentioned in this chapter refers to the difficulty encountered in tracking, contacting and obtaining interviews with private landowners. Since comuneros were generally incapable of providing precise information on the companies which bought land from them, contact information was mainly found on the internet, and in most cases resulted to be outdated or incorrect (e.g. office addresses were wrong or old and telephone numbers not active). Among the seven enterprises which I managed to contact, three openly refused to participate or deferred several times.

5. The current configuration of the hydrosocial territory of the peninsula of Santa Elena (PSE)

This chapter presents a general picture of the current state of affairs with regard to the main actors involved in land and water access dynamics of the hydrosocial territory of the PSE, the irrigational structures actually built and in function, and the current distribution of land. Firstly, a description of the PHASE scheme is provided, with a particular focus on the historical processes behind its development and its resulting configuration. Secondly, an overview of the political principles and objective that guided its design is presented, in order to give an idea of what the expected results of the project were, and how they relate with the actual outcome. Thirdly, a presentation of the stakeholders is included, to introduce the reader to the different entities that had and have a role in the planning and use of the irrigation scheme, with particular emphasis on the existing sociopolitical structures that characterise the PSE. These main stakeholders include, as previously mentioned, comunas, public authorities and institutions and private land owners. Finally, the impacts the construction of PHASE system has had on the configuration of the hydrosocial territory of the peninsula are presented and briefly discussed, particularly focusing on distribution and concentration of irrigable land.

Figure 7: Ecuador, location of the peninsula of Santa Elena (INEC, 2015)

5.1. The PHASE irrigation scheme

5.1.1. Construction and development

The PHASE irrigation scheme, as designed by CEDEGE, is the most ambitious irrigation project of the country. Its construction began in 1986, although in 1987 it was paralysed for a few months due to criticisms and controversies in the national congress. The project was aimed at creating the structure to supply irrigation to an area of 42.804 ha; it comprised about 120 km of canals, several tunnels, three pumping stations (Daule, Chongón, Leoncito) and five areas equipped with pressure

pipes[7] (Herrera, 2005; Hidalgo *et al*., 2011; CEDEGE 2002a; CEDEGE, 2002b). Extracted from the Daule river, through the pumping station of La Toma, the water flows towards the city of Guayaquil and through a tunnel of 27 km and another one of 7 km, to reach the reservoir in Chongón. The studies and the final design of the water transfer system began in the early 1980s, when it was decided that the construction of the scheme would take place in two phases, each dedicated to a different level of the system. The first would cover the lower level (*nivel inferior* – lower than 40 mamsl), including the pumping station of Daule, the tunnels connecting Daule and Chongón, the Chongón dam, the Chongón-Playas canal, the Cola reservoir and five irrigation areas (Chongón, Daular, Cerecita, San Lorenzo and Playas), of which only three were actually built. The second phase would cover the construction of the upper level (*nivel superior* – higher than 40 mamsl), comprising the pumping station of Chongón, a canal connecting Chongón and Sube y Baja, a reservoir in Sube y Baja, a second canal between Azúcar and Rio Verde, one between Sube y Baja and Javita, and few irrigation areas (Villingota, Sube y Baja, Azúcar, Zapotal, Rio Verde, Atahualpa y Javita) (Figure 10). However, due to delays caused by the criticisms advanced by some in the congress, as well as the intermittence of funding, the second phase of construction was never entirely completed. The pumping station of Chongón was completed only in the year 2000, along with the creation of two treatment plants, which also receive water through the Daule-Santa Elena transfer system and supply most of the population of the PSE with drinking water[8]. The pumping station in Chongón has a capacity of 9,2 m^3/s, as it includes four groups of pumps, each with a capacity of 2,3 m^3/s, which can propel water up to a height of 70 m; however, due to their high costs, up to present only two of the four pumps are in place, hence the water volume conducted is only 4,6 m^3/s (Kuperman, 2014). The same under-exploitation of capacity applies to the pumping station in Daule, which also has four groups of pumps that would allow to drive a volume of water up to 44 m^3/s; nevertheless, two of these pumps are not yet functioning, thus the flow of water is of a maximum of 22 m^3/s[9].

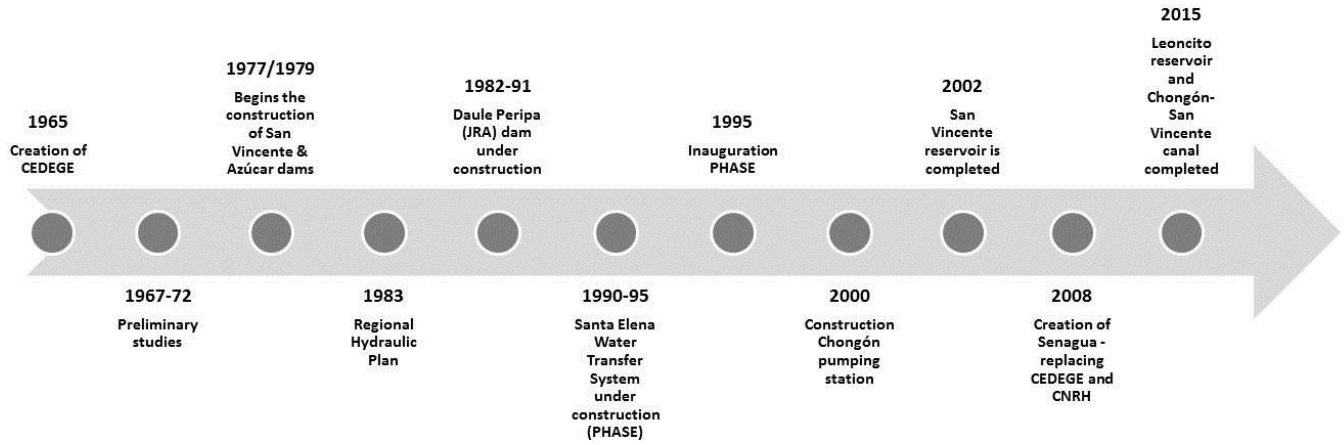


Figure 8: Timeline for the construction of the PHASE scheme 1965-2015

[7] Pressure pipe irrigation is a network installation consisting of pipes, fittings and other devices installed to supply water under pressure from the source of the water to the irrigable area (Phocaides, 2000).

[8] Interview with representative of MAGAP Department of irrigation and drainage on 14 April 2015

[9] Interview with representative of GAD Santa Elena Department Water Resources Management on 23 April 2015

It is relevant to mention the existence of two additional structures which have been built previous to the PHASE: the dam of San Vicente and the dam of El Azúcar. The first was started in 1977 under the initiative of the Ecuadorian Water Resources Institute (Instituto Ecuatoriano de Recursos Hidráulicos, INERHI), an institution created in 1966 with the task of establishing and implementing a nation-wide irrigation policy. With a capacity of 40 million m3 and 1.5 m3/s, the dam was completed only in 2003, due to several technical issues and to the occurrence of the phenomenon of El Niño, which caused considerable damages. When terminated, the reservoir remained dry and unutilised for years, until it was connected to the Daule-Santa Elena water transfer system through the creation of a new canal, a new dam and a new pumping station in Leoncito, and finally started operating in February 2015. The El Azúcar dam, on the other hand, was developed between 1979 and 1983 by the same institute, INERHI. It has a capacity of 70 million m3 and it was connected to the reservoir of Chongón through the canal of Sube y Baja[10] (Kuperman, 2014). Figure 8 presents a timeline for the design and the construction of all hydraulic structures in the PSE, comprised or connected to the PHASE irrigation scheme.

Figure 9: Sign in the proximity of San Vicente reservoir "the Citizens' Revolution is financing this work!", in the comuna of Las Balsas

Up to present it is estimated that 100% of the structure of the PHASE's lower level (15.691 ha), as originally conceived, has been completed; on the other hand, only 7% of the upper level (8.300 of

[10] Interview with representative of MAGAP Department of irrigation and drainage on 14 April 2015; interview with representative GAD Santa Elena Department Water Resources Management on 23 April 2015

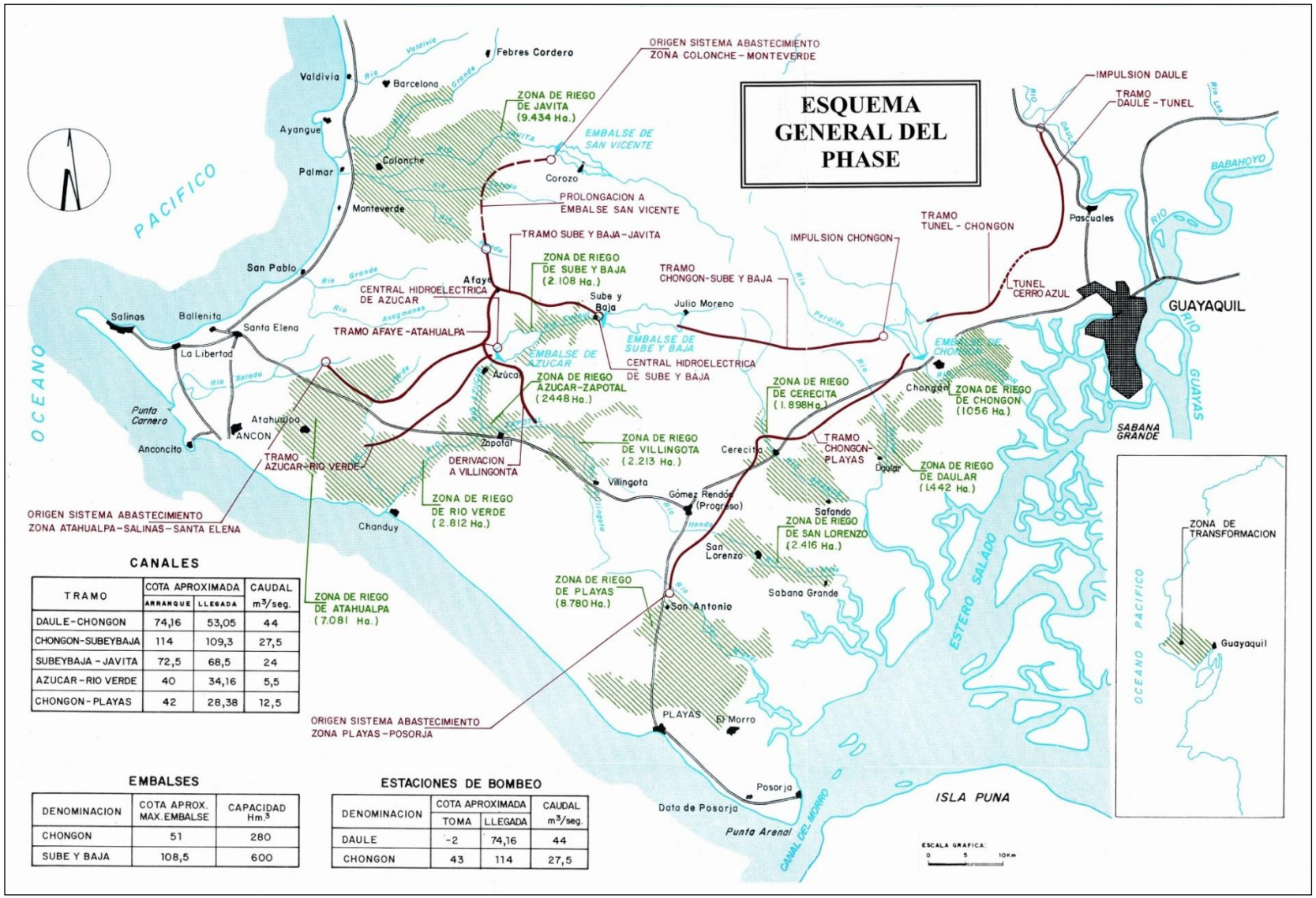
27.113 ha), now located in the recently constituted province of Santa Elena, is built and in function (Figure 11).

Therefore, the total structure so far constructed covers an area of 23.991 ha, about 56% of the total surface envisaged in 1983[11] (CEDEGE, 2002a). Figure 11 shows the infrastructure currently built which, in comparison with the original design showed in Figure 10, does not include the Sube y Baja – Javita canal nor the branch towards Villingota, while containing unplanned structures such as the reservoir in Leoncito and the canal connecting it to the San Vicente dam. Furthermore, in the first half of the 2000s, CEDEGE estimated that the irrigable land actually cultivated was no more than 6.500 ha; such low underutilisation was mainly due to the high tariffs needed to cover the expensive operation and maintenance (O&M) costs of the water transfer system. In 2007 consequently, tariffs were reduced from 0,04 (pressurized irrigation) and 0,03 (open canal) US$ per cubic metre to 0,02 and 0,01 US$, in order to incentive the use of the system and the agricultural utilization of the land[12]. No official data can be found on the current amount of cultivated land, whilst the most optimist speculations refer to an area of about 12.000 ha[13] (CEDEGE, 2002a). The number of users also appears to have increased since CEDEGE's last assessment, with about 780 users today against the 472 recognised in 2001. SENAGUA, the national agency which replaced CEDEGE in the management of the scheme, along with the recently created EPA, estimated in 2013 that the annual cost for the O&M of the system, for an irrigated area or 11.900 ha, is of about 6.861.958 US$. The correspondent proportional price for cube metre is hence relatively high, 0,092 US$/m3. Moreover, based on projections which contemplate future extensions of the actual irrigated area (up to 23.500 ha in 2020, e.g. through an optimisation of the Chongón pumping station), SENAGUA predicts a gradual reduction in the costs, which should reach 0,088 US$/m3 by 2020 (SENAGUA, 2013). The total cost for the construction of the PHASE irrigation scheme was of about 568 million US$, and it was mostly granted by international organizations by way of external debt or contributions, distributed among different actors: other governments, mainly Brazil (47%), multilateral financial institutions (10%), international banks (6%) and the government of Ecuador (38%) (CEDEGE, 2002a; Herrera, 2005; Espinel & Herrera, 2008).

[11] Interview with representative of GAD Santa Elena Department Water Resources Management on 23 April 2015; interview with representative of SENAGUA Department of Irrigation and Drainage on 27 March 2015

[12] Interview with representative of SENAGUA Department of Irrigation and Drainage on 8 May 2015

[13] Interview with representative of SENAGUA at the station of Chongón on 17 March 2015



TRAMO	COTA APROXIMADA		CAUDAL
	ARRANQUE	LLEGADA	m³/seg.
DAULE-CHONGON	74,16	53,05	44
CHONGON-SUBEYBAJA	114	109,3	27,5
SUBEYBAJA - JAVITA	72,5	68,5	24
AZUCAR-RIO VERDE	40	34,16	5,5
CHONGON-PLAYAS	42	28,38	12,5

DENOMINACION	COTA APROX. MAX.EMBALSE	CAPACIDAD Hm.³
CHONGON	51	280
SUBE Y BAJA	108,5	600

DENOMINACION	COTA APROXIMADA		CAUDAL
	TOMA	LLEGADA	m³/seg.
DAULE	-2	74,16	44
CHONGON	43	114	27,5

Figure 10: PHASE irrigation scheme, original design by CEDEGE (CEDEGE & CEDEX, 1984)

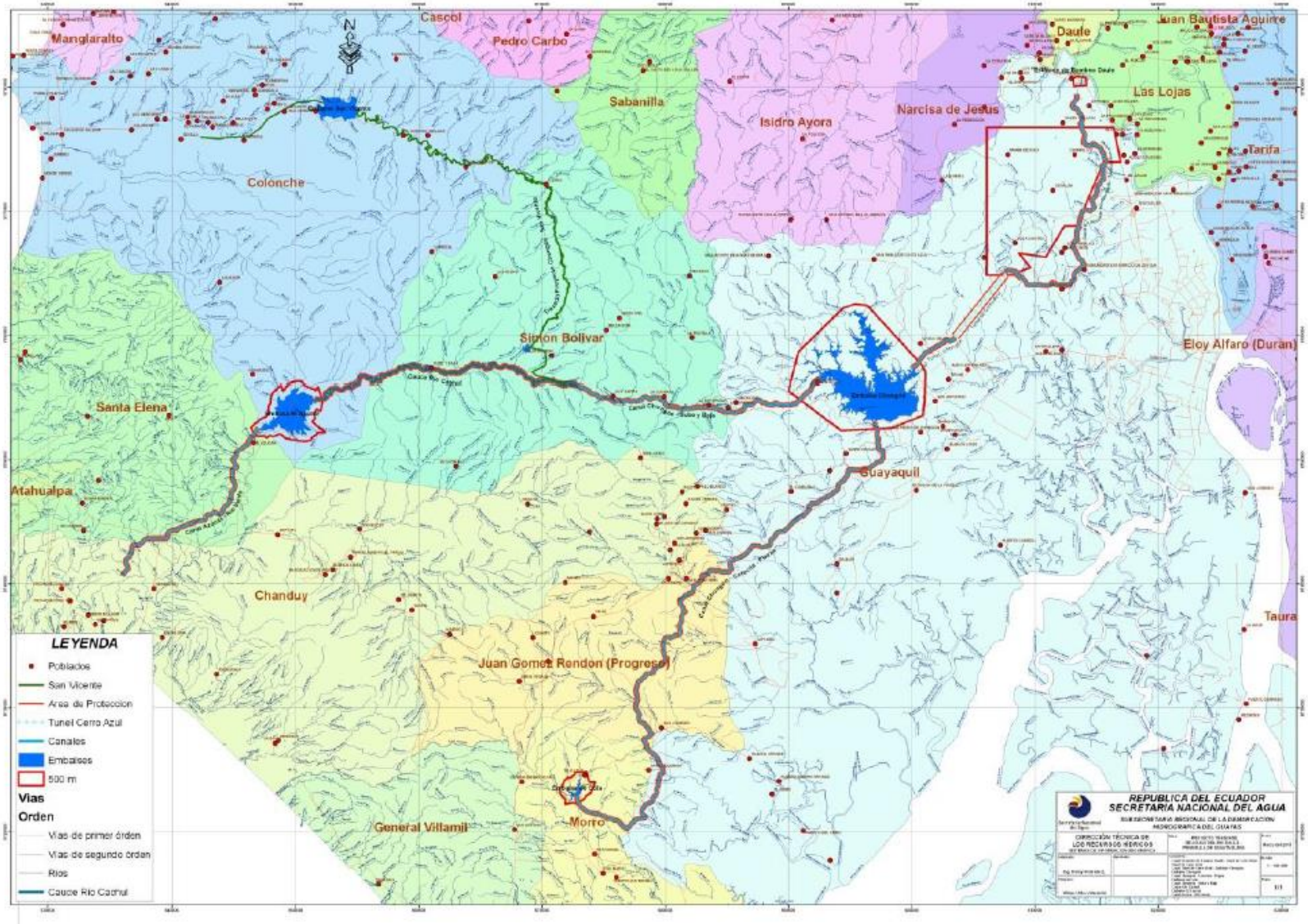


Figure 11: Santa Elena water transfer system, actual current design (SENAGUA, 2013)

5.1.2. Political discourses and objectives of the PHASE scheme

The construction of the Daule-Santa Elena water transfer system and of the PHASE scheme was proposed by the government as a solution to the great water deficit the peninsula had to cope with for decades. It was aimed at intensifying the agricultural use of land, hence benefitting local communities, at least in principle. Nevertheless, several factors caused it to sort a different outcome than the one wished and propagandised when the project was being designed[14]. Despite being promoted as an intervention to defend the peasant sector of the PSE, the actual rationale of the project, as it will be elaborated further in the thesis, benefitted other actors such as big investors or agribusiness groups (Corral, 2006). The principles at the base of this irrigation project implied a productivist perspective over the exploitation of water and land resources, which caused a change in their allocation mechanisms. CEDEGE's vision led to the creation of an administrative-bureaucratic process which regulates the provision of water through pre-fixed fees. Moreover, land allocation and access started being affected, if not entirely regulated, by market mechanisms, despite the limitations deriving from the communal framework (Herrera, 2005). An almost utterly foreign concept, private property, was introduced in this region during its reconfiguration [15]. The irrigation scheme seemed to be planned to foster large-scale intensive agriculture; in order to transform this region in the future granary of America (*el granero de America*), as the peninsula was referred to during the development of the PHASE, production was to increase not only through a larger supply of water, but also through a change in farming methods and traditions. Large land owners were therefore implicitly preferred to comuneros, because considered as more efficient users of both land and irrigational structures. These types of actors, and their production techniques, were perceived as more suitable for recouping the investment done for building the PHASE scheme, as well as for increasing and optimizing production[16]. An underlying assumption was that by favouring or attracting more powerful market actors, developmental advances would follow, denoting a rather modernistic thinking by both local and national authorities and planners. This utopian scenario failed to realise due to the detachment of the project with reality and the existing social structures. Comuneros were expected to a adapt spontaneously to the new setting and its implied model of production, changing their practices and to a large extent their system of beliefs. Furthermore, excessive emphasis was put on the preliminary stage of the project, its construction, and too little on the most crucial phase, its operation. A purely technological approach could not ensure its success, as it failed to focus on its real social function and on those who were said to be its beneficiaries[17].

[14] Interview with ex-representative of CEDEGE on 13 May 2015; interview with representative of FCG on 17 April 2015

[15] Interview with researcher and activist for the Foro de los Recursos Hidricos on 10 April 2015

[16] Interview with scholar from ESPOL - Dean of postgraduate studies on 18 March 2015

[17] Interview with ex-representative of CEDEGE on 13 May 2015; interview with scholar from ESPOL - Dean of postgraduate studies on 18 March 2015

5.2. The communal system

5.2.1. History and transformative adaptation of the communal system

Before presenting and discussing what have been identified as the impacts and outcomes of the construction of the PHASE scheme, it is useful to describe more thoroughly the unique social structures which characterise the PSE: the comunas. Today's comunas can be defined as the product and manifestation of historical processes of sociocultural adaptation and transformation of the population of the PSE (Bazurco, 2006). According to archaeologists, the existence of first organised and sedentary societies in the area dates back to thousands of years ago, long before the Manteño Huancavilca civilisations flourished between the 500 and 1500 C.E. along this part of the coast of Ecuador (Marcos, 1988; Bazurco, 2006). The colonial domination, initiated in the XVI century, caused the forced assimilation of native peoples to the capitalistic system imposed by the Spanish crown, along with an attendant political and administrative reconfiguration of the territory. The communities inhabiting the PSE, however, have been characterised through time by their unique strategies of adaptation and resistance, managing to maintain control, to some extent, over their mediums of production and social reproduction. Despite the loss of several cultural traits, this form of resistance has allowed for the development of a distinct cultural identity, which was strongly linked to the control over their territory. Inhabitants of the PSE, differently from the indigenous communities of the sierra, are recognised to have undergone a deep process of Latinisation, adopting the language, the clothing and other customs of the Spanish colonizers. However, such a process included also few mechanisms which have allowed the descendants of the Manteño Huancavilca to maintain their distinctive identity, particularly in relation to their property over the territory and their exclusive use of it, which granted their ethnical integrity. In 1857, a second attempt to invalidate indigenous communities and incorporate them within the dominant system led to the replacement of the notion of *indio,* as political and administrative entity used to mediate the relationship between the State and some of its population, with the one of *citizen*. This way, people started being addressed as equal and individual beings in front of the law and the State, losing their recognition as part of a community or of a bigger whole. Secondly, private property as a form of control over land and resources was introduced and proliferated all over the country as an expression of natural and individual rights. Within this context of sociopolitical changes, the PSE was being affected by other issues of different nature. Prolonged droughts, in turn aggravated by extensive deforestation, caused by the growing role of charcoal production as main livelihood activity and as a replacement for livestock, pushed many to migrate towards the closest cities of Guayaquil, Santa Elena and La Libertad (Álvarez, 2001; Marcos *et al*., 2004; Álvarez *et al.*, 2005; Bazurco, 2006). In 1937 the aforementioned Law of Organization and Regime of the Comunas marked the first official recognition and the institutionalisation of this form of social organisation, corresponding to a new effort to normalise it and place it within the mainstream model of development. The law provided the juridical base for creating standardised political institutions and governance structures, succeeding in the homogenisation of rural communities, labelled as *comunas*. According to the legal definition, a comuna corresponds to the smallest political-administrative entity of Ecuador, with 50 or more

permanent residents, which depends administratively on the Ministry of Agriculture[18] (MAG, nowadays referred as MAGAP). Comunas are entitled to directly elect their leaders, although according to forms and rules imposed from the outside, and under the supervision of MAGAP, who should approve the legitimacy of these procedures. The executive body of the comunas, the council (*cabildo)*, is composed by a president, a vice-president, a secretary, a treasurer and an administrator, who have a mandate of one year and can be re-elected. The other important political body is the assembly (*asemblea*) which is the institution bringing together all members affiliated to the comuna, guaranteeing their democratic participation and a collective involvement in the decision making (Bazurco, 2006; Yashar, 2005). Assembly meetings usually take place once a month, and include a report from the council on its activity. These moments are highly ritualised and somehow detached from ordinary social relationships between comuneros. Whilst the majority of council's members is usually men, women's participation in both the assembly and the executive committee has always been accepted and it is now increasingly encouraged (Bazurco 2006). Assets, such as land, are distributed by the council to each member through the appointment of rights of possession, which allow the usufruct preserving the collective ownership. Although the above described form of political organisation suggests and entails clear elements of democratic participation, the incorporation of rural comunas within the mainstream system did not in effect grant them with equal status, considering the situation of structural disadvantage and vulnerability in which comuneros used to live (e.g. illiteracy) (Yashar, 2005). This top-down institutionalisation of comunas stemmed from a conceptualisation that pictured them primarily as units of production, rather than sociocultural spaces. Both the Law of the Comunas and the Judicial Statute of Rural Communities from 1937 include references to the economic and financial nature of the relationship between comunas and public authorities, who are in charge of promoting measures to transform the first in cooperatives for production (Bazurco, 2006; Bretón, 1997). This vision was later reflected in the design of the PHASE irrigation system which, as mentioned, does not fit with the communal methods of agricultural production but it is rather oriented toward larger scale agriculture. The irrigation system can be interpreted as a last big endeavour of the Ecuadorian government to assimilate comunas' territory and to disassemble the communal system as sociocultural construct. In the 1960s political élites, facilitated by the flow of new political discourses brought about by those comuneros who migrated, started questioning the communal system itself, its viability and its efficiency in terms of productive potential. The Daule-Santa Elena water transfer system was planned with the aim of increasing this productive potential, without actually integrating the existing social structures. Economic motivations were coupled with neoliberal thinking, which is traditionally hostile to the idea of collective property of land. After years of resistance through adaptation and transformation, the very core of comunas' cosmovision, their collective and social conceptualization of natural resources was being attacked. In reaction to these tendencies, in 1965 comunas opted for organising in a federation, the Federation of the Comunas of Guayas (FCG), which had the role to guide a movement for the re-appreciation of their identity under an overarching flag (Álvarez, 2001; Bazurco, 2006; Álvarez et al., 2005). This mobilization managed to finally obtain an official

[18] Formerly comunas depended on the one Ministry of Social Welfare.

recognition of the territorial property of 47 comunas in 1982, when the National Programme for Regionalisation (PRONAREG) launched an initiative to map communal territories and record the geographical coordinates of each comuna (Álvarez, 2001; Bazurco, 2006). Today comuneros are still recognised as the largest population group in the PSE, considering comunas possessed approximately 85% of its territory at the time before the construction of the PHASE scheme (Herrera, 2005). The comunas currently recognised by authorities in the province of Santa Elena are 68, which, summed to the 19 ones in the province of Guayas (including 5 on the Puná Island), form the 87 comunas currently recognised in the PSE [19] (Figure 12).

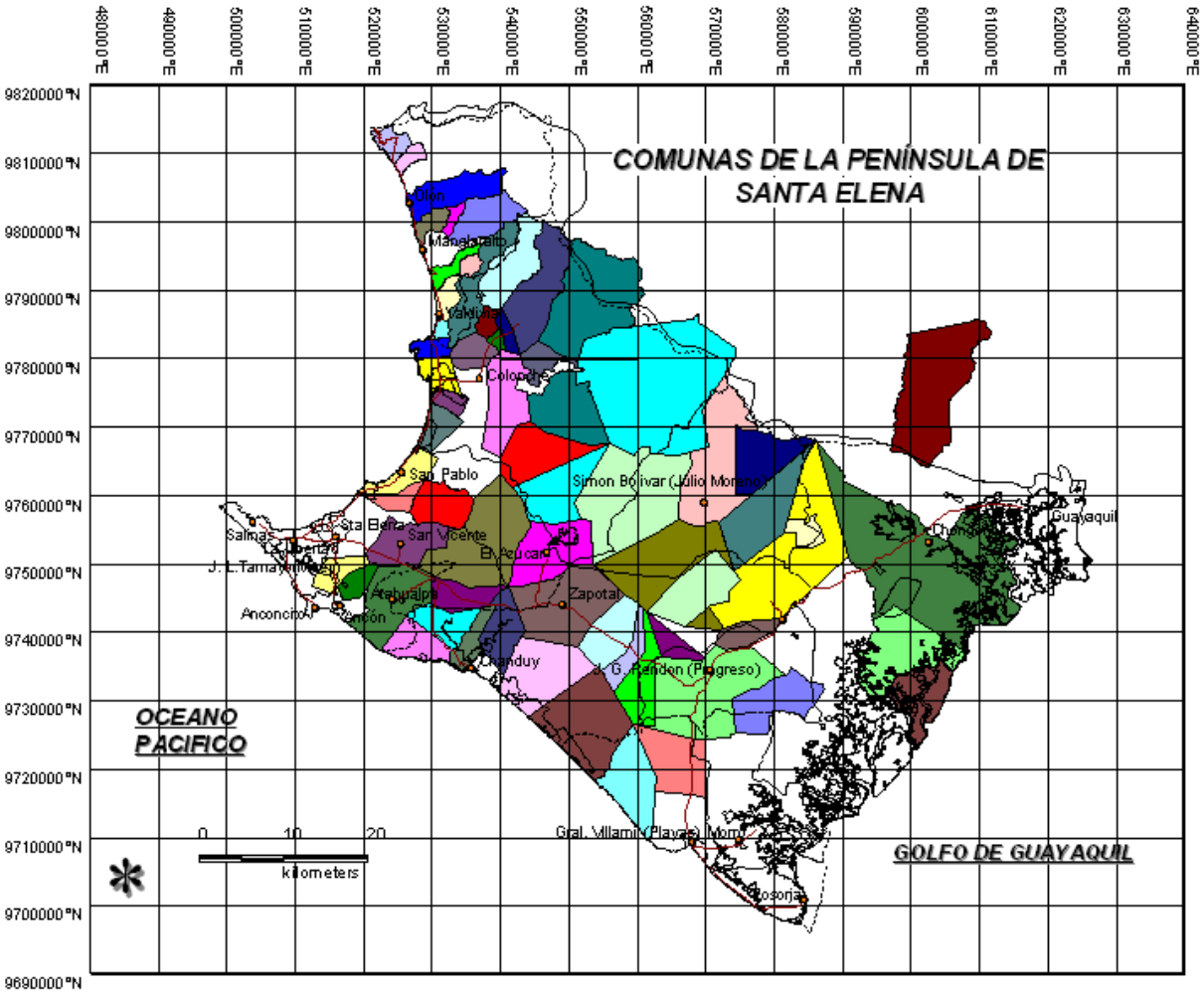


Figure 12: map of the comunas in the PSE, excluding the ones on the Puná island (Ramos, 2005)

The creation of the independent province of Santa Elena, after a popular referendum in 2007, is a clear manifestation of the desire of the population of Santa Elena to be recognised as a separate region, characterised by particular cultural and sociopolitical traits which distinguish it from the population in the province of Guayas. Such division however does not fully reflect the reality in place, considering that 19 comunas remained under the control of Guayas, due to strategic considerations such as the expansion of the urban area of Guayaquil. The FGC was

[19] Interview with representative of FCG and comuna San Antonio on 15 April 2015

hence forced to reorganise, and a new Federation of the Comunas of Santa Elena (FEDECOMSE) was created in June 2009 to continue to guide comunas towards common goals and claims.

Table 1 gives an overview of the legal framework for rural land tenure with particular attention to communal land and the historical evolution of its legal protection. It can be observed that there has been a continuous endeavour by institutions to organise land tenure to foster a more equitable distribution of assets, characterised by a particularly prominent and active role of the State. From the end of the 1970s, however, this attitude appears to have changed in favour of a more neoliberal approach, entailing a growing role of the market, which has undoubtedly influenced land governance in communal territories. In 1998, with a new constitution the protection of ancestral lands belonging to indigenous was established, although the formulation of the law left room for doubts and diverging interpretations that would exclude comunas. Finally, the last constitution written in 2008, and the attendant laws, denote a radical change of paradigm, which reaffirms the aim of equitable land access and protection of smallholders.

Table 4: Legal framework of rural land tenure and communal territories

Law	Year	Content
Law of Fallow Lands and Colonization	1936	Aim of the law was to foster equitable land distribution, expropriating fallow lands if unproductive or if necessary for 'colonization' purposes. Comunas however were allowed to maintain control over their territories even if unproductive or undeveloped.
Law of Organization and Regime of the Comunas	1937	Aim of the law was to recognise communal organisations and regulate their legal personality by integrating them in a centralised model; their land ownership is also recognised and protected, through the prohibition to notarise property deeds for communal land.
Law of Agrarian Reform and Colonization	1964	Aim of the law was correcting existing flaws in the agrarian system, particularly promoting a more equitable distribution of land through expropriations and reversions of uncultivated land and the integration of smallholdings, while at the same time fostering the modernization of agrarian practices.
Law of Agrarian Reform	1973	Reconfirmed the objectives of the previous agrarian reform, with particular emphasis on the need for modernisation. However, the role of the

		State remains substantially active.
ILO Convention 169	1989 (ratified in 1998)	Indigenous and Tribal Peoples Convention, which includes several principles such as: recognition of their identity and specificities, non-discrimination, consultation and participation (particularly when taking decisions on the use of their territories or other natural resources which could affect them), and the right to decide their own priorities for development.
Law of Agricultural Promotion and Development	1979	It was the final act of a long process of agrarian reform in which the State actively intervened on the structure of property. This law was aimed at increasing agricultural production and productivity rapidly, and therefore market forces and values came to take on greater importance.
Law of Agrarian Development	1994	In sharp contrast with previous measures, this law annihilated the role of the State, it promoted land trade and it removed many of the restrictions on land transfers and property size established by previous laws. Moreover, it allowed the division of communal land and its transfer to third parties, article 24 states: "comunas […] desiring to parcel their land […] may proceed to split it after a resolution, adopted by the assembly with the vote of at least two thirds of its members". Additionally the law created INDA, as a replacement of IERAC.
National Constitution	1998	For the first time communal land was recognised in the constitution as inalienable and indivisible at constitutional level, though the principle of the three Is expressed in Article 84.2: "the state will recognise and guarantee […] the right of indigenous peoples to preserve the imprescriptible property of their communal land, which is inalienable, unseizable and indivisible, except for the faculty of the State to declare their public use". This principle however was interpreted by some as applicable only to

		nationalities.
UN Declaration on the Rights of Indigenous Peoples	2007	Declaration of the UN on the rights of Indigenous Peoples, including self-determination, non-discrimination, the principle of Free, Prior and Informed Consent for intervention on their territories or other resources, and cultural heritage protection.
National Constitution (Citizens' Revolution)	2008	Article 57 reaffirms the same principle of Art. 84 of the previous constitution, just expanding its reach and including all "communities, peoples, indigenous nationalities, the afro-Ecuadorian people, the coastal peoples and the comunas".
Reform of the Judicial Statute of Rural Communities	2009	Reform of Art. 10 of the Judicial Statute of Rural Communities, passing the responsibility for the resolution of conflicts over communal lands from MAGAP to civil judges.
Organic Law of Food Sovereignty	2009	The aim of the law is to achieve food security for all inhabitants of the country, while reaffirming certain concepts already expressed in the Constitution such as the social and environmental functions of land, and the will to contrast the concentration of land and other means of production.
National Plan for Buen Vivir 2013-2017	2013	The aim of this document is to guide the development of the country according to the principle of Buen Vivir. Objective n. 2 refers to "the achievement of equality, cohesion, inclusion and territorial and social equity, in respect of diversity", and one of the measures to take in order to do so is to "democratize the means of production […] strengthening mechanisms for the prevention, control and ban of concentration, accumulation and grab of land".

(ILO, 1989; Alvarez, 1997; Asamblea Nacional Constituyente 1998.; Jordán B., 2003; Bazurco, 2006; United Nations, 2007; Asamblea Nacional Constituyente, 2008; Brassel, Herrera, & Laforge, 2008; Asamblea Nacional Ecuador, 2010; Hidalgo, Laforge, & SIPAE, 2011; SENPLADES, 2013).

5.2.2. Comunas' capitals and cosmovision

Anthropologist Silvia Álvarez has conducted extensive research on the history and the current social organisation of the indigenous inhabitants of the PSE. Using a variation of the capitals model derived from the Sustainable Livelihoods Approach[20], Álvarez describes the communal system as soundly founded on social capital. Comunas are recognised as a particular form of social institution, whose members share a collective (life) objective, which is pursued and structured by relationships of solidarity, reciprocity and trust. Comunas have the capability to mobilise their social capital to achieve a common good; their major strength resides in their organisational capacity, which enhances the governability and the political sustainability of the system. However, comunas also rely on a shared cultural capital, formed by the set of values (*ethos*) and ideals which guides their interactions within the social group and with the surroundings. The cultural capital of a social group reflects its shared cosmovision, hence determining their conceptualisation of development. Particularly, comunas' cultural capital includes all principles regulating their relationship with nature (their environmental rationality), which result in a combination of social practices able to transform the established power structures and relations, through the creation of an alternative rationality (Marcos *et al.*, 2004; Leff, 2004). Finally, comunas' natural capital, identified by Álvarez, is of great value for analysing the reconfiguration of the PSE's hydrosocial territory; highly interrelated and complementary to cultural and social capitals, it refers to the meaning that comuneros attribute to natural resources and their management, which in turn is associated with the technological capital developed in function of this relationship. *Albarradas*, for instance, are a pre-Hispanic technological system developed by the inhabitants of the PSE to rationalise water harvesting during rainy season, particularly in the occurrence of El Niño. Within the cosmovision of comunas, water is conceived as an integral part of social capital, as it belongs to the community in its entirety, and it is essential for life, livelihoods and social practices. This conceptualisation noticeably differs from the common idea of water as a natural resource, usually counted as a mere factor of production; it is rather a social asset, and it is therefore approached differently (Álvarez *et al.*, 2005). Land, on the other hand, is also conceived as a social asset within the comunas' worldview. To understand this notion it is helpful to refer to the two different concepts of *territory* (*territorio*) and *land* (*tierra*) proposed by Bazurco in his study on the comunas of the PSE. When describing the two different approaches that comuneros still living in the comunas (insiders) and those who have migrated elsewhere (outsiders) have with regard to land, Bazurco puts the emphasis on the concept of territoriality. For insiders the concept of territory predominates over the one of land; territory here corresponds to a sociocultural construction strictly linked to the communal domain. It relates to both space, being the site where members of the community live, coexist, produce and reproduce jointly, as well as time, being the territory which the community has historically conquered, ruled and defended. For those comuneros who have been forced to migrate, and therefore have experienced very different processes of socialization and acculturation, the meaning attributed to land is one of mere source of livelihood. It is a mean to obtain revenues and it can therefore be cultivated or sold to serve this purpose; land appears to their eyes as an object, without the social

[20] For further information on the SLA see DFID, 1999 and SIDA, 2001.

connotation of a territory, and thus it can be owned, divided, sold ad bought (Bazurco, 2006). Furthermore, the legal framework regulating the communal system and access to resources fails to reflect the complexity of all social processes involved in the production of different forms of exploitation of natural resources (Bazurco, 2006; Álvarez *et al*., 2005). These considerations once more draw the attention on the communal non-productivist but rather social meaning attributed to natural resources, which is embodied by the collective property of land and which has been severely threatened by the construction of the PHASE irrigation scheme and by the advance of the neoliberal model. Private enterprises became relevant and powerful actors in the PSE, thanks to the expansion of shrimp farming and agricultural production for export. Communal land had little appeal for the market before access to water was increased and facilitated by the irrigation scheme; its construction has triggered a new reconfiguration of the territory of the peninsula, causing an unprecedented weakening of the communal system and a (unequal) redistribution of resources among a new group of actors [21]. It is relevant to mention, however, that the unity of comunas varied consistently due to the existence of internal struggles for power and conflicting interests, which brought some leaders and community members to behave against the common interest. These entities are characterised by a great social cohesion derived from their cosmovision, but nevertheless are not immune from rent-seeking behaviours and infighting.

5.3. Other stakeholders: public authorities and private landowners

5.3.1. Public authorities

Public authorities involved in the design, construction and in the operation and maintenance of the PHASE irrigation scheme include a variety of agencies and institutions which, as those in charge of mediating with comunas and land governance, have evolved and changed through time. Here the most influential ones and their competences are presented. The chief actor involved in the preparatory and planning phase is the afore mentioned CEDEGE, a technocratic institution, created in 1965 and in charge of conducting preparatory studies for hydraulic interventions in the entire watershed of the Guayas river, in cooperation with different consultancy firms, the most influential being CEDEX[22], a public institute from Spain, as well as of coordinating later the entire project for the water transfer system. Along with CEDEGE, INERHI[23], another public agency with the task designing and implementing a nation-wide irrigation policy, was created in 1966 and later replaced in 1994 by CNRH[24]. With the change in the government in 2008, and therefore the advent of a new legislation for the management of

[21] Interview with legal representative of FEDECOMSE on 31 March 2015; interview with representative of FCG on 17 April 2015; interview with scholar from ESPOL - Dean of postgraduate studies on 18 March 2015

[22] Centro de Estudios y Experimentación de Obras Públicas

[23] Instituto Ecuatoriano de Recursos Hídricos

[24] Consejo Nacional de Recursos Hídricos

water resources, both these agencies were replaced by the new SENAGUA[25], a ministry in charge of guiding and supervising the actuation of an IWRM model, as established by the law, while coordinating various subordinate organisms. The ministry in effect works in close collaboration and coordination with two other national agencies created in 2014, EPA[26] and ARCA[27]. The first is responsible for the development and management of all hydraulic infrastructures in the country, including all multi-purpose hydraulic projects, as well as for offering technical and business support to public or community service providers; ARCA, on the other hand is still moving its first steps, and it is in charge of controlling the integrated management of water resources with particular attention to quantity and quality of water as well as all public services provision[28]. With respect to the public institution in charge of dealing comunas, rural development and land governance, the main is MAGAP; the ministry is the referential entity for comunas, towards which it holds administrative and partly juridical responsibilities. Besides being responsible for recognising comunas' legal personality, MAGAP used to be in charge of resolving land disputes and expropriations, through its subsidiary organisms, IERAC[29] and later INDA[30], which after 2010 has been replaced by the Sub-secretary for Land and Agrarian Reform[31]; in 2009 however the authority for resolving land disputes had passed to civil judges, due to the high level of corruption inside public offices[32]. Additionally, MAGAP also hold competencies with respect to irrigation and water management for agriculture at national and regional level, through its Sub-secretary for irrigation and drainage.

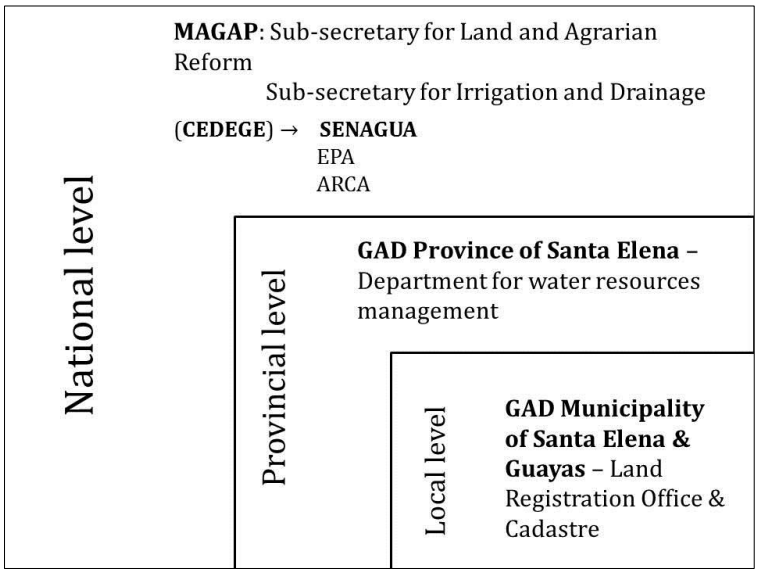


Figure 13: Public authorities framework

Finally, provincial authorities share responsibilities within this sector. The Decentralised Autonomous Government (GAD) of the province of Santa Elena should in effect have concrete competences in terms of designing and implementing a provincial plan for irrigation; however, due to the still limited decentralisation of tasks and the lack of coordination with SENAGUA and its agencies, the real opportunities for influence of the GAD of Santa Elena on water

[25] Secretaría Nacional del Agua
[26] Empresa Pública del Agua
[27] Agencia de Regulación y Control del Agua
[28] Interview with representative of SENAGUA Department of Irrigation and Drainage on 27 March 2015
[29] Instituto Ecuatoriano de Reforma Agraria y Colonización
[30] Instituto de Desarrollo Agrario
[31] Subsecretaría de Tierras y Reforma Agraria.
[32] Interview with representative of MAGAP Santa Elena Sub-secretary for Land and Agrarian Reform on 24 April 2015; interview with representative of MAGAP Guayas Sub-secretary for Land and Agrarian Reform on 8 May 2015

management, particularly for irrigation, are scarce and remain linked to the pure implementation of small projects[33]. Finally, the municipal land registration offices and the cadastres of Santa Elena and Guayaquil, part of the Municipal GADs of these cantons, have the task of registering land property, issuing titles and recording transfers of real estate. Figure 13 illustrates all these different agencies and their operational level (national, provincial, local), which also tends to correspond to their degree of power and influence.

5.3.2. Private landowners

The other group of actors relevant to the process of reconfiguration of the hydrosocial territory of the PSE is composed by private landowners who have acquired communal land throughout time. As described in the methodological chapter, access to information on the numerous companies present on the territory resulted to be rather difficult, also because of the unwillingness of many to be interviewed. Some of the comuneros, of the personnel of the federations as well as of the other researchers interviewed expressed to have concerns and suspects about their real activities since in many cases there was no (public) information at all. They made insinuations about the fact that some of the enterprises who have acquired land in Santa Elena might not be fully legitimate businesses, functioning as covers for illegal activities; however this is a pure speculation, as it was not possible to prove it. Nevertheless, from a general overview it appears that the majority of private landowners and users of the PHASE are Ecuadorian enterprises involved in the agribusiness sector, producing crops for both the national and international markets; a substantial number of these firms, however, does not exploit their entire property due to the high investments needed to cultivate and irrigate such large plots of land[34] (Herrera 2005; Espinel & Herrera 2008). All private properties have direct access or connection to the infrastructure of the water transfer system, and each user can employ an unlimited amount of water, being charged volumetrically through the use of water meters, which however are mainly not in function for the moment. Private enterprises tend to consume considerable amounts of water due to the fact that thirsty crops, such as mango, cocoa and plantain, are very common. Unfortunately, the limited information I collected directly from representative of a few companies does not allow to make a more complete description of these actors.

5.4. The impacts of the construction of the PHASE scheme

5.4.1. Land deals

As mentioned, the construction of the Daule-Santa Elena water transfer system has caused transformations in both the geographical and the sociopolitical configuration of the territory of the peninsula of Santa Elena. The introduction of a new asset, such as water, in a context where

[33] Interview with representative of GAD Santa Elena Department Water Resources Management on 23 April 2015

[34] Interview with scholar from ESPOL - Dean of postgraduate studies on 18 March 2015

land productivity has always been strongly limited by its lack, has led to a revaluation and a reconceptualization of this region. These effects started manifesting longer before the concrete materialisation of the irrigation structures. The mere idea of a future scenario where water was accessible and secured has had tangible impacts on the PSE and its population. The revaluation of these territories was perceived by powerful actors (public authorities and potential private investors) as purely economic; an increase in the productive potential signified a direct increase in the commercial value of land itself. With a more or less constant supply of water, it became possible to invest in the production of perennial crops or to sow and harvest all year around. Before the creation of the irrigation scheme, farmers (mainly comuneros) in the PSE were able to cultivate only once a year, during the winter, when precipitations were more intense. The use of *albarradas* had slowly declined due to the lack of rainfall and the scarce maintenance they received and, as previously explained, agricultural production became only a marginal activity for comuneros' livelihoods[35]. The increased economic and agricultural value of land has attracted the attention of new, well informed, actors who did not belong to the context of the PSE. During the first half of the 1990s, when the PHASE was still under construction, members of the political and economic élites of Guayaquil, the largest city and commercial centre of Ecuador, started showing interest towards the acquisition of large plots of land in the PSE. This group included a variety of actors with diverse interests and ambitions, ranging from land investors and speculators to agribusinesses intentioned to produce crops for export. In order to be able to acquire properties in the peninsula, these groups had to interact and negotiate with the primary land owners, the comuneros. According to a reconstruction based on the information collected during field work, a considerable number of land deals have been sealed between the year 1994, just before the inauguration of PHASE, and the year 2000. These sales concerned uniquely land with direct access to the new irrigation canals, and the methods and procedures through which they were concluded appear noticeably suspicious and deceitful. According to article 21 of the 1937 Law of the Comunas, it is prohibited for notaries or land registry offices to register or notarize property deeds for collective assets belonging to the comunas. This prescription was hardly respected at the times of the development of the irrigation scheme, admitting a great quantity of land deals that were in effect illegitimate[36]. What emerged to be a typical procedure for transfers of communal land to (foreign) individuals or companies consisted of a few steps described as follows. Firstly, comuneros holding rights of possession over a plot of land[37] visited notary offices and the cadastre at the municipality of Santa Elena to convert them in property rights, despite it being illegal. Once documents were in order, they could proceed to transfer their properties to buyers, who usually acquired a large number of titles in order to aggregate them and gain control over properties of 50 or more

[35] Interview with representative of GAD Santa Elena Department Water Resources Management on 23 April 2015; interview with scholar from ESPOL - Dean of postgraduate studies on 18 March 2015; interview with scholar from ESPOL & UAB Barcelona (Social and cultural anthropology) on 23 March 2015.

[36] Interview with scholar from ESPOL - Dean of postgraduate studies on 18 March 2015; interview with legal representative of FEDECOMSE on 31 March 2015; interview with legal representative of FCG on 17 April 2015

[37] The size of the plots assigned to each comunero varied from comuna to comuna and throughout time. For the largest part, however, each comunero had control over plots of 2 to 10 ha.

hectares. The transfers were therefore also unlawfully registered and approved by cadastral authorities, who were often bribed in exchange for their favours.[38] The contracts between the parties were sometimes vague in their content and left space for misinterpretation at the advantage of investors, particularly with regard to the location and coordinates of the plots sold. Moreover, privates were able to purchase communal properties at very low prices (about 200 US$ per ha in areas were the current minimum price is 1500 US$[39]); these cheap rates derived from comuneros' disinformation, as they were not aware of land market value nor of its increase due to the advent of the irrigation scheme. Comuneros were usually guided through the sale process by communal leaders, which functioned as gatekeepers and main contacts between buyers and sellers. Leaders were in effect the first to be approached by investors, who already had knowledge of the irrigation project, its location and its time of operation.[40] Many of the comuneros interviewed argue that presidents and other representatives of the council received money in exchange for the recruitment of other members of the comuna who were willing and interested in selling their land[41]. According to the most common interpretation of the law[42], before 1998, a comuna was allowed to divide and sell its land only when respecting two requisites: firstly, the assembly had to authorise the measure, with two thirds of the members voting in favour and signing the necessary documents; secondly, the MAGAP had to give its approval, specifically with regard to the legitimacy of the deal. These two requirements were frequently eluded; communal leaders in particular, did not act above board, keeping the negotiations secret and presenting land sales to the assembly only once they were concluded [43]. It is evident that the missed implementation of the law, originating from widespread corruption affecting both communal and public authorities, played a central role in facilitating this unclear land commerce. Buyers usually approached leaders and members of those comunas they knew would receive access to the water transfer system in the imminent future; this could happen either by direct visit to the comuna or by approaching outside comuneros when in the city. Their access to privileged information, as it will be explained further, was facilitated by their close relation with governmental authorities and CEDEGE. Comuneros welcomed enthusiastically the offers they received, as they perceived their large quantities of fallow land to be useless. Moreover, the idea of an immediate gain resulted very appealing, as these rural communities had been living in conditions of profound poverty and economic insecurity for

[38] Interview with representative of MAGAP Santa Elena Sub-secretary for Land and Agrarian Reform on 24 April 2015; interview with representative of MAGAP Guayas Sub-secretary for Land and Agrarian Reform on 8 May 2015

[39] Price variation between comunas is significant. Whereas in some comunas an hectare can cost up to 5000 US$, in other it costs around 1500 US$. This is due to external factors such as the vicinity of the road and the accessibility of the fields.

[40] Interviews with comuneros in Pechiche on 7 April 2015 and in Cerezal Bellavista on 22 April 2015 and in El Azúcar on 24 April 2014

[41] Interviews with comuneros in Pechiche on 7 April 2015 and in Cerezal Bellavista on 22 April 2015 and in El Azúcar on 24 April 2014; interview with representative of FCG of 17 April 2015

[42] Law of the Organization and Regime of Comunas and 1994 Law of Agrarian Dvelopment.

[43] Interview with representative of MAGAP Santa Elena Sub-secretary for Land and Agrarian Reform on 24 April 2015; interviews with comuneros in Pechiche on 7 April 2015 and in Cerezal Bellavista on 22 April 2015

decades, due to the unfavourable environmental conditions and governments' systematic negligence. When offered what sounded like copious amounts of money for assets they considered to be worthless and unproductive, many comuneros did not hesitate in seizing the opportunity. This long series of uncontrolled land sales has caused a great redistribution of resources between comuneros and private land owners, producing a striking reconfiguration of the territory of the PSE. Today property transfers are more limited and controlled, and comuneros effectively cannot transform their rights of possession in property titles, which would allow them to sell plots without the consensus of the community and MAGAP. However, land sales are far from disappearing, as some leaders and/or community members are still in favour of land trade and territory fragmentation and pursue it through both legitimate and illegitimate practices[44].

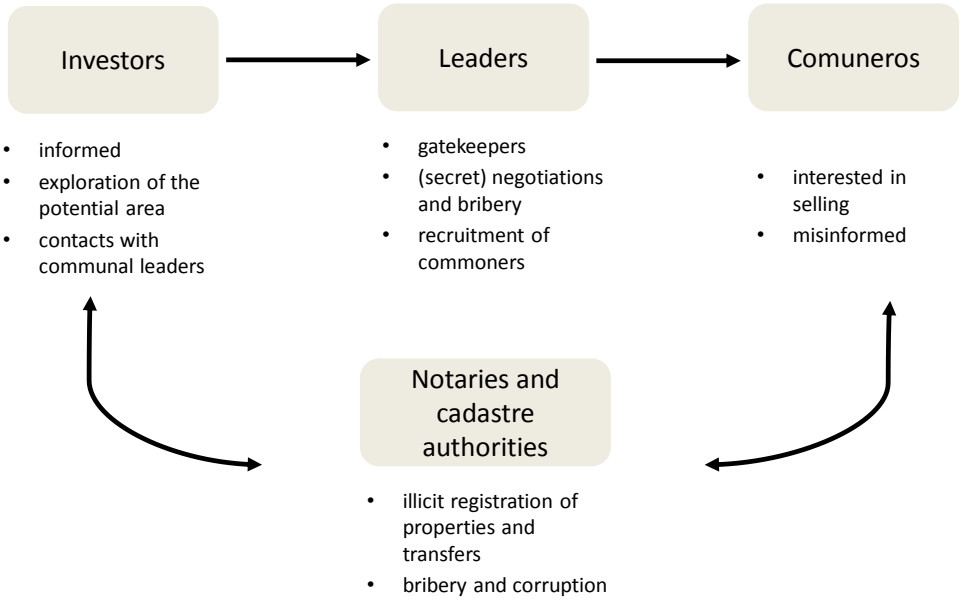


Figure 14: Anatomy of an illegitimate land deal

It is relevant to mention that along with the creation of the PHASE irrigation scheme, other factors have contributed to the disintegration of the territory belonging to comunas in the PSE. Coastal areas results particularly attractive for two more types of industry: tourism and shrimp farming. The first activity has started growing in recent years, since the 2000s, when big properties have been acquired by privates in localities on the seaside. Large touristic complexes and hotels have been developed on former communal land, in order to attract visitors from both inside and outside the Simultaneously, shrimp farming became an expanding sector since the 1980s, taking over other large areas of former communal lands. This industry is mainly spread in the central western and the southern areas of the peninsula, and it is based on a very

[44] Interviews with comuneros in El Azúcar on 24 April 2015 and in Chongón on 2 May 2015; interview with consultant of MAGAP on 6 May 2015.

intensive exploitation of soil and water; its uncontrolled expansion has caused severe ecologic deterioration and the loss of large parts of mangrove ecosystems. Coupled with agribusinesses growing presence and power, these two sectors have contributed to a great loss of communal territory, which had in turn weakened comunas and their cohesion. country.

5.4.2. Reconfiguration

It is estimated that about 90% of the communal land transferred by comunas has been sold to non-native investors, mainly agribusinesses (Herrera, 2005). The vastest majority of these companies are from Ecuador, although some are affiliated to bigger transnational groups. The main products that these enterprises grow include plantain, banana, cocoa, papaya, mango, watermelon, melon, timber, plum, toquilla palm, oil palm and maize. Other common crops grown in the PSE comprise citrus fruit, grape, chia, pepper, onion and tagua palm [45] (ESPOL-CEDEGE, 2009). It has been observed that large portions of the territories acquired by private land owners are still left uncultivated, partly because of the high investments needed for production inputs (irrigation equipment in particular) and partly because investors have no actual interest in cultivating the land, but rather in speculating on its increasing value (Espinel & Herrera, 2008). In 2001, CEDEGE estimated that only 6.000 ha were actually being cultivated, causing a severe loss on the investment done for the construction of the project. This number has surely changed, as at the time the amount of users was estimated to be around 472 (Table 2), whereas now, according to representatives of SENAGUA, users are 780 and the total surface of cultivated land is almost 13.000[46] ha (ESPOL-CEDEGE, 2001). The comunas which are recognised to have lost the highest portion of territory are the ones equipped with pressurized irrigation systems, Chongón, Cerecita and Daular, and the comuna El Azúcar, which has lost almost 90% of its territory[47]. Previous studies have investigated and described the distribution of irrigable land after the completion of the PHASE scheme. Nevertheless, it is relevant to mention that the currently available data regarding the distribution of land with access to the irrigation system are rather imprecise, outdated, as no study, after CEDEGE's one, was conducted by authorities to investigate this issue until this year. The MAGAP, in cooperation with SENAGUA, has in fact recently concluded a study on this specific matter, aimed at assessing land tenure in the PSE, its legality and the current land use. Comunas have been involved, along with other stakeholders such as private land owners and provincial authorities, in the investigation which was meant to obtain a clearer picture of the current state of affairs. The results of this Multi-temporal Study on Land Tenure in Communal Territories (Estudio Multitemporal de la Tenencia de la Tierra en Territorios Comunales), concluded in May 2015, are yet to be published, awaiting for the President's approval.

[45] Interview with representative of MAGAP Santa Elena Department of Agricultural Development on 15 April 2015

[46] Interview with representative of SENAGUA at the station of Chongón on 17 March 2015

[47] Interview with legal representative of FEDECOMSE on 31 March 2015; interview with legal representative of FCG on 17 April 2015; interview with comunero of El Azúcar on 24 April 2015

Table 5: Users of phase and land concentration in the PSE (Espol-Cedege, 2001; Espinel & Herrera, 2008)

Size of unit of production (ha)	Number of users	% users	Hectares	% hectares
0 - 5	169	36	373	1
5 - 10	59	13	454	1
10 - 20	34	7	539	1
20 - 50	76	16	2.609	6
50 - 100	50	11	4.007	10
100 - 200	39	8	5.986	15
> 200	45	10	26.662	66
TOTAL	**472**	**100%**	**40.630**	**100%**

Considering that some of the processes which have caused the redistribution in land access in the PSE are still on-going, it can be safely assumed that changes have occurred and that the current situation differs from the one depicted in the studies from CEDEGE and ESPOL. Nonetheless, observing the data reported in Table 2, one can notice that a very small number of users (45), representing only 10% of the total group, own 26.662 ha of irrigated land, which corresponds to 66% of the total irrigable land in the PSE. By aggregating different categories of units of production, it appears that 36% of users (with plots smaller 5 ha each, hence comuneros) was found to own 1% of land benefiting from the irrigation system, whereas 18% (with plots bigger than 100 ha, hence privates) hold 81%. The image depicted by this study is one of extreme inequality and land concentration; comuneros are still in possess of a large portion of land in the PSE, however, it is almost exclusively unproductive and fallow, as it is located far away from the irrigation canals. Their limited economic capabilities prevent them from connecting to the irrigation system, due to the fact that the equipment and the structures needed would be very extensive and costly[48].

[48] Interview with scholar from ESPOL - Dean of postgraduate studies on 18 March 2015; interviews with comuneros of Pechiche on 7 April 2015, Cerezal Bellavista on 22 April 2015 and Chongón on 2 May 2015; interview with consultant of MAGAP on 6 May 2015

5.5. Conclusions

The PHASE irrigation scheme, which was planned, at least according to the discourses used by its promoters, to benefit the PSE and its historical inhabitants, has actually produced a different result. The increase in the value of land has attracted a number of private investors who acquired large properties with direct access to the irrigation facilities; the reconfiguration of the hydrosocial territory of the PSE therefore entails not only the presence of new structures that divert water according to a precise scheme, but has also triggered a sort of 'land rush' through which more powerful actors (land investors) appropriated valuable plots, consequently controlling all the existing resources for agricultural production. By restructuring water access it has also indirectly restructured land tenure. Those who are truly taking advantage of the project are private actors that do not belong to the sociocultural context of the PSE, whereas comunas are not only (physically) excluded from accessing the irrigation system, but have also been partially deprived of their most important social and cultural asset.

6. Case studies and drivers of the reconfiguration

6.1. The case studies

Five comunas were chosen to serve as case studies in order to have a more in-depth perspective on the dynamics of transformation of the territory of the PSE and on the conflicts between local inhabitants and foreign actors that arose from it. As explained in the methodological section, comunas were selected based on their location and access to the infrastructure of the PHASE scheme, as well as on their history with respect to land deals and disputes. Each comuna has a different historical identity, despite of belonging to the same broader social structure; each one has experienced the construction of the canals in a different manner, although it is possible to identify a certain number of similarities. Table 3 illustrates the main characteristics of these five comunas, whereas the following section includes a more detailed description of the events characterising each of them and the reconfiguration of their territory. The data presented were collected from different sources, mainly informants from MAGAP and comuneros; when official data were available and accessible they were utilised to crosscheck the information provided by respondents during the interviews, considering the difficulty observed among them to recall past events in detail. However, in a great number of cases, official studies do not exist at the moment, thus numbers are sometimes approximate or outdated. The extension of each comuna indicated in the table is the one reported in the first property titles they obtained and it is the one comuneros still deem valid, as they tend to consider private landowners as 'temporary invaders', whereas in legal terms the real territory on which these five comunas have control does not comprehend those plots who were sold and are now being contested. It is important to mention that comuneros, including members of the councils, were often unable to provide precise information with regard to land deals, the plots of land contested and most importantly the 'occupiers' of such land; obtaining information about the companies involved in the disputes (e.g. their name, their business, the year of property transfer) resulted to be significantly difficult. The information here provided with respect to the number and the entity of land sales in each comuna is therefore incomplete and at times vague; nevertheless, it shall provide an overview of the dynamics underpinning the redistribution of land and water access.

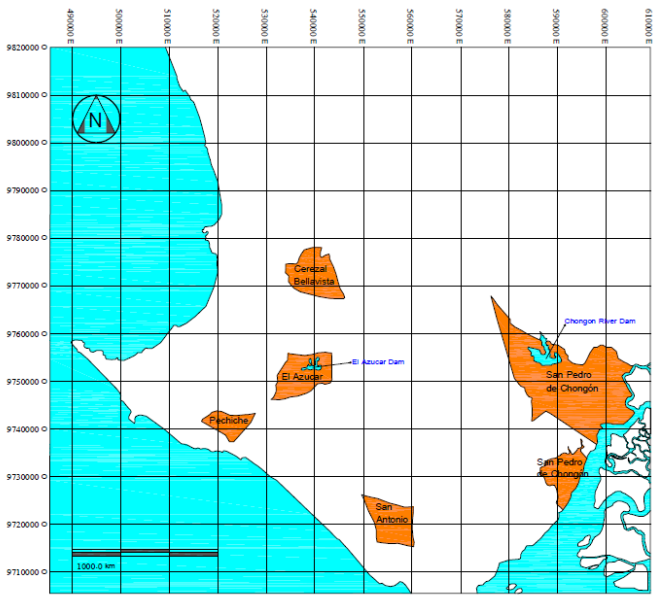


Figure 15: map of the PSE and the comunas studied

Table 6: Case studies, land sales and conflicts

Comuna	Pechiche	Cerezal Bellavista	El Azúcar	San Antonio	Chongón
Foundation	1945 1982 (PRONAREG with official measurements)	1938 1982 (PRONAREG with official measurements)	1982 (PRONAREG with official measurements)	1998	1946 1992
Original territory	**3.640,9 ha**	**9.915 ha**	**8.435 ha**	**6.218 ha**	**44.897,50 ha**
Population	4.400	3.227	900	2.000	18.000
Members[49]	1.700	298	400	300	1.100
Main livelihood activities	Fishing and agriculture	Stone mining and agriculture	Agriculture	Agriculture and fishing	Shrimp farming, industry and services for urban settlements
Irrigation infrastructure	Canal Azúcar - Rio Verde	Canal Chongón - San Vicente	El Azúcar dam (INHERI) and the canal Azúcar-Río Verde	Canal Chongón - Playas	Chongón dam and Chongón pressurised system
Year of operation	1995	2011 (San Vicente dam) 2015 (canal)	1984 (dam) 1995 (canal)	1998	1991 (dam and tubes) 2000 (pumping station)
Contested land	**1.208,5 ha**	**1.500 ha**	**7.500 ha**	**1.203 ha**	about **10.000 ha**, no precise data

[49] Those inhabitants who are also affiliated to the comuna, namely men and women older than 18.

6.2. The reconfiguration in detail

6.2.1. Pechiche

The comuna of Pechiche is located in the south west of the peninsula and it accesses water for irrigation through the canal El Azúcar – Rio Verde, which was completed in 1995. It was formallz recognised as an independent entity in 1945, although its official borders were established in 1982 through the governmental programme of PRONAREG. According to the members of the comuna the geographical coordinates recorded by the competent agency did not reflect the real ancestral boundaries, which were marked by natural and geomorphological features, such as trees and hills; this inconsistencies have been source of conflict between Pechiche and the neighbouring comunas, particularly Manantial de Chanduy. The total territory attributed to Pechiche had an extension of 3.640,9 ha, although it decreased throughout time due to several land transactions concluded between comuneros and private land investors. 100 ha are currently being cultivated with maize and watermelon as part of the programme PIDAASSE supervised by the MAGAP; an additional 90 ha should be included in the programme but are for the time being suspended because involved in a dispute[50]. From an historical reconstruction based on both the recounts of comuneros and the information found in the proceedings of trials and previous administrative appeals, I recognised six land sales[51]:

1) In 1994 the comuna sold a plot of 300 ha to the company Rilesa S.A. which is based in Guayaquil and produces papaya for export to the United States and Europe. The company has later subdivided its property and sold most parcels to other companies, among which Unifrutti Ecuador S.A., Futurocell S.A. and Cafiesa-Triari[52].
2) The same company Rilesa S.A. acquired 200 ha from the bordering comuna of Manantial de Chanduy; the plot is part of a territory which has been disputed by the two comunas for years[53].
3) In 1998, 400 ha were sold to a private landowner; it is unknown however what the purpose and the current use of the land is, or if the individual represents a company.
4) In 1998 a total of 300 ha was sold to two distinct companies through the same deal. The companies are Rinoracorp S.A. and Holdek S.A. and acquired respectively 200 ha and 100 ha; the location of the plots transferred was changed during the course of the transaction, as the route of the irrigation canals was not the one originally planned due to technical issues. No precise information on their business activity could be found, although it was observed that part of the properties are not being cultivated.
5) 0,5 ha were sold to a private individual in 2001, although I have no information on the use of the plot.

[50] Interviews with comuneros in Pechiche on 7 and 9 April 2015

[51] Interviews with comuneros in Pechiche on 7, 8 and 9 April 2015; legal proceedings documentation provided by members of the communal council as well as by the legal representative of FEDECOMSE

[52] Interviews with comuneros in Pechiche on 7 and 9 April 2015; interview with representative of Rilesa S.A. on 4 May 2015

[53] Interviews with comuneros in Pechiche on 7 and 9 April 2015; interview with representative of Rilesa S.A. on 4 May 2015

6) In 2002 8 ha were sold to another private, whose activity is also unknown.

Pechiche has filed several administrative appeals as well as legal lawsuits against those companies who are said to have acquired land illegally and without the consensus of the entire communal assembly. All sales have in effect been concluded without first consulting community members, including the transfer to the two companies Rinoracorp and Holdek, whose terms initially was approved by the assembly, but were then modified according to the location of the irrigation canals[54]. Particular is also the case of Rilesa S.A. who has been accused of having bought a plot illegitimately appropriated by the comuna of Manantial. In 2009, when MAGAP was still in charge of resolving land litigations, Pechiche won a case against the company for those 200 ha. The resolution however was later impugned and revised by several instances, leading to an annulation by the Supreme Court because of inconsistency. The first resolution of MAGAP appears suspicious because of a few incongruities between the dates of emission and notification, as the first seems to have been modified and anticipated. MAGAP's responsibility in terms of resolution of land litigation was removed in May 2009, the notification of the resolution reached the company Rilesa few days later, although the date of emission of the resolution was in March of the same year, hence 3 months earlier. No civil trial has been concluded yet although there are several ongoing, whereby the comuna is represented and assisted by the lawyer of FEDECOMSE. Additionally, a few legal issues arose due to the invasion of private properties by comuneros, who have been evicted and physically removed through a police intervention (e.g. in 2012). According to the comuna a total of 1.208,5 ha of its territory have been transferred to privates illegitimately, and are now being reclaimed through legal actions.

6.2.2. Cerezal Bellavista

The comuna of Cerezal Bellavista is located in the north west of the peninsula, in an area where the water deficit is slightly lower than in the rest of the peninsula due to the presence of underground aquifers which favoured the development of agricultural activities even during the long periods of drought. It was firstly founded in 1938 and originally covered an area of 9.915 ha and it is served by the canal connecting the pumping station of Chongón to the dam of San Vicente located in the neighbouring comuna of Las Balsas, which started functioning only in February of 2015. 1446 ha of the comuna are part of the programme PIDAASSE, and another 3226 ha are dedicated to the programme Socio Bosque of the Minisitry of Environment aimed at reforesting the area. Comuneros and council representatives argued that the disputed territories amount to 1500 ha, although they were not able to provide precise information with regards to land sales and investors. They referred to several fragmented property transfers (of 50 ha per comunero) made to different individuals and companies between 1998 and 2001, by a certain group of community members residing in the area of the comuna called Bellavista. At the moment four companies are recognised to be occupying territories which formerly belonged to the comuna. Their identity was not clear to comuneros or the FEDECOMSE, who generally

[54] Interview with comunero in Pechiche on 7 April 2015.

referred to them by their (supposed) nationality[55]. From further investigation I have identified these enterprises as being:

1) Conait S.A., an Ecuadorian company who had bought 50 ha before 2000[56];
2) a company from Colombia producing banana and owning a plot of almost 400 ha;
3) two companies from Panama who acquired an overall plot of 750 ha, currently uncultivated;
4) an Ecuadorian company producing coffee, which, as it was later revealed, does not own any property in the comuna but has an agreement with a few community members producing coffee as direct suppliers in exchange for agricultural inputs[57].

Furthermore, at the moment there are no ongoing trials as the previous communal council from 2014 had no interest in pursuing those already started by a previous administration in 2011 over 750 ha.

Figure 16: small reservoir in the comuna of Cerezal Bellavista before the canal reaches the dam of San Vicente

[55] Interviews with comuneros in Cerezal Bellavista on 22 and 23 April 2015

[56] Proceedings documentation provided by legal representative of FEDECOMSE

[57] Interviews with comuneros in Cerezal Bellavista on 22 and 23 April 2015; interview with representative of Solubles Instantaneos C.A. on 12 May 2015

6.2.3. El Azúcar

El Azúcar is a comuna located in the central area of the peninsula and it is supplied water through the dam constructed by INHERI in 1984 from which the canal of Azúcar – Rio Verde extends towards the west. It had an original extension of 8.435 ha but it is now recognised to be one of the comunas which has *lost* the most territory. It is estimated that private landowners occupy about 88% of former communal land, distributed among fifteen different private enterprises. The fist and the majority of sales was concluded between the years 1998 and 1999. Private plots were later parcelled and sold to new companies and speculators. Through interviews and participant observation I have identified 4 private companies with private properties within the original boundaries of the comuna, although the group is much bigger[58]. These four include:

1) Agricola Pura Vida, part of the bigger Rueda Group, which owns almost 1.000 ha cultivated with grape, for both the Ecuadorian market and for export, as well as maize and livestock.
2) Quirola Group, who bought about 1.000 ha (and 2.000 ha in a neighbouring comuna) to grow bananas and cocoa.
3) Hacienda la Cinthia, with 3.000 ha where it produces a large variety of crops, including avocado, citrus fruit, grape and prickly pear;
4) Agricola Saroma S.A., an Ecuadorian company owning 300 ha for the production of onion and other vegetables for the internal market.

Despite this list being incomplete, the total land in the hands of private landowners amounts to 7.500 ha, considering that comuneros presently occupy less than 1.000 ha and correspond to a population of no more than 900 inhabitants[59]. No legal actions have been taken yet against private companies, principally because the comuna has started organising politically with the aim of recovering land only in recent times, in coincidence with MAGAP's multi-temporal study. Internal issues between members of the comuna itself, with conflicting interests, have prevented them from taking action before.

6.2.4. San Antonio

The comuna of San Antonio is located in the province of Guayas, therefore in the eastern region of the peninsula. It was founded more recently than the majority of the other comunas, in 1998, when it occupied an area of 6.218 ha and when the construction of canal Chongón – Playas was completed. Its proximity to the seaside and the fact that it is crossed by the main road leading to the touristic destination of Playas have facilitated the involvement of comuneros with livelihood activities not related to agriculture or land use. The comuna recognizes four transactions as having illegitimately subtracted valuable land to comuneros[60]:

1) 347 ha were awarded by INDA to the company Tremoli S.A. in 1998, because it was in possession of registered land titles, acquired through an unclear procedure. Comuneros

[58] Interviews with comuneros in El Azúcar on 24 April 2015

[59] Interviews with comuneros in El Azúcar on 24 April 2015

[60] Interview with comuneros in San Antonio on 5 May 2015; interview with legal representative of FCG on 6 May 2015

have recently occupied a portion of this land, which the company was not exploiting, while another part (272 ha) was sold to the company Hermishey C.A. in 2011.

2) Hidalgo e Hidalgo S.A. is a construction company who bought 700 ha before 1998 to grow sugar cane; the company is the one which won the bidding for the construction of the canal connecting the dam of Chongón to the reservoir of La Cola, as well as other sections of the PHASE irrigation scheme in the area of San Antonio. The company made large investments also in the bordering comunas of San Miguel del Mate and San Juan, amounting to a property of approximately 10.000 ha, entirely cultivated with sugar cane for biofuel production.
3) A plot of 5,80 ha was sold in 2010 to a private, who then transferred it in 2014 to the company Govirec S.A., whose activity is unknown.
4) 155,5 ha were sold in 1993 to an individual who grows papaya and maize, among other crops. However, the name of the company he/she represents is unknown.

All land sales have been concluded before or during the official recognition of the comuna by MAGAP, hence it is questionable to consider them as transfers of communal land (even though the population was already organized as it is today). San Antonio has pressed charges against Termoli S.A., Hidalgo e Hidalgo and Govirec S.A. Through the Sub-secretary of Land and Agrarian Reform it has achieved a victory against Govirec S.A. which was ordered to evacuate the property. Acts of invasion by comuneros of properties formally belonging to Termoli S.A., to Hermishey and to the private individual, have also been reported, causing their coercive displacement through police interventions and the detention of communal leaders.

6.2.5. San Pedro de Chongón

San Pedro de Chongón is the biggest comuna of the PSE, with a former extension of 44.897,50 ha according to official measurements dating back to 1992. It receives a strong political influence from the nearby city of Guayaquil, and it includes more urbanised areas and settlements[61]. Its inhabitants depend on a wide variety of livelihood activities, including shrimp farming, agriculture and services within peri-urban settlements. The dam of Chongón is located in the territory of the comuna, along with the pumping station which started operating in the year 2000. 4.166 ha were expropriated by the State for installing structures belonging to the water transfer system and the PHASE irrigation scheme, as well as for a new international airport for Guayaquil, whose construction is supposed to start in 2025 (Figure 17). Shrimp farms occupy 30% of the productive original communal land (about 17% of the total territory), whereas only 7.5% is dedicated to agriculture; mango plantations occupy 600 to 900 ha, while other 180 ha are destined to short-cycle crops such as maize; additionally, also citrus and cacao are widely cultivated. The list of sales and transfers which has interested the communal territory of Chongón is considerably long. Most sales occurred between 1990 and 1998, and amount to a territory of 10.000 ha; comuneros now are in control of only 200 ha with access to the irrigation scheme. Among the companies presently active in the area figure:

[61] Interview with comunero in Chongón on 2 May 2015

1) Bresson S.A., with 360 ha bought in 1994 to grow mango directed to foreign markets and where is also located one of the four mango processing plants of the country.
2) Young Living, a USA company which acquired more than 800 ha in 2005 to grow herbs to produce essential oils for foreign markets.

Figure 17: sign for the future new international airport of Guayaquil in Chongón, where irrigable land was expropriated to the comuna

The total extension of land transferred according to unclear procedures from the comuna to private owners is of about 10.000 ha, although no precise data were accessible. It is estimated that 4% of the units of production present in Chongón control 65% of the territory, whereas comuneros are in control of 90% of the units of production, of very small size. No legal or administrative actions have been undertaken as the communal council is not intentioned to recover the original properties, but on the contrary it appears to have so far facilitated sales and the disintegration of the communal territory, probably because of the political influence of the municipality of Guayaquil, where the agribusiness oligarchy has great clout[62]. Comuneros who are active and eager to re-establish the original boundaries of the comunas collaborate closely with the FCG, but are mostly prevented from taking action as they are not elected representatives.

[62] Interview with comunero in Chongón on 2 May 2015; interview with legal representative of FCG on 17 April 2015

6.3. Drivers of the reconfiguration

After studying the historical and sociopolitical processes that have produced the current configuration of the hydrosocial territory of the PSE, chiefly from the perspective of the five comunas, a further analysis was conducted in order to identify the drivers underpinning the impacts the PHASE irrigation scheme has had. As described in the previous chapter of this thesis, it appears that the construction of such irrigation system, or better, the modality with which it was designed and constructed, has caused a discriminatory and disproportionate distribution of costs and benefits. Those who were meant to be the primary beneficiaries found themselves with little or no access to the long awaited water, while other stakeholders entered the arena. This missed recognition led to a situation in which the envisioned utopia (a productive territory where land and water are successfully and intensively exploited by local communities for agricultural production, creating wealth and ensuring livelihoods) was transformed in dystopia, even before its actual materialisation. The current scenery is chiefly the product of actions and events (property transfers or forged documents) occurred before or during the first years of operation of the irrigation system, and it is still far from fulfilling the initial imaginary. If one considers the effects the PHASE scheme has produced on the organisation of territory before the canals were even constructed, its implicit rationale and objectives become obvious. Land speculation, or at least the first interest and contacts advanced by investors and agribusiness companies in the PSE, date back to the early 1990s, when the first part of the irrigation scheme was under construction. Something very similar is occurring with regard to the land adjacent to the location of the future new international airport of Guayaquil, positioned between the comunas of Chongón and Daule. Investors are now offering generous sums to buy properties from the two comunas, anticipating a great increase in their value and capital gain[63].

To better explain the dynamics underpinning the reconfiguration of the hydrosocial territory of the PSE, I have identified six categories of drivers based on the data collected from comunas and the other stakeholders involved in land transfers and in the operation of the PHASE.

i. Disregard of existing sociopolitical structures

The principles and discourses guiding the design and the construction of the irrigation system have, as previously mentioned, systematically neglected the existing organization of territory according to the communal system. Such disregarding attitude of the central state, which was reflected in several sectors of the administration of this territory, corresponded to geopolitical and economic interests which deliberately favoured land buyers and speculators, considered as better users of the irrigation scheme because able to exploit more efficiently the untapped potential of the territories in the PSE[64]. What concretely materialised of the utopian scenario envisioned by CEDEGE and the other promoters of the project was a scheme which resulted to be highly incompatible with the social structures in place, particularly with collective property.

[63] Interview with comunero in Chongón on 2 May 2015; interview with legal representative of FCG on 17 April 2015

[64] Interview with independent researcher and representative of IESS Seguro Campesino on 7 April 2015

Private property, which was a foreign construct to the communal system of values and rules, was introduced and spread abruptly, inevitably affecting the organisation of the territory by facilitating processes of land speculation and concentration[65]. The proposition of a different form of land tenure coincided with the pursuit and application of what Herrera defines as a 'wrong conception of development' (Herrera, 2005). Such conception resulted in effect to be in strong discordance with the one envisioned by comunas; in planning the irrigation project, CEDEGE and the other authorities failed to consider the reality of the productive structures in place (Herrera, 2005). The PHASE scheme was designed to foster intensive (monoculture) production on large plots of land, an objective which did not really match the type of agriculture practiced by communal small farmers. As argued by Álvarez, "CEDEGE created a model based on 'family production units' which follows a specific development model, with the aim of promoting monoculture and extensive cropping. It is a model that disregards and ignores the traditional system of complementary and diversified agriculture, which still works in communal territories" (Álvarez, 2001). Each comunero, as previously explained, is entitled to use a limited number of ha for both his/her dwelling and his/her livelihood activities (when these involve the use of land). The size of these parcels rarely exceeds 10 ha, usually being of 2 ha. No large scale agriculture can be practiced if land is fragmented and organised in this manner; moreover, comuneros are unlikely to produce products for external (to the peninsula and to the country) markets, their primary concern being subsistence farming and achieving food security. Despite what is argued in the constitution, in the national plan for Buen Vivir and in the organic law on food sovereignty, and despite the argument picturing the PSE as the future granary of America able to feed not only the country, but the entire continent, these priorities were not respected[66]. The private actors who take advantage of the PHASE have no role in the achievement of (local) food security and sovereignty as they dedicate to export. Additionally, the entire system of *albarradas*, which consists of cheap, functioning and environmentally sustainable technology to harvest and preserve water, has been ignored and neglected despite its broad presence in most comunas.

Finally, the resulting configuration of the project is a clear reflection of the aforementioned conceptualisation of comunas as units of production rather than as societies. Comunas were not involved nor consulted during the design phase of the project; feasibility studies, of technical, economic, social and environmental nature had been conducted by CEDEGE, CEDEX and other consultancy firms, but comuneros' voices were not included, unlike in other projects carried out by the same agency, such as the Babahoyo hydraulic project [67].

ii. Disregard of pre-existing problems and conflicts

Strictly interconnected and somehow overlapping with the first driver described, is the disregard of pre-existing problems and deficiencies that were afflicting the inhabitants of the

[65] Interview with researcher and activist of Foro de los Recursos Hidricos on 10 April 2015

[66] Interview with representative of GAD Santa Elena Department Water Resources Management on 23 April 2015

[67] Interview with ex-representative of CEDEGE on 13 May 2015, interviews with comuneros of Cerezal Bellavista on 22 April 2015 and Chongòn on 2 May 2015

PSE already before the construction of the PHASE system. The first, over-encompassing issue that had been neglected by authorities when planning the irrigation schemes relates to comunas low economic capabilities. Comunas, as previously mentioned, lived in conditions of structural destitution for several decades because of the lack of water, which inevitably affected their food production and their livelihoods, as well as because of the lack of access to basic services, such as schools or health centres. According to INEC[68] 72% of the population in 2010 lived in conditions of poverty because of unsatisfied basic needs (UBN), these referring to housing, water access, education and income (Kuperman, 2014; UNDP, 2015; INEC; 2010). Their limited capital and livelihood security played a crucial role in comuneros' choice to sell part of their properties in exchange for immediate revenues, and it could be assumed that investors and buyers were aware and took advantage of it. Due to the lack of inputs to employ in agriculture, comuneros were not in the conditions to exploit their properties at their full potential; many of the interviewees argued they truly did not know what to with all that land. "Now this land has a different potential, because of water. Before it had no value, we could do nothing with it"[69]. The need for urgent financial security inhibited their capacity and possibility to have a longer term vision, also in terms of intergenerational solidarity, as comuneros came to realise that land sales concluded in the 1990s inexorably had impacts on new generations. Additionally, comunas' low economic capability prevented them from fully benefitting from the irrigation system by connecting to the canals and by paying the high tariffs required for its operation and maintenance[70]. Furthermore, their lack of capital has been aggravated by their inability to access credit, as communal land is not accepted as collateral by banks[71] (Castillo, 2003). Comuneros were expected to profit automatically by the construction of the irrigation system, but its (economic) accessibility resulted to be discriminatory. As also remarked by Herrera *et al.*, it can be concluded that despite the provision of irrigation through public infrastructure could appear as a Pareto optimality improvement able to benefit all, it actually favoured a certain segment of the population (the 'rich') more than another ('the poor') (Herrera *et al.*, 2006).

A second deficiency which has been overlooked by CEDEGE is the scarce agricultural knowledge and capacity which comuneros had at the time the irrigation scheme was developed. Comunas had lived for more than four decades in conditions of severe drought and water deficit. Not only they had been obliged to abandon much of their livestock farming due to such hostile environmental conditions, but they were also prevented from undertaking any type of agricultural activity except seasonal farming for short-cycle crops. Being forced to pursue other professional activities, mainly fishing, mining or charcoal production, comuneros lost the greatest part of their practical skills and knowledge with regard to farming. This deficiency has not been counterbalanced by any kind of professional socialisation or capacity development

[68] Institudo Nacional de Estadisticas y Censos

[69] Interview with comunero in Cerezal Bellavista on 22 April 2015

[70] Which were consequently reduced, in order to incentivise the use of the service.

[71] Interview with scholar from ESPOL - Dean of postgraduate studies on 18 March 2015

programme; once again, they were provided with infrastructure and technology without the means to actually exploit it[72].

A further issue which was generally ignored relates to the fact that the majority of comunas was involved in disputes over borders delimitation, since boundaries were established by comunas themselves by using approximate methods, based on so-called ancestral points which consisted of natural elements such as hills, rivers or trees. In 1982, as stated before, the government launched a programme of demarcation of the borders of each comuna; the measurements, even if based on more advanced and technological methods, in a few cases failed to respect previous ancestral delimitations causing disagreements and rivalries between comunas. One case exemplifies well the consequences that ignoring such pre-existing problem could have on comunas and land management. The comunas of Pechiche and Manantial de Chanduy, located in the south western part of the peninsula along the canal El Azúcar – Rio Verde, have disputed over boundaries since 1982; in 1994, however, the leaders of Manantial de Chanduy agreed to transfer to the company Rilesa S.A. 300 ha of the same land claimed by the other comuna. Pechiche, therefore, accused Manantial to have sold part of its territories and pressed charge both against Manantial and Rilesa, in order to recover the 300 ha. In 2009 MAGAP had solved the controversy by ordering the restitution of the property to Pechiche, however Rilesa impugned the resolution, and the Supreme Court finally judged unacceptable and inconsistent because badly formulated; the dispute is now still on-going under civil jurisdiction[73]. Land deals inserted themselves within this context of semi-hostility and uncertain configuration of the territory, exacerbating pre-existing conflicts. Disputes derive particularly from transfers of property of contended land, whose legitimacy is therefore questionable.

iii. Exclusion from decision-making

Low economic capabilities were accompanied by equally low political capital, as demonstrated by comunas' inability to have their values, interests and needs represented during the design phase of the irrigation scheme. Negligence from institutions towards comunas' social institutions and their problems, was possible thanks to their exclusion from spaces and processes of decision-making. Political power resulted to be a crucial factor for the distribution of costs and benefits of the PHASE scheme. Considering the three *forms* of power identified by Gaventa in his power cube model, which include *visible, hidden* and *invisible* power, one can argue that comunas have historically been exposed to forms of both *hidden* and *invisible* power. In concrete terms, their underrepresentation at both local level (the PSE) and national level (the national congress) and their exclusion from *spaces* of power prevented them from exercising sufficient pressure on governing authorities and therefore from being fairly engaged, which with time resulted in an internalisation of their *powerlessness*[74]. It is particularly evident for those spaces dedicated to the planning and the development of the PHASE system since the

[72] Interviews with comuneros in Pechiche on 7 April 2015 and in Chongón 2 May 2015; interview with representative of Unifrutti Ecuador S.A. on 7 May 2015

[73] Interviews with comuneros in Pechiche on 7 April 2015; interview with representative of Rilesa S.A. on 4 May 2015

[74] Interview with scholar from ESPOL - Dean of postgraduate studies on 18 March 2015; interview with researcher and activist of Foro de los Recursos Hidricos on 10 April 2015

institution of CEDEGE in 1965; they were closed to the participation of ordinary citizens and involved almost exclusively technocrats and subject to the pressure of other powerful actors such as influential entrepreneurs. CEDEGE and CEDEX, as previously mentioned, conducted preliminary studies which also comprised the evaluation of social and economic aspects of the PSE and its inhabitants; nevertheless, they seemed no to leave much space for comunas to influence the planning[75]. Comuneros in Chongón for instance, affirmed not to have been consulted nor clearly informed about the reason of the expropriation of those 2.536 hectares where the dam of Chongón and the canals were to be constructed[76]. Additionally, power inequalities have allowed investors to behave abusively at the expenses of comuneros. Cases of misconduct in which buyers took control of larger areas than the ones they were granted by contract were often reported, for example in the comunas of Pechiche, San Antonio and El Azúcar. Powerful actors hence took advantage of comunas' previous inability to take precise measurements, as well as of their limited capacity to appeal for justice[77]. Moreover, the preliminary studies and programmes carried out by the government seldom included participatory activities or socialization workshops to present and discuss the future impacts of PHASE and issues related to land governance in the PSE[78]. The lack of political power, resulting from the lack of access to both certain spaces and forms of power (decision making), not only excluded comunas from the planning process but also hindered their ability to access accurate and complete information about the PHASE scheme and the future of their territory, as explained with the next driver identified.

iv. Asymmetric information

The lack of socialization and the conditions of relative isolation which comuneros were living during the period of construction of the PHASE system led them to have limited information on the projects itself and on its possible future benefits. Comuneros in effect had scarce access to media and other sources of information that would have provided them with knowledge on the plan of the government, as well as on the land market situation. According to their own reconstruction, the majority was unaware of the future configuration of their territory (what kind of structures) and on the actual time of operation of the irrigation system[79]. Information on the location of the canals at the time of the land sales is recognised to vary considerably from one comuna to another, depending on the years in which the canals were actually constructed. In the comuna of Cerezal Bellavista for instance, people were well informed about the location of canals, considering that such structures (including the dam of San Vicente) were completed long before they actually started operating. However, the majority of comuneros interviewed stated to be aware at least of the advent of the new infrastructure in their comuna. It is also

[75] Interview with ex-representative of CEDEGE on 13 May 2015

[76] Interview with comunero in Chongón on 2 May 2015

[77] Interviews with comuneros in Pechiche on 7 April 2015, in San Antonio on 5 May 2015 and in El Azúcar on 24 April 2015

[78] Interview with ex-representative of CEDEGE on 13 May 2015; interview with consultant of MAGAP on 6 May 2016

[79] Interviews with comuneros in Pechiche on 7 April 2015, in Cerezal Bellavista on 22 April 2015 and in Chongón on 2 May 2015

important to notice that, in many cases, such as for the comuna of Cerezal Bellavista, the time span between the beginning of construction and the actual operation of the canals was long enough to discourage their expectations[80]. Land investors, on the other hand, had access to a larger quantity of information thanks to their higher political and social capital, which derived from their proximity to the government (chiefly at the provincial level). According to the economic theory of Asymmetric Information, information affects decision making in every context, and has clear impacts on political processes. Asymmetries of information between those governing and those governed, considered to be omnipresent, played a crucial role in the reconfiguration of the PSE (Herrera *et al*., 2006). The lack of knowledge on the benefits of the PHASE scheme which characterised the comuneros, coupled with their (forcefully) short termed vision and their condition of structural disadvantage, caused them to take the decision of selling their land, at very low prices[81]. Investors were usually more informed and prepared with regard to the future configuration of the PHASE scheme; an example of how the asymmetry in information has permitted investors to manipulate negotiations to their benefit comes from the comuna of Pechiche. In 1997, the two companies Holdek and Rinoracorp S.A. had started negotiations for a plot of land (a total of 300 ha) in the south western part of the comuna and reached a business agreement with comuneros during an assembly meeting. Few months later, however, once it became clear that the irrigation canal would not pass by that side of the comuna due to technical problems, the two buyers renegotiated their deal, in a more private manner directly with leaders, in order to change the coordinates of the plot they would buy. The new property, located in 'El Mirador' area of the comuna, had direct access to the irrigation structures, and was sold at the same price agreed for the other plot[82]. Nonetheless, it is unpredictable to know how comuneros would have behaved if they were in possess of more information, mainly for three reasons: firstly, as already described, comunas did not dedicate very much to agricultural production, and therefore their interest towards this activity was quite low. Secondly, private property and the suggested reallocation of land were forms of land tenure with which comunas were not familiar, and thus their awareness of the future effects of land sales might have been distorted. Thirdly, as it was explained, there was large variation with regard to the information held by each comuna, but land transfers occurred regardless, even in those where people were more informed on the construction and function of the canal. It could be argued that it was not necessarily a large asymmetry in information to compromise comuneros' capability to grasp the PHASE's future benefits, but rather a lack of preparation to understand it. Differences between the two groups (sellers and buyers) in terms of awareness and knowledge of the process were undoubtedly present; nevertheless, comunas decision making was influenced by the combination of all factors here presented. They not only lacked access to information, but if and when they had it, they lacked the capacities to use it for their own interest.

[80] Interview with comunero in Cerezal Bellavista on 22 April 2015
[81] Interview with scholar from ESPOL - Dean of postgraduate studies on 18 March 2015
[82] Interview with comuneros in Pechiche on 7 April 2015

v. Deficiencies in the legal framework and in its implementation

As previously anticipated in the beginning of this document, the legislation regulating communal land tenure and transfers in Ecuador changed through time. After the publication of the Law on Communal Organisation and Regime in 1937 and the consequent institutionalisation of communal properties, comunas were able to obtain property deeds from notaries. Additionally, being the law somehow unclear on the matter, it was generally interpreted so that land could be sold if and when all members gave their approval (Herrera *et al.,* 2006). In fact, as it was described before, two requisites were customarily considered: the approval of the assembly and the authorization of the MAGAP. Nonetheless, the lack of effective control from the MAGAP and the limited information and power assembly members had over their leaders, caused these requirements not to be respected[83]. An important step towards the preservation of communal land was made in 1998, with a new constitution, which elevated the protection of territories belonging to indigenous communities at a higher level of legislation. In its V Chapter on The Collective Rights of Indigenous and Afro-Ecuadorian Peoples, the collective property of communal lands was recognised as an ancestral heritage, based on the self-determination of these groups as nations[84]. It was further stated that such lands were inalienable, non-seizable and indivisible (this principle is generally referred to as the three "I's"), and hence they could not be registered as property to be sold or bought (Asamblea Nacional Constituyente, 1998). Comunas in the PSE did not formally qualify as nationalities, due to their past adaptation to the colonial system which meant the loss of their language and customs. The missed fulfilment of the legal definition as indigenous community has allowed for the proliferation of different interpretations which denied to recognise comunas as entities entitled to the rights prescribed by art. 84 of the constitution[85]. Regardless of the three I's principle several deals were concluded with almost no control until the year 2000 due to the unaccountable conduct of authorities at distinct levels. Firstly, communal leaders, as previously described, often served as facilitators for property transfers in exchange for favours or payments 'under the table'. Secondly, at the municipal level, cadastre authorities were also often bribed in order to accept illicit documentation regarding property transfers of communal land, which had already been illegitimately notarised. Finally, corruption reached its highest governmental level through the National Institute of Rural Development (INDA[86]), an agency operating under the Ministry of Agriculture, which was in charge of granting property deeds, allocating land owned by the State, expropriating land according to the law, managing land registration and cadastres and facilitating the implementation of the agrarian reform[87] (FIAN, 2013). In 2010 INDA was

[83] Interview with representative of MAGAP Santa Elena Sub-secretary for Land and Agrarian Reform on 24 April 2015; interviews with representative of MAGAP Guayas Sub-secretary for Land and Agrarian reform on 8 May 2015; interviews with comuneros in Cerezal Bellavista on 22 April 2015; interview with legal representative of FCG on 17 April 2015

[84] The notion of nationality is here understood as characterising an ethnic group whose members share a certain and distinctive language, costumes, history, government structures and are linked to a certain territory.

[85] Interview with ex-representative of the Cadastre of Santa Elena on 11 May 2015

[86] Instituto Nacional de Desarollo Agrario

[87] Interview with representative of FCG and comuna San Antonio on 15 April 2015; interview with representative of MAGAP Santa Elena Sub-secretary for Land and Agrarian Reform on 24 April 2015;

replaced, under the new government of Rafael Correa, by a new organ, the Sub-secretary for Land and Agrarian Reform, part of the reformed MAGAP. The same decree which ordered its dissolution argued that INDA "was not paying the adequate attention to societal needs and therefore was not properly fulfilling its functions"; several officials were accused of corrupted behaviour, including the acceptance of bribes to facilitate illicit proceedings or the delay in trials for the benefit of one party (El Universo, 2010). In conclusion, despite the existence of laws and rules for the protection of ancestral land, their application was inconsistent and compromised when it came to facilitating land investments; as one respondent emblematically asserted: "everyone knows that laws are [mandatory] for the poor and not for the rich"[88]. In this case exceptions were made for transactions in which both comuneros and investors actively participated, but from which, however, the latter have undeniably benefitted more.

In 2008, with the new constitution product of the citizens' revolution, the principle of the three I's had been reaffirmed and enriched. Article 57, in the IV Chapter (Rights of the communities, the peoples and the nationalities), extends the recognition and protection of rights on collective lands to comunas in broader terms, independently from their qualification as nationalities[89]. This opening does not leave any space for an excluding interpretation of the law, as it encompasses a wider variety of entities, among which comunas in the PSE. Moreover, article 60 recognises comunas with collective land property as an ancestral form of territorial organisation (Asamblea Nacional Constituyente, 2008). As a consequence of this new constitutional formula, after 2009 property transfers were effectively outlawed and comunas started granting usufruct rights to privates through the allocation of rights of possession, although some illegal property sales still occur. The contracts stipulated allow comunas to revoke the concession whenever they want to regain control over the land, although they usually do not include any reference to a specific duration[90]. Solving land litigations caused by previous sales, however, is not a simple task. As explained, all transfers done after 1998 are automatically be considered as null and as unconstitutional by MAGAP; transfers occurred before, on the other hand, are difficult to retrace and reconstruct. Officially, as it appears in the documents, properties were sold with the agreement of all members of the comuna, acting as one single juridical person, and it results extremely challenging to discredit and question the validity of such contracts, as they were properly registered and notarised by (unaccountable) authorities[91].

vi. Deficiencies in justice mechanisms

The last driver identified is related to the opportunities different actors have to appeal for justice when involved in a dispute over a territory or over a deal concluded in the past under the

interview with representative of MAGAP Guayas Sub-secretary for Land and Agrarian reform on 8 May 2015

[88] Interview with consultant of MAGAP on 6 May 2015

[89] Interview with ex-representative of the Cadastre of Santa Elena on 11 May 2015

[90] Interviews with comunero in San Antonio on 5 May 2015 and in Chongón on 2 May 2015; interview with representative of MAGAP Guayas Sub-secretary for Land and Agrarian reform on 8 May 2015

[91] Interview with representative of MAGAP Santa Elena Sub-secretary for Land and Agrarian Reform on 24 April 2015; interview with legal representative of FCG on 17 April 2015

previously described unclear circumstances. Among the comunas studied, Pechiche, Cerezal Bellavista and San Antonio are currently involved in trials with the aim of recovering their land sold few years ago by previous leaders or community members. Generally, not all comunas have so far managed to organise themselves successfully to claim their previous properties and to start a lawsuit against private land owners. FEDECOMSE has had an increasing role in guiding comunas through their legal battles and in creating a common strategy for all. Lawsuits and court cases have surely increased also in relation to the multi-temporal study on land tenure conducted by MAGAP, which has nurtured comunas' hope for land reallocation and transfers annulment. The procedure for solving land disputes in case of land disputes has been reformed in 2009, shortly before the abolition of INDA. Before 2009 INDA, hence public administration, was in charge of solving litigations. However, due to the spread unaccountability that affected this institution, the solution of several cases was delayed for years. In 2009, also in reaction to comunas' protests and claims nationwide, the responsibility of resolving conflicts passed from the public administration to civil jurisdiction[92]. Civil judges are now in charge of addressing disputes and this entails usually a longer and more resource consuming process, as parties are brought to confront in courts. Comunas' lack of legal and financial capacities prevents them from being able to confront with private owners or companies at an equal level[93]. Only few members are truly informed about their rights and about the proper procedures to defend them; additionally, the comuneros interviewed demonstrated several times to have little knowledge on the entities they were confronting. The companies they have to challenge are usually perceived as distant and extraneous bodies belonging to other realities (the city of Guayaquil), and any information on them is usually acquired through hearsay and speculation. In the comuna of Cerezal Bellavista, for instance, it was found that Solubles Instantaneos C.A., a company which the majority comuneros believed to have illicitly bought land, is actually carrying out a developmental project in cooperation with the comuna itself. The company has an agreement directly with few comuneros, who have accepted to become new coffee producers and suppliers in exchange for inputs, initial investments for production and capacity development support. The project is authorised and supervised by PIDAASSE, the aforementioned governmental programme to foster sustainable agricultural practices in the PSE[94]. This episode confirms the fact that comuneros are often too scarcely informed and equipped to address land disputes. Furthermore, FEDECOMSE, which provides legal guidance and support, only has one lawyer available to assist all 50 comunas affiliated to the federation in their legal battles. Moreover, comuneros lack the resources to move around the country, particularly to the capital, in order to be present at the trials. Private companies usually do not face these problems and are capable of employing one or more lawyers to defend their position. For this reason comuneros, who had previously advocated for a change in the procedure of land disputes resolution and had hoped for MAGAP's dismissal with respect to these issues, are now asking for a restoration of the original administrative procedure. Essential changes have

[92] Interview with representative of MAGAP Santa Elena Sub-secretary for Land and Agrarian Reform on 24 April 2015

[93] Interview with legal representative of FEDECOMSE on 31 March 2015; interview with legal representative of FCG on 17 April 2015

[94] Interview with representative of Solubles Instantaneos C.A. on 12 May 2015

occurred in the meantime, the current essence and configuration of MAGAP and of the Sub-secretary for land are very distant from the one of INDA[95]. Comuneros are now in the position of trusting these institutions to take more unbiased and transparent decisions, as well as of their commitment to actually solve existing disputes in a shorter time. However, for the moment, power inequalities between them and their opponents are furthered and still hinder a process of equal distribution of resources, despite of what is advocated by the government of the Citizens' Revolution.

6.4. Conclusions

It is evident that all six drivers are strictly interrelated and mutually influential. Ignoring existing realities inevitably means ignoring their problems and issues, and such behaviour is undoubtedly facilitated by asymmetries for which comunas had no access to power arenas. This exclusion from the decision making process also caused them to have limited information on the dynamics of development of the irrigation system, its impact on the land market and on the future configuration of their hydrosocial territory. Moreover, the same unequal power relations have contributed to the emergence of other contextual issues, such as flaws in the implementation of the legal framework for communal territories and in the justice system meant to facilitate the resolution of disputes. The current situation is therefore one in which very scarce official data and information are held with respect to the distribution of irrigable land in the PSE, as well as one in which trials have been delayed for years, only aggravating tensions. Comunas often do not have the resources, in terms of knowledge, legal preparation and finances, to confront private companies on equal terms; the fact that respondents in the five comunas studied could not provide accurate information with regards to the companies they are opposing is indicative of their scarce degree of preparation. The impacts of the construction of the PHASE scheme varied substantially from comuna to comuna; El Azúcar for instance has sold the majority of its territory to agribusinesses, whereas Cerezal Bellavista still conserves most of it, and those companies who acquired land are not exploiting it for the most part. A crucial factor is the accessibility of irrigation facilities within the comunas, as for example in the comunas of El Azúcar and Chongón structures are greater than in many other comunas, as they also host dams and reservoirs, and thus a larger users can access them. All land deals occurred in the five comunas researched and described in the beginning of the chapter, concerned land around the irrigation canals or tubes, with direct access to water coming from the Daule river. Members of different comunas were approached by land investors with distinct means and strategies; particularly striking is the case of San Antonio, in which the biggest private landowner is the same company that has constructed the irrigation scheme, after being selected by public authorities. The political history of each comuna has undoubtedly influenced their response to the 'land rush' and to the proposals of land investors. Some had leaders who were more reluctant to sell land and who therefore limited the loss, whereas in other cases leaders and/or community members in general were more propitious to cede communal properties to

[95] Interview with Representative of MAGAP Santa Elena Sub-secretary for Land and Agrarian Reform on 24 April 2015

strangers. This also has to do with the relevance of agriculture for livelihoods back at the time of land transfers. Likewise, differences were observed with respect to comunas' current endeavours and commitment to recover their ancestral lands; for instance, in the comunas of Pechiche, Cerezal Bellavista, San Antonio and to a certain extent El Azúcar as well, leaders were selected precisely because of their zeal for the cause of land recovery and justice and because of their combativeness. In the comuna of Chongón, on the other hand, elections have been manoeuvred on occasion to elect personalities which are politically close to the Social Christian Party ruling in Guayaquil. These leaders, due to their closeness to powerful groups with interests in the agribusiness sector, are unlikely to facilitate the concretisation of claims for land or the start of legal actions against private companies.

The government of Rafael Correa has undoubtedly taken a few steps in a new more transparent direction, in order to solve conflicts, particularly through the intervention of MAGAP; the social conflict which originated from the construction of the PHASE scheme and the attendant redistribution of land, are finally recognised as part of a social debt that public authorities hold with comunas in the PSE. Since June 2013[96], the comunas of the PSE have for the first time a representative in the National Parliament, and their participation to the political debate, particularly with regard to the formulation of the new land law, is growing. Justice mechanisms, nevertheless, are still a reflection of comunas' low clout; the transfer of responsibilities from public administration to civil jurisdiction is emblematic of the State's perspective on the role it should have towards comunas. The government renounced to its mediatory function, classifying the issue of land speculation or accumulation and the one of disintegration of the peninsula's communal system as purely private matters. Despite the constitutional imperative of protecting comunas and conserving their land, with the 2009 Reform of the Judicial Statute of Rural Communities the Ecuadorian State has dismissed its responsibility, by determining that land disputes (and more in general problems concerning comunas) are to be solved as conflicts between private citizens.

[96] The province of Santa Elena was already represented in the National Assembly since its creation; however, in 2013, a deputy close to the comunas was elected.

7. Responses and adaptation

In the two previous chapters of this thesis, the reconfiguration of the hydrosocial territory of Santa Elena was described and explained, with particular emphasis on the vision and sociopolitical processes underlying the creation of the PHASE scheme and the consequent redistribution of land. The purpose of the present section is, on the other hand, to describe the reaction of each actor involved in the (relatively) new configuration and their different forms of adaptation. Each group of stakeholders evidently has different interests to pursue: comunas are organising and struggling in an effort to recover territories sold (illegitimately), which they are now determined to cultivate. Agribusinesses and investors aim at gaining legitimacy, proving their ownership over disputed properties, continuing their businesses if profitable or transferring plots to new buyers, for a higher price than the one they originally paid. Public authorities are interested in making clarity on the current situation of land tenure and access in the area, also in function of improving the cost-efficiency of the water transfer system, to be able to operate it and maintain it as well as to recover the initial investment. Each of this perspective is presented and then contextualised within the current debate on the urgency for a new land law, to foster a more equal distribution of means of production in line with the longer term goals of the government of the Citizens' Revolution.

7.1. Comunas

Comunas' reaction to the reconfiguration of their territory grew gradually. Initially, being often directly responsible for land sales, comunas' leaders were not actively concerned with the recuperation of territories, which finally had access to the irrigation canals. This somehow indifferent behaviour was also encouraged by a few cultural traits that characterise the local inhabitants of the PSE. Comuneros tend to dislike direct or animated confrontations, preferring to adopt a behaviour that could appear as passive or submissive. In many cases, today's leaders serve as activists elected to represent the needs of the comuna and to fight the battles that the other community members are unwilling to fight actively. Another influential factor with respect to comuneros' unwillingness to be involved in direct conflicts is related to the fact that comunas' social capital, as previously explained, is founded on sound family relations and on endogamy. When conflicts between members of the same comuna would arise because of unauthorised land deals, comuneros were unlikely to report them to the attention of public authorities, due to the involvement of family ties and the strong value attributed to them[97]. For a long time social cohesion, therefore, overrode the feeling of discontent or injustice among comuneros; still today, many refuse to speak openly about past property transfers or omit to mention the names of those involved. In the aftermath of the reconfiguration, according to what I have observed, particularly through an analysis of the narratives used by comuneros, they tend to ascribe land sales to three causes: 1) themselves, self-blaming for the mistake

[97] Interview with researcher and activist of Foro de los Recursos Hidricos on 10 April 2015

committed when they were in conditions of need and insecurity; 2) investors, blaming them because, being more informed, they unscrupulously took advantage of their naivety; 3) their ex-leaders or other fellows comuneros, because of their lack of morals in deciding to sell communal assets. Furthermore, it is important to notice that comuneros frequently do not attribute the loss of land to the construction of the PHASE scheme, but to collateral forces and dynamics, such as the asymmetric information or the general abandonment to which they were left by past governments, which drove them into a situation of insecurity and misery. The vast majority argued that it was the lack of resources to invest at the time of the construction that caused them to act short-sightedly and to sell their land, rather than the irrigation scheme attracting outsiders and speculators[98].

Nevertheless, their desire to recover the irrigable land has gradually increased, also in concurrence with a few external enabling factors. Since the election of the government of Alianza PAIS, comunas have received more attention and space in the political arena, which have helped strengthening their institutions, particularly the two federations[99]. Firstly, the creation of the independent province of Santa Elena in 2007 signified a recognition of the particular identity of the inhabitants of the PSE (at least those who are part of the new province) and it came as a reaction, from both comunas and authorities, to the long history of negligence and inattention of the central and provincial governments with respect to communal issues. The division has later led to the formation of two separate federations, FEDECOMSE for Santa Elena and the reformed FCG for those who remained within the boundaries of the province of Guayas, whose primary aim is evidently the defence of ancestral territories and resources. Secondly, few programmes aimed at fostering the economic and social development of the peninsula have been launched by the government. Of all, the project standing out the most, dedicated to the promotion of agricultural practices and empowerment, is PIDAASSE[100], further described in paragraph 6.3.. Additionally, the entrance in the National Assembly of deputy Vanessa Fajardo, close to FEDECOMSE, has given a further encouragement to comunas in their endeavour to recover land[101]. The two federations do not seem to act in coordination, despite facing the same issues and problems; this is probably due to the fact that their administrative interlocutors at provincial government level are now different, also in terms of political alignment[102]. Their counterparts within MAGAP and the Sub-secretary for Land, which has a decentralised office in Santa Elena but operates mainly from the district office in Guayaquil, is however the same. The main role of these federations is to represent all comunas under the same standard, while providing them with support and assistance for claiming their rights. Regular meetings are organised at least once a month, during which representatives of all comunas gather to discuss

[98] Interviews with comuneros of Pechiche on 7 April 2015 and Cerezal Bellavista on 22 April 2015

[99] Interview with comuneros in Cerezal Bellavista on 22 April 2015 and in El Azúcar on 24 April 2015; interview with representative of FEDECOMSE on 27 March 2015

[100] Proyecto Integral de Desarrollo Agrícola, Ambiental y Social de Forma Sostenible del Ecuador.

[101] Interview with legal representative of FEDECOMSE on 31 March 2015

[102] The provincial government of Guayas is led by Alianza PAIS, but the municipal administration of Guayaquil is controlled by the Social Christian Party and has a strong influence also on the peri-urban area surrounding the city; the provincial government of Santa Elena, on the other hand, is largely composed by members of Alianza PAIS (CNE, 2014).

urgent issues or future strategies. Nonetheless, when interviewing comuneros it sometimes emerged that, in spite of the trust attributed to the federation and its actions, they feel like their struggle is still individual, considering that each has to deal with different private actors as well as different historic and political events[103].

Finally, the enrichment of the legal framework, through the 2008 constitution, which extended the protection of communal land to those social groups that did not qualify as nationalities, stimulated a certain sense of *nativism*[104] among comunas and their members. Comuneros, whose indigenous character had been neglected for a long time due to their unique adaptation, found great pride in an empowered image of 'native', as direct descendant of an antique civilization, in opposition to the mestizo population from the cities[105]. The rediscovery and appreciation of this identity played a central role in awakening their will for justice and their sense of territoriality, leading to increased activism and advocacy. Nonetheless, the change in the legal framework was not the only factor that triggered this nativist tendency; the same struggles and conflicts arising from the construction of the PHASE irrigation scheme have encouraged a reappraisal of their cultural and social heritage.

As a result of the reconsolidation of their structures, comunas behave now more proactively and resourcefully, engaging in legal actions against land owners, even though power and capital inequalities are still very evident and influential. Employing Gaventa's categorisation for *spaces* of power, one could argue that comunas in the PSE are slowly creating new *claimed* spaces, for instance participating actively to the consultations on the draft for a new law of rural land and ancestral territories. Federations themselves are, to a certain extent, *third claimed* spaces, which were organised to oppose and reject hegemonic power.

7.2. Private landowners

Private investors and companies took advantage of the irrigation infrastructure thanks to their bigger financial capital and their privileged access to spaces of political power, which granted them information which comuneros could not have. Their current ambition is, for the largest part, to maintain the status quo and the current distribution of resources, being significantly profitable for them. Such interest does not result difficult to defend, due to the afore described advantages that these actors have when it comes to legal confrontations and lawsuits. Furthermore, landowners, or at least those who bought their plots before 1998, hold legal (even though perhaps not legitimate) property titles, registered at the cadastre of Santa Elena. Controls over the actual use and social function of land have started only in recent times, as part of a broader strategy to foster a more equal distribution of assets, which should lead to a land reform. Some investors, who bought large properties in the 1990s (100 ha or more), have later

[103] Interview with comuneros in Pechiche on 7 and 9 April 2015

[104] Understood as "any conscious, organised attempt on the part of a society's members to revive or perpetuate selected aspects of their culture", particularly in opposition to acculturation (Linton, 1943).

[105] Interview with ex-representative of the Cadastre of Santa Elena on 11 May 2015

subdivided them in parcels and sold them to other companies[106]. This practice is for some a simple speculative activity, whereas for others it relates to the fact that the investments required to cultivate such extensive plots of land are enormous and unaffordable, which, as explained by Herrera, is what causes large landowners to be inefficient users of the PHASE scheme (Herrera, 2005). These large companies tend to be disembedded from the surrounding communities, at times being physically gated and protected by security guards whose responsibility is to prevent anyone from entering, even when the land is not being cultivated. As explained in the previous chapter, quite a few episodes of illegal property invasion by comuneros have occurred, and have subsequently led to police interventions and forceful evacuations, entailing the destruction of any plantation or structure on it[107]. For this reason, and the more general belief that rural populations, particularly if indigenous, are 'backwards' and uncivilized, the perception of comunas that the majority of private landowners in the area have, is rather negative. The stereotyped image of comunero which emerged by interviewing a few private entrepreneurs is one of a short-sighted, self-victimising, avaricious and at times dishonest individual, who has little interest in doing agriculture. An interviewee, whose property had been invaded by the comuneros of Pechiche in the past, refers to them as "predators, rather than farmers (…) who only care about renting out their land and making money, not cultivating it". For this reason he argued, the irrigation system has brought some benefits to few agribusinesses, but it has not produced the expected employment opportunities; the only solution for overcoming this impasse is, in his view, the abandonment of communal collective property and its redistribution among "real farmers", who would know how to convert it in something profitable, while simultaneously fostering local development[108]. Some companies, however, are more embedded and have developed relationships with the surrounding comunas; Solubles Instantaneos C.A. (which however is not a land owner), as described before, is implementing a programme to assist farmers in developing capacities and acquiring more autonomy in their practice. Unifrutti Ecuador S.A., on the other hand, is also engaging and employing local inhabitants; however, its representative, also shared the opinion that comuneros (in Pechiche) are not skilled farmers[109].

All enterprises considered in this study have direct access to water through the public infrastructure of the PHASE scheme, but some dissatisfaction was expressed with regard to the quality and most importantly the reliability of the service offered by SENAGUA and EPA. Interviewees mentioned that the supply is not always constant and that a few times users were prevented by the authorities, though military controls, from accessing the water in the canals, in order to ensure the provision for human consumption to the entire peninsula. Moreover, maintenance has also been scarce and intermitting, particularly in the areas with pressurised irrigation systems which tend to break more frequently, causing substantial problems to users

[106] Interview with comuneros in Pechiche on 7 April 2015, in Cerezal Bellavista on 22 April 2015, in Chongón on 2 May 2015 and in San Antonio on 5 May 2015; interview with Scholar from ESPOL – Dean of postgraduate studies on 18 March 2015

[107] Interview with comuneros in Pechiche on 7 April 2015 and in San Antonio on 5 May 2015; interview with legal representative of FCG on 6 May 2015

[108] Interview with representative of Rilesa S.A. on 4 May 2015

[109] Interview with representative of Unifrutti Ecuador S.A. on7 May 2015

and their yields[110]. Some users opt for storing water in small reservoirs or *albarradas* inside their properties, in view of these supply problems and possible interruptions. As mentioned before, private users tend to consume large quantities of water, considering that among the most common crops grown by these agribusinesses there are several thirsty crops such as cocoa, coffee, mango, oil palm and banana.

7.3. Public authorities

The chief public authorities which serve as interlocutors for comunas and private landowners, for issues related to the irrigation scheme and land tenure, are MAGAP and its subordinate organisms, such as the Sub-secretary for Land and Agrarian Reform or the Provincial Directorate for Agribusiness[111], and SENAGUA and EPA. In spite of the change in the attitude the State has towards the communal system and the co-existence of different nationalities and ethnic groups within the country, which would suggest a more tolerant and inclusive approach, comunas still seem to represent a troublesome element for centralised power. Their system does not correspond to the model the State would like to administrate, and attempts of incorporation and homologation continue at present days. This partial rejection is also frequently reminded by MAGAP's attitude, which seems to follow a strategy of promotion of activities that are incompatible or in competition with the ones of comunas, such as the *Plan Tierras*[112] or the creation of farmers cooperatives in communal territories. "At national level, comunas are recognised on paper, but not in real terms (…) the communal society is perceived as a questioning to current power structures and for this reason its development is hampered", argues an anthropologist residing in the PSE[113]. An example of attempted assimilation and of annihilation of comunas' autonomy is the marginalization of traditional water users associations (WUAs). In the past the number of associations managing drinking water supply was substantial (about 50 in the entire peninsula); later, with the superimposition of new different (governmental) entities, responsibilities and physical structures were overlapping, causing unnecessary spending and consequently the disintegration of communal WUAs. As stressed before, the traditional system of albarradas has also been ignored and abandoned; any structure or technology that is not part of the water transfer system is generally underappreciated and excluded, for example, from the provincial plans for water resources management[114]. A further sign of authorities' detachment is the State's renunciation, in contrast with art. 57 of the constitution, to its authority in terms of land disputes on communal territories, which are now approached as private matters.

[110] Interview with representative of Unifrutti Ecuador S.A. on7 May 2015; interview with representative of Bresson S.A. on 13 May 2015; interview with comunero in Chongón on 2 May 2015

[111] Dirección Provincial Agropecuaria de Santa Elena, in this case.

[112] The Plan Tierras is an initiative of MAGAP launched in 2009 at national level, aimed at redistributing land to farmers' organisations or cooperatives in an effort to support small-scale farming and foster rural development.

[113] Interview with researcher and activist of Foro de los Recursos Hidricos on 10 April 2015

[114] Interview with researcher and activist of Foro de los Recursos Hidricos on 10 April 2015; interview with representative of GAD Santa Elena Department Water Resources Management on 23 April 2015

Figure 18: sign for the programme PIDAASSE in Santa Elena

On the other hand though, MAGAP, through the Sub-secretary for land, is still active and involved in communal land governance, as witnessed both by the constant dialogue maintained between its officials and comunas' federations, as well as by the recent multi-temporal study on land tenure and legality. A governmental programme was created to assist comunas in developing agricultural capacities and improving their livelihoods: the aforementioned PIDAASSE (Comprehensive Project for Agricultural, Environmental and Social Sustainable Development of Ecuador). The project is an initiative of the ministry and it aims at the requalification of land for agricultural use in communal areas of the PSE; it is the product of a cooperation agreement between the governments of Ecuador and Cuba, which covers different sectors, including education, health and agriculture[115]. Launched in 2009, the objective for the first phase of implementation was to cultivate 10.000 ha; however the second phase has started in 2012 and so far 5.630 ha have been equipped and put in production. Concretely, PIDAASSE is meant to facilitate the application of systems of integrated agriculture with modern and sustainable technologies, to assist the development of communal territories in the PSE. The activities implemented within the programme include:

- technical agricultural trainings and support;
- assistance for the installation of irrigation structures for parcelled properties;
- provision of agricultural inputs for the first harvest (seeds, plants, machinery, fertilizers, irrigation equipment and pumps – to transport water to the fields as communal plots rarely have direct access to the canals);
- assistance in marketing and development of a business plan;
- the creation of credit and savings banks

[115] Interview with representative of MAGAP Department of irrigation and drainage on 14 April 2014

The direct counterparts of MAGAP for the implementation of PIDAASSE are the comunas, whose councils are in charge of selecting those members who will take part in the activities, according to a few criteria such as having a plot located at a maximum distance of 5 km from the closest source of water (usually canals or reservoirs of the water transfer system, considering the water problems of the peninsula), and not being involved in land dispute with other actors[116]. Overall, the programme was received by comuneros with great appreciation, being enthusiastic about finally receiving State's direct support. Contrarily, few experts and public institutions representatives advance criticisms with respect to its sustainability and actual impact. Some argue that no real agricultural development can be achieved through PIDAASSE, as it does not bring about any structural or mind-set change, being too costly and resource-consuming. Many interviewees, including few comuneros, did not support the excessive focus of the programme on maize, which is considered as an easy crop to grow but not very profitable, particularly considering that each comunero usually has control on no more than 2 hectares[117]. The programme is considered by some as unsustainable because the production costs in the area, especially for water, are very high, and because irrigation infrastructure damages frequently and easily, due to the lack of maintenance[118]. The sustainability of the PHASE scheme is in effect a real concern; the structure is often referred as a 'white elephant', since transferring water to the peninsula is expensive. Such costs for O&M, not to mention the initial investment, are for the moment impossible to recover as the tariffs users are asked to pay are too low, being publicly subsidized in an effort to incentive the use[119]. It is also important to mention that tariffs are not progressive, which means all users, independently from their economic capacities, pay the same price per m^3.

7.4. Concluding remarks on reconfiguration and responses

The image of the PSE here depicted involves the three groups of stakeholders pursuing distinct and sometimes conflicting interests, while reproducing the same struggles over resources, rights, authority and values (of natural resources) which have contributed to the reconfiguration of the peninsula in the first place. Currently, two systems of land access and rights can be recognised in the PSE: the communal one, with collective property of resources, and the private one, with private property of land. These two systems coexist side to side, and

[116] Interviews with comuneros in Pechiche on 7 and 9 April 2015, in El Azúcar on 24 April 2015 and in Chongón on 2 May 2015

[117] Interview with representative of GAD Santa Elena Department Water Resources Management on 23 April 2015; interview with legal representative of FEDECOMSE on 31 March 2015; interview with consultant of MAGAP on 6 May 2015

[118] Interview with consultant of MAGAP on 6 May 2015

[119] Interview with representative of GAD Santa Elena Department Water Resources Management on 23 April 2015; interview with consultant of MAGAP on 6 May 2015; interview with representative of SENAGUA Department of Irrigation and Drainage on 8 May 2015

are both recognised an regulated in the legal framework. With regard to the water rights (for irrigation) created around the Daule-Santa Elena transfer system[120], however, there seem to be only one model in place. In order to access water for agricultural use which is a public good served through public infrastructure, as described by Herrera, van Huylenbroeck and Espinel, one needs to access (and own) a private one, land. Alternatively one should have conspicuous economic resources in order to be able to connect to the canals from plots that have no direct access to them. Comuneros, generally lack both land with direct access to the infrastructure and the capital needed to invest in irrigation structures. The water rights system resulting from these circumstances confirms that the hydrosocial reconfiguration produced by the PHASE scheme is highly discriminatory, as it led to the exclusion of a certain social group. Comunas' response is often aimed at overturning those relations of power which are at the origin of such unjust outcome and which are enabling its reproduction. In their attempt, they are assisted by changes in the wider context which have characterised Ecuador and the political discourses adopted by the government in recent years, although however they have not produced any result so far. Public authorities' attitude is, in effect, very inconsistent: the desire to re-establish legality and legitimacy and to foster agricultural self-sufficiency, is contradicted by the estrangement towards land conflicts and *ancestral* land protection. Finally, private companies and landowners' interests reflect accurately the paradigm of production and resources appropriation which caused the unequal redistribution of land in the first place and which ensures their primacy.

7.5. The (infertile) debate on the new Land Law

The theme of equitable land distribution and access has been central to the political discourse in Ecuador for a long time, particularly for the establishment of the government of the Citizens' Revolution. Unequal land distribution is a great concern for the country, which has one of the highest GINI coefficients for land concentration of Latin America (0,80). Inequality and land concentration were observed to be extraordinarily high in the coastal region, and particularly in the provinces of Guayas and Santa Elena (Figure 19); in the year 2000 in Guayas INEC measured a GINI coefficient for land of 0,836, the highest of the country (Hidalgo & Laforge, 2011; Hidalgo et al., 2011). Notwithstanding its promises and premises, also with reference to the envisioned change in the model of production (*cambio de la matriz productiva*) and the recognition of the State's social debt with the agrarian sector, the administration of Rafael Correa has not managed yet to pass a new law for land or a real agrarian reform. With the aforementioned Plan Tierras, MAGAP identified approximately a million small-scale farmers with no or limited access to land, and attempted to promote a redistribution of assets, including the very ambitious goal of reducing the GINI index from 0,80 to 0,69 in only four years. Moreover, with the Law on Food Sovereignty (art.6) and the Plan for Buen Vivir (strategy 1), the intention of creating a more democratic and egalitarian society, through a redistribution of the means of production, particularly land, water and other assets that are not fulfilling their social function, already stated in the articles 281 and 282 of the constitution, was reaffirmed. However, these measures

[120] Here other sources of water, such as river basins or groundwater, are not considered.

turned out to have little echo in concrete actions and interventions (Alvarado & Vandecandelaere, 2011).

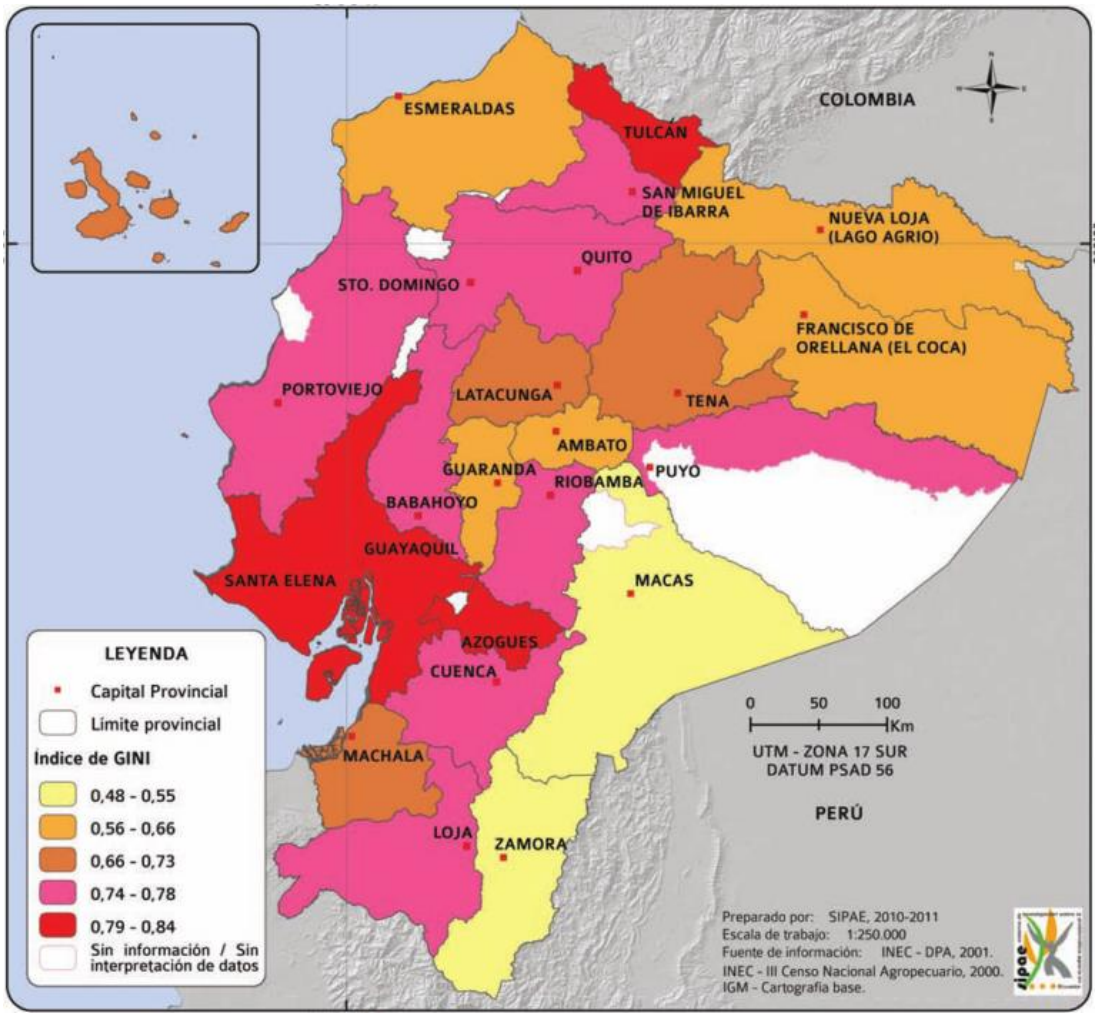


Figure 19: Gini coefficient for land concentration per province in Ecuador (SIPAE, 2011)

In 2010, SIPAE[121] presented a draft for a new Law on Land and Territories to the National Assembly; the debate was arrested on the proposition of setting a maximum limit for the size of agricultural properties, due to the great influence that large-land owners and agro-exporters have on the political system. Overall proposals and ideas abound, but debate and democratic participation are still scarce; what is lacking, according to some, is a body with sufficient legitimacy to organise and moderate the debate, able to integrate different opinions and perspectives in one draft (SIPAE, 2011). Regardless of these issues, comunas from the PSE have gained their own space of intervention and contribution during the pre-legislative consultation on the draft of the Law of Rural Lands and Ancestral Territories, a legislation originated from the unification of five different initiatives. Comunas in Santa Elena, through their representatives and FEDECOMSE, had two rounds of discussion and consultation on the bill, in

[121] Sistema de Investigación sobre la Problemática Agraria en el Ecuador - a research organism based in Quito, which gathered contributions and opinions from experts and representatives of both indigenous groups and peasants organisations.

order to formulate one unanimous proposal and "speak the same language" (representative of FEDECOMSE, communal assembly, 2015). A new law on land is not only necessary for resolving existing social conflicts, but it is highly instrumental for the implementation of developmental projects, argued the lawyer of the federation (representative of FEDECOMSE, communal assembly, 2015). The new legislation should translate the constitutional principles on the social and environmental functions of land in more concrete parameters, also to assist in the achievement of the objectives of food sovereignty and Buen Vivir. Moreover, it should include specifications on the expansion of credit opportunities for comunas, in order for them to be able to access them without having to offer their properties as collateral thanks to a State guaranty fund. A further recognition of collective rights and property is also demanded to the State, helping to strengthen their institution and ensuring spaces for participation in decision-making on matters concerning communal social, territorial and cultural organisation. Lastly, they ask for a restitution of the legal competency on the resolution of land litigations to MAGAP and the Sub-secretary for Land and Agrarian Reform, as the 2009 reform is unconstitutional and penalising for comunas. The law is still being discussed, but the missed achievement of an agrarian reform, to substitute the problematic one from 1994, is considered by citizens, particularly the peasant movement, as a great failure of Correa's government (FEDECOMSE, communal assembly, 2015). There is a noticeable incoherence between the actual political process and the constitutional commitments in different sectors, from food sovereignty and the change in the production model to the creation of a truly democratic and plurinational society, as witnessed by the vast discontent and protests of indigenous groups, which led to several episodes of State violence and repression in August 2015.

Romelio Gualán, president of the peasants organization Eloy Alfaro, in an interview to the Institute of Sudamérica Rural argues that the government's approach to the agrarian issue can be subdivided in three different moments: the first since its election until 2010, in which it truly was a government representing and including social movements; a second one between 2010 and 2012, in which it drifted away and became a contended government between left and right parties; finally, a third period after 2013, when it became a right oriented government, starting to contrast indigenous and campesinos' historical struggles, banning dissent. There are two (traditional) positions confronting on this necessary land reform: one more in favour of agribusiness and exports, belonging to the well-known neoliberal model, and one which truly endorses small-scale farming, agroecology and food sovereignty (IPDRS, 2015). The direction taken with the creation of the PHASE scheme and the cases of land speculation and concentration that followed, seems to belong to the first line of thought. Thus the next steps of the government in terms of land reform and concrete measures for (equitable) agrarian development will be crucial for comunas in the PSE and for its hydrosocial territory, including private actors, more in general.

8. Discussion

The main objective of this study was to investigate and explain the process of reconfiguration of the territory of the peninsula of Santa Elena induced by an alteration in its hydrosocial cycle. The hydrosocial territory studied corresponded to an area mainly populated by indigenous people, descendants of pre-Hispanic societies, who live organised in comunas. Different forms of land tenure now coexist as a consequence of a change at both biophysical (quantity of water flowing to the PSE) and political (water rights systems in place) level, brought about by the construction of the PHASE irrigation scheme. To pursue the objective, and test the underlying hypothesis of a causal relationship between the PHASE scheme and the inequitable outcomes of the reconfiguration, the study addressed the following main research question:

How and to what extent did the development of PHASE irrigation scheme contribute to the reconfiguration of the hydrosocial territory of the peninsula of Santa Elena?

In order to answer this question, and the related sub-questions, I conducted an historical review of the processes and events characterising the conception, the design and the material construction of the Daule-Santa Elena water transfer system and the connected irrigation facilities. Particular attention was also given to the outcome and the infrastructure actually completed (corresponding to only 56% of the original plan), and to the process of land tenure change and concentration prompted by the advent of water.

8.1. Discussion of findings and theories

By adopting a political ecologist perspective I have retraced those relations of power which affected the outcome of the creation of the PHASE scheme and its impacts. Concepts derived from the theory, such as 'manufactured scarcity', 'marginalisation', the 'power-knowledge' nexus and the 'hydrosocial cycle', as well as elements of SCOT, revealed to be extremely useful for analysing the issue.

Physical water scarcity was the motivation underpinning the development of such an extensive infrastructure; despite overcoming the existing of water deficit by increasing the flow in the hydrologic cycle, the PHASE irrigation scheme has in turn created a situation of manufactured and selective water scarcity, as other obstacles to accessibility have been introduced. As argued by Robbins and other political ecologists, scarcity is artificially produced through resource enclosure or appropriation by state authorities, private firms, social elites or other powerful actors (Robbins, 2012, Harvey, 1996; Johnson, 2003; Swyngedouw, 2009). This reflection leads to the recognition of marginalisation as one of the main outcomes of the PHASE irrigation scheme. Scarcity is now experienced only by a certain group of actors (comuneros) as a result of their substantial exclusion from access to irrigation and of their relegation to less valuable land. Such marginalisation is to be understood in view of what has been observed by Herrera, van Huylenbroeck and Espinel, who pointed at the exclusive nature of this public irrigation infrastructure, due to the fact that in order to enjoy it one also has to possess an indispensable

private good (land) (Herrera, Van Huylenbroeck, & Espinel, 2004; Espinel & Herrera, 2008). Land transformed progressively into a private asset precisely because of the construction of the irrigation scheme, which has increased both its economic value and agricultural potential, fomenting the desire of some to appropriate it. Comuneros had an active role in this process, as they renounced to their access by selling their properties; their agency however has undeniably been affected by their condition of structural poverty, the lack of services and their internalisation of a disbelief in institutions. The material and political outcomes of the construction of the irrigation scheme accurately reproduce the relations of power in which the development process was embedded; the influence certain actors and their worldview had on the production of this technological artefact are evidently mirrored in it, as demonstrated by the fact that it has and still serves particular interests, rather than the ones of the local population.

The influence of power structures on the knowledge and regimes of representation embodied by the irrigation scheme is thus evident. As Foucault argued, power and knowledge are dependent on each other, as the first cannot be exercised without the second, and knowledge inevitably embodies and engenders power (Foucault, 1980; Boelens, 2015). The knowledge and discourses mobilised to justify the PHASE scheme were reflection and instrumental for power holders, namely public authorities. The project is to be attributed to a political class whose greatest ambition for the PSE was to improve the conditions for large scale (cash crops) farming, in favour of big agribusinesses, without truly considering the need of ensuring and consolidating comuneros' livelihoods and food sovereignty. The conceptualisation of nature expressed through the construction of the PHASE scheme reflects in effect a rationality whereby land and water are perceived chiefly as means of production. For this reason, the alteration of the territory favoured the diffusion of private property and attracted a certain type of actors: agricultural entrepreneurs and land speculators. The latter were aware of the continuous increase in land market prices due to several developments planned for the peninsula beyond the irrigation system, such as roads, a new international airport, a new port and an increase in touristic facilities, and seized the opportunity. The dominance of this knowledge, originated by a thinking that almost omitted to contemplate comunas and eventually expulsed them, had to do with the supposed incapacity of comuneros to transform the area in a productive territory. Such notion, along with the idea that involving strong market actors would bring about development and wellbeing, denotes a dominant modernistic thinking. Authorities acknowledged the high agricultural potentiality of the PSE and were intentioned to unleash it through a purely technological intervention, which would have naturally attracted the most efficient users and consequently contributed to the development of the PSE ('the greater good') (Bryant, 1998). The development pattern proposed, nonetheless, did not belong to the sociocultural context of the peninsula and comuneros were not prepared to understand it. The technology that was imposed did not fit with their practices and it was directed to a different type of agriculture.

By analysing this outcome using elements of SCOT theory, the PHASE's embodiment of powerful actors' 'regimes of truth' and their interests is confirmed. It is the result of a negotiation process which deliberately excluded one *relevant* group of actors, rejecting to consider their norms and their needs and omitting to consult their representatives (Klein & Kleinman, 2002). Power structures created a circumstance in which those who were supposed to involve all relevant

social actors in the negotiation were able to label themselves as relevant and prevent others from participating to so-called spaces of power. Comunas were not considered as relevant, or as capable of deciding for their own interest or that of the region, perceived as strategic for the country's food production. Thus, the outcome resulting from this biased and unfair planning process was similarly inequitable; the interaction between different actors was almost marginal as it only occurred between entities belonging to the same social group (government and experts). This hydraulic infrastructure carries evident political meanings; costs and benefits were distributed reflecting them, even before the concrete materialisation of irrigation, confirming the iterative and mutual relationship between society and environmental changes and the hypothesised causal relationship stated in the methodological chapter. The reciprocal exchange between society and water through which they form a 'constructed nature', referred to as hydrosocial cycle, is reflected in the process that has led to the current outcomes of land concentration (Swyngedouw 2009; Boelens 2014; Linton & Budds 2014)). Biophysical scarcity (nature) led to a planned technological intervention, intrinsically mediated by social relations and power (society), which has in turn caused a reallocation of natural resources (nature), marginalising one social group (society), due to the creation of a situation of land concentration and manufactured scarcity.

To better explain the role of power, social relations and the dynamics of the reconfiguration that has led to these inequitable outcomes, a set of six drivers was outlined; these drivers were: i. disregard of existing sociopolitical structures, ii. disregard of pre-existing problems and conflicts; iii. exclusion from decision-making; iv. asymmetric information; v. deficiencies in the legal framework and its implementation; vi. deficiencies in justice mechanisms. The drivers can be ascribed to two groups of causes: one relates to the vision underlying the conception of the PHASE scheme, and the second has to do with the context in which this was developed.

Gaventa's power cube was used to analyse power distribution which demonstrated to be influential for the first group of causes, including driver i., ii., iii. and iv.. Comunas' exclusion from decision-making and from spaces of power has affected their capacity to access information as well as the neglect of CEDEGE and other planning authorities towards the communal system. Applying the power cube framework, it can be noted how spaces for participation to decision-making were *closed* to local people, as part of the general attitude of institutional inattention that comunas have faced throughout history. *Claimed* spaces have been formed only in recent years and for other (sometimes related) political issues, through the reinforcement of FEDECOMSE and FCG; such consolidation corresponded also to the opening of some invited spaces by State institutions, such as the pre-legislative consultation for the bill of the new land law. Decisions for the PHASE scheme were mainly taken at national level, with very limited engagement of local actors, both comuneros and provincial authorities; CEDEGE appeared as an institution composed by technocrats who were not necessarily knowledgeable or related to the reality of the peninsula. Finally, power distribution during the development of the project was mainly *hidden*, as public authorities had the chance to control the political agenda and the access to the decision-making table (Gaventa, 2006).

Driver v. and vi., on the other hand, relate to contextual forces characterising the circumstances in which the development of the PHASE was embedded. Laws and regulations failed to reflect

the complexity of reality and to provide an effective protection for communal land for a very long time; nonetheless, even when such protection was formalised in the national constitution, corruption and unaccountable practices from both comunas and the competent public authorities hindered its fulfilment. Justice mechanisms offered to the parties of land disputes, on the other hand, revealed to be ineffective or biased, jeopardising the resolution of numerous cases of conflict and forgery. The State has given up its role in this matter, which used to execute through the MAGAP; land conflicts in the PSE between private landowners and comunas, one of the cultural and ethnic groups which the constitution claims to protect, are now considered as something that falls out of the State's responsibilities. Besides the contradiction and legal violation of the constitution, subjecting comunas and privates to civil jurisdiction means counterposing these entities on unequal terms due to their disparity of resources, consequently reproducing the same power asymmetries.

The hydrosocial territory produced by the concurrence of all six drivers does not correspond to the utopic *granero de America* envisioned by CEDEGE or the previous Ecuadorian governments; it rather turned into a dystopian setting, where more vulnerable actors are excluded from accessing natural resources and where food sovereignty is not a crucial goal anymore, at least for those producing mangoes, cocoa and bananas for foreign markets, which are now in possess of the vastest portion of irrigable land. Most of the social impacts of the PHASE scheme, including land speculation and concentration, were produced before its actual operation. The mere idea of an increased flow of water to the PSE has triggered a 'land rush', which has caused a further weakening of the communal system, linked to the loss of land, a fundamental social asset. The willingness of some comuneros to sell part of their ancestral territory could be the signal of a deeper disintegration of this traditional institution. On the other hand however, it could be argued that the communal system has also been unified by these shared struggles for land and water, which pushed comunas to organise politically also in view of a broader array of factors impairing their organisation (e.g. shrimp industry, tourism, urban expansion).

Boelens's framework (ERA) was particularly useful for the analysis of the responses and reactions of stakeholders to the new configuration, which include struggles at all four levels of analysis. Comuneros are competing with private landowners to regain control over land and water, attempting to reaffirm communal land tenure over private property. Laws have started being concretely enforced only in recent times and communal land can now be taken only in usufruct by non-comuneros through the acquisition of rights of possession; before 2009 the content (or the interpretation) of these rules was continuously readapted to please investors' interests. Current struggles regard also the appointment of the authority who should be in charge of managing land litigations. Responsibilities and tasks with regards to water management are clearly and legitimately divided among public agencies, but with respect to land governance and disputes settlement there is a certain degree of confusion and stakeholders have conflicting interests. Comuneros, now confronted with a more transparent and accountable counterpart (MAGAP), advocate for the restitution of such authority to the Sub-secretary for Land and Agrarian Reform and for the effective respect of article 57 of the constitution. A ultimate struggle between stakeholders relates to the discourses employed to justify the outcomes of the reconfiguration triggered by irrigation scheme as something

originating from other causes, as for instance comunas' indifference to agriculture. Despite authorities recognising the social debt they owe to the communal and rural population of the PSE, the construction of the irrigation scheme is still portrayed as a necessary technological intervention that could not have been carried out otherwise.

8.2. Relevance of the study

The findings discussed can be linked to the broader national level and the changing governance approach of the Ecuadorian government; with this regard there are two issues that should be considered. One is the current and heated debate on a land reform; the structure of land tenure in Ecuador is not favourable for the majority of the population, which is composed of smallholders. If a more structural societal change has to occur, it has to entail the issuing of a new land law, being a critical element for the pursuit of a more equitable and democratic society. Such law not only would have to include measures to contrast land concentration, but it should also promote respect and inclusion, rather than absorption, of different forms of land property, the communal one being widespread at national level. The existence and correct implementation of such a legislation would have probably prevented the negative turn which the reconfiguration of the PSE has taken. Secondly, considerations done with respect to the management of the situation in the peninsula lead to a wider critique of the, not yet fulfilled, ideal of Buen Vivir and the environmental governance approach of the current government. Buen Vivir is well embedded in comuna' cosmovision, for whom social capital, as embodied in natural resources and particularly land (as *territorio*), is paramount. A development model shaped on the notion of Buen Vivir should bring about different discourses compared to the ones employed today to legitimise big ecological changes caused by technocratic interventions such as hydraulic mega-projects (e.g. the Coca Codo Sinclair project[122]), which justify this massive measures as for the 'greater social good' and the sake of clean energy self-sufficiency. The so-long preached multiculturalism and plurinationalism of Ecuador, openly disregarded in the past, does not seem to receive better attention from Correa's government, in spite of the initial claims. The envisioned change for the country's production model (*cambio de la matriz productiva*), including the interventions specifically planned for the PSE, are far from promoting a paradigmatic change. The persistence of a technocratic approach to environmental issues and of a process of commodification of nature could lead to the same deluding and unjust outcome which characterised the PHASE irrigation scheme. Thus, the findings of this study continue to hold relevance despite Ecuador's political renovation, as the attitude towards infrastructure development and natural resources management seems not to have changed. In view of this, future hydraulic projects should be researched and questioned with scrutiny, taking into account the considerations derived from this work.

The use of political ecology to frame the issue at study has proven helpful and effective for the identification of those social forces underlying the construction of the PHASE scheme that

[122] A hydroelectric project financed by the Export-Import Bank of China, whose future environmental and social impacts are have been denounced by many, particularly because it will constitute a threat for the San Rafael Falls, Ecuador's largest waterfalls, also part of the UNESCO Sumaco Biosphere Reserve.

explain its outcomes and impacts. Despite having analysed the issue mainly from the point of view of comunas, the study attempts to provide a complete overview of the events and processes which characterised the reconfiguration. The findings presented confirm the controversial nature of large scale infrastructure projects, particularly if embedded in a context where the main form of social organisation differs from the predominant one. Corroborating the widespread concerns about their sustainability, the study provides new insights into the unequal distribution of costs and benefits originating from such projects. Usually the impacts derived from the development of hydraulic structures, such as population displacement or changes in flow patterns, are direct and self-evident. In the case hereby discussed the chain of events and of effects triggered by the creation of the PHASE scheme is less linear and visible, as it involved the active role of the adversely affected population and the concert of several contextual factors. The study therefore suggests that the impacts of the construction of hydraulic infrastructural projects can be more far-reaching than it is usually assumed. Proving the correlation between the creation of the scheme and the outcome in terms of land distribution and tenure entailed a process of in depth reflection on social structures and relations that made it more difficult to grasp. This study provides a clarification on a phenomenon that had so far been examined and explained by public authorities and institutions only superficially. The adopted methodology entailed the collection of factual information, policy documents, personal narratives and participant observation, which were analysed with a critical approach and through the use of analytical tools derived from the theoretical framework. Doing so, it provides a clear overview of the current situation as well as a critical interpretation of its causes.

9. Conclusions

The findings of the study and the argumentations proposed throughout the thesis confirm the existence of a causal relationship between the construction of the PHASE scheme and the unjust outcomes brought about by the territorial reconfiguration that it has triggered. In Chapter 5 I introduced the PHASE irrigation scheme and the context in which it is inserted, as well as the impacts it has had on it. The increase in the value of land and in its agricultural productivity has attracted private investors who, since the beginning of the 1990s, have progressively acquired the greatest part of land with access to the irrigation facilities through illegitimate land deals. Rules protecting ancestral and communal land were in force since 1937, but often lacked implementation allowing for numerous illegal transactions between comuneros and privates to occur. I have further investigated and described how such a redistribution of land was possible, identifying six categories of factors that explain the unjust outcome indirectly produced by the construction of the PHASE irrigation scheme. Presented in Chapter 6 after a more detailed description of the characters of the reconfiguration in each of the five comunas I had selected as case studies, the drivers relate to two overarching issues: the vision underlying the infrastructural project and additional contextual forces. The first implied a conceptualisation of nature which was in sharp contrast with the one of comunas, for whom land is not only a natural and economic asset (a mean of production), but also an essential component of social capital. Contextual forces included weak and unaccountable institutions, inconsistent behaviour of public authorities and comunas' condition of structural vulnerability. Both classes of causes were however deeply affected by power distribution and social relations between the actors involved in the PSE. The present struggles over the appropriation of natural resources, namely land and water, which occur both at a material (*resources*) and at an abstract level (regimes of representation), are a product of original power asymmetries. The PHASE irrigation scheme, and the bigger Jaime Roldós Aguilera hydraulic project of which it is part, are technological artefacts that carry great political meanings, and that therefore have had *political* impacts, beyond the physical reconfiguration of the territory of the peninsula. These impacts were already observable before the materialisation of the irrigation infrastructure, reaffirming the social relations embodied in it; many properties were in effect transferred before water had actually reached the region, preventing the PHASE scheme from fulfilling its promises and objectives and from distributing its costs and benefits equally.

The study was chiefly dedicated to comunas' perspective and experience of the reconfiguration; such a narrow focus has undoubtedly influenced the analysis of the processes observed and consequently the findings and the explanations provided. However, approaching this issue, which is intrinsically political, from the local population's point of view was useful for recognising dynamics that would have not been identifiable if approached from a more detached perspective, with the risk of providing an *apolitical* analysis of a political phenomenon. The value added of the study also resides in the fact that irrigation systems are rarely approached as something possibly problematic or political, unlike dams, which are widely questioned and opposed. By contextualising the transformation of the PSE within a political

ecology framework, the processes underpinning the creation of the scheme were scrutinised and questioned to explain land concentration and speculation. The case hereby presented suggests that the utopian scenery and the positive effects expected from the provision of irrigation did not realise because relations of power were deliberately not taken into account. It would be of great interest and value to approach the phenomenon of hydrosocial reconfiguration from the perspective of the other relevant actors, namely public authorities and private landowners, taking the time needed to reach and engage the latter in the study, and researching their motivations and expectations more in depth. Moreover, it would be useful to observe the evolution of the infrastructure, especially in terms of sustainability, and of the territory of the PSE throughout time, particularly after the radical political changes brought about the Citizens' Revolution, whose future direction is now uncertain. This study, nonetheless, should provide important insights into the analysis of hydrosocial changes and large scale infrastructure projects, whereby dynamics affecting water and land are greatly intertwined. The Ecuadorian government is planning a long list of infrastructural projects, running the risk of committing the same mistakes of its predecessors and possibly hampering the redistribution of land and means of production at the base of the achievement of a more equal society.

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Appendix I: list of interviews conducted and meetings attended

N.	Date	Interviewee
1.	17/03/2015	Representative of SENAGUA at the station of Chongón
2.	18/03/2015	Scholar from ESPOL – Dean of postgraduate studies
3.	23/03/2015	Scholar from ESPOL – Archaeology Department
4.	23/03/2015	Scholar from ESPOL & UAB Barcelona - Social and Cultural Anthropology Department
5.	24-25/03/2015	Foro Internacional por el Día Mundial del Agua
6.	27/03/2015	Representative of SENAGUA - Department of Irrigation and Drainage
7.	27/03/2015	Representative of FEDECOMSE
8.	31/03/2015	Legal representative of FEDECOMSE
9.	02/04/2015	Independent Researcher and representative of IESS Seguro Campesino
10.	07/04/2015	Comunero of Pechiche
11.	07/04/2015	Comunero of Pechiche
12.	07/04/2015	Comunero of Pechiche
13.	07/04/2015	Comunero of Pechiche
14.	07/04/2015	Comunero of Pechiche
15.	08/04/2015	Comunero of Pechiche
16.	09/04/2015	Comunero of Pechiche

17.	09/04/2015	Meeting of FEDECOMSE to discuss proposal for new land law
18.	10/04/2015	Researcher and activist of Foro de los Recursos Hidricos
19.	14/04/2015	Representative of MAGAP - Department of irrigation and drainage
20.	15/04/2015	Representative of FCG and comuna San Antonio
21.	15/04/2015	Comunero of Pechiche
22.	15/04/2015	Representative of MAGAP Santa Elena - Department of Agricultural Development
23.	17/04/2015	Legal representative of FCG
24.	22/04/2015	Comunero of Cerezal Bellavista
25.	22/04/2015	Comunero of Cerezal Bellavista
26.	22/04/2015	Comunero of Cerezal Bellavista
27.	22/04/2015	Comunero of Cerezal Bellavista
28.	22/04/2015	Comunero of Cerezal Bellavista
29.	22/04/2015	Comunero of Cerezal Bellavista
30.	22/04/2015	Comunero of Cerezal Bellavista
31.	23/04/2015	Comunero of Cerezal Bellavista
32.	23/04/2015	Representative GAD Santa Elena - Department Water Resources Management
33.	23/04/2015	Participation at meeting of the Department Water Resources Management (GAD Santa Elena)
34.	24/04/2015	Comunero El Azúcar

35.	24/04/2015	Comunero El Azúcar
36.	24/04/2015	Representative of MAGAP Santa Elena Sub-secretary for Land and Agrarian Reform
37.	29/04/2015	Representative of IESS Seguro Campesino
38.	02/05/2015	Comunero of Chongón
39.	02/05/2015	Comunero of Chongón
40.	04/05/2015	Representative of Rilesa S.A.
41.	05/05/2015	Comunero of San Antonio
42.	05/05/2015	Comunero of San Antonio
43.	06/05/2015	Legal representative of FCG
44.	06/05/2015	Consultant for MAGAP
45.	07/05/2015	Representative of Unifrutti Ecuador S.A.
46.	08/05/2015	Representative of SENAGUA - Department of Irrigation and Drainage
47.	08/05/2015	Representative of MAGAP Guayas Sub-secretary for Land and Agrarian Reform
48.	11/05/2015	Representative of MAGAP Santa Elena - Department of Agricultural Development
49.	11/05/2015	Ex-representative of the Cadastre of Santa Elena
50.	12/05/2015	Representative of Solubles Instantaneos C.A.
51.	13/05/2015	Representative of Bresson S.A.
52.	13/05/2015	Ex-representative of CEDEGE

Appendix II: interview guidelines (translated in English)

Interview guidelines for comuneros

1. History of the comuna and data:
   a) Origins and foundation
   b) Boundaries and mapping
   c) Territory and area
   d) Population
   e) Members
   f) Productive activities before the construction of PHASE
   g) Current productive activities (if agriculture, which crops, where and with which technology)
   h) PIDAASSE and other governmental programmes
   i) Land sales
   j) Contested territory

2. PHASE facilities:
   a) What kind of structure is there in the comuna?
   b) When was it completed and when did it start operating?
   c) Current location (private or communal land)?

3. Land sales:
   a) When?
   b) Who was involved within the comuna?
   c) Who bought?
   d) Why was the land sold?
   e) How was it sold (practices and procedures for contacts, decisions and formalisation)?

4. Who are the private landowners and what do they do?

5. Disputes and recovery of land (if any desire):
   a) How?
   b) Who?

6. Legal actions and trials (if any)

7. Anything to add?

Interview guidelines for private enterprises

1. How many hectares do you own in the PSE?
2. Is there access to the irrigation canals there?
3. How many hectares are currently cultivated?
    a. If not all, why?
4. What kind of crops do you grow?
5. What is the destination of your product (local market or export)?
6. What kind of irrigation technology do you use?
7. How much did it cost initially to invest in irrigation?
8. How much do you pay per month?
9. How much water do you use on average per month?
10. When did you buy the property in Santa Elena and from whom?
11. Why did you decide to buy it there?
12. Do you or does your company have other properties in the country or outside?
13. Is it a profitable activity?
14. What are the problems and challenges you have encountered so far?
15. Are there any contacts and/or problems with the surrounding community? If yes what kind?
16. Anything to add?