# KNOWING WATER WORLDS:
## A Postphenomenological Approach to Socioenvironmental Imaginaries in Costa Rica

FRANCESC GABRIEL RODRÍGUEZ-MANSILLA

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## Abstract

In a context of increasing liberalization and privatization of the energy sector in Costa Rica, a wave of applications for private concessions to build run-of-the-river dams has swept over the country during the last decade. These hydroelectric projects have caused concern among residents adjacent to the targeted rivers to the extent that a socioenvironmental conflict has erupted in several communities in the southern Pacific side of the country, which I refer to as "water worlds". I use the term "water worlds" both to transcend the limits of a human-focused notion of community, and to refer to the mutually sustaining confluence of relations between the materiality of water, human and non-human living beings, knowledge claims and practices (acts-of-knowing) and their corresponding socioenvironmental imaginaries in particular territories and river water areas. This dissertation focuses on the acts-of-knowing and the underlying socioenvironmental imaginaries of these "water worlds".

My empirical study seeks a postphemenological ethnographic approach, and draws theoretical connections between Cornelius Castoriadis and Science & Technology Studies. Using advocacy research, it was conducted in 34 fieldwork sites, involved 14 unstructured interviews and dozens of conversations with community participants, and drew on numerous documents and visual resources.

My analysis shows how:

- The Environmental Impact Study (EIS) report of the San Rafael River over-simplifies the knowledge capacities of neighbor communities and environmental groups. The EIS report does not fully take into account knowledge about biophysical dynamics that members of the communities are able to co-create using alternative acts-of-knowing, such as: (i) giving attention to historical perspectives, (ii) embodying practices, and (iii) creating community coalitions in response to perceived knowledge deficits.

- Local communities co-create imaginaries of water worlds associated with ways of living and the maintenance of community relations, upon which rivers have significant influence. This notion of imaginaries as a life force of connectivity challenges the underlying (modern) assumptions and treatments of rivers, as expressed in the EIS report. That is, it defies the imaginary of rivers as quantifiable, determinable, divisible, and isolated from the human and non-human communities.

- Multispecies encounters in daily situations represent an important element in understanding acts-of-knowing articulated by the local communities in the "water worlds" of this dissertation. Drawing from Cornelius Castoriadis' perspective of living beings, I offer alternative imaginaries of the role of non-human animals in Costa Rica that are more intimate and affective than what I understand as mechanical and passive notions of non-human animals in the multiple spaces that they share together with humans.

Overall, this dissertation contributes to a deeper (and politically significant) understanding of acts-of-knowing in a particular conflict over (more than) water. In doing so, it contributes to existing work on sociotechnical and environmental imaginaries in Science & Technology Studies and political ecology by adopting a postphenomenological perspective, which aims to transcend taken-for-granted assumptions about acts-of-knowing under the sustainable development approach in Costa Rica.

## Dedication

This dissertation is truly dedicated to Dr. Richard A. Jarrell (1946-2013), and to my parents Hilario and Ascensión for their love and endless support throughout my life.

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During my fieldwork in Costa Rica, I encountered many non-human animals, and sitting now near me, a four-footed canine companion called Miamol happened to be one of them. Mol contributed to create a supportive environment wherever I went. In some way, this is also his project.

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I conducted part of the dissertation writing process in an imaginary place called Tabarnia. Tabarnia has different meanings for different people, but for me, helped me at least to overcome the inevitable disappointment of seeing every day the increasing polarization of my neighbors and friends caused by an old ideology called nationalism. Tabarnia represented for me a place of humor, satire and irony in light of divisive and dreadful debates about leaving or staying that convulsed my native city, Barcelona, in late 2017 and early 2018.

This is also for you, Messi, ¡Qué bueno que viniste al Barcelona!

This last word of acknowledgment I have saved for Richard A. Jarrell, who passed away during the completion of this work. Richard was, among many other things, an extraordinary scholar, professor and supervisor, and was excited about this project in its very early phases. In one of my last conversations with Rich, I told him about my trip plan to visit Northern Ontario in the upcoming weeks. Some days later, Rich sent me a detailed email with wonderful trip suggestions and routes to explore. I have put Rich´s suggestions in the Appendix R, with the hope that someone will enjoy these suggestions as my Austrian friend Philip and I did during a memorable trip to the Manitoulin Island a few years ago.

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# Chapter I: Introduction

The Republic of Costa Rica once had approximately 400,000 native inhabitants who lived divided into a great amount of cultural groups (Hybel, 2020). It later became a colony of Spain for more than 300 years. The Republic became independent, first from Spain on 15 September 1821, which is to this day the official country's Independence Day. Later on, in 1923, it became independent again, but this time from the First Mexican Empire. Costa Rica gained its full independence as a sovereign state by splitting from the Federal Republic of Central America in 1838.


**Figure 1: Partial Map of Central America showing Costa Rica and surrounding countries. Copyright by © MapTiler and © OpenStreetMap.**

In 2018, the population of Costa Rica reached 5 million people for the first time (INEC, 2019), with average life expectancy hitting 77.7 years for men and 82.7 for women (INEC, 2018). According to the Human Development Report for Latin America and the Caribbean (PNUD, 2016), Costa Rica has one of the highest proportions of middle class in Latin America, reaching almost 50% of its population (people who earn between 10 and 50 dollars a day). In other Central American countries such as Honduras, Guatemala or Nicaragua this proportion is less than 11%. Despite this, it is estimated that poverty does reach 20% of households in Costa Rica and extreme poverty 5.7% (INEC, 2018). In 2018, the percentage of the rural population

in Costa Rica was 21% (World Bank, 2018). To put this into perspective, this is a higher percentage than in countries like Belgium (2%), Israel (8%), Japan (8%) and the Netherlands (9%), but a lower percentage compared, for example, to Italy (30%), Panama (32%), South Africa (34%), and Ecuador (36%).

Costa Rica is widely recognized as a symbol of peace and was ranked second among Latin American countries in the Global Peace Index of 2019 (Institute for Economics & Peace, 2019). Since the end of the Civil War of 1948, there has not been a war fought within Costa Rican borders. The country is one of the few independent states in the world with no military forces. This absence of an army is part of the national identity and one of the things that many Costa Ricans most like to recall, as I had the opportunity to learn in the many conversations I had with local residents. Stemming from the 19th century, the fact that Costa Rica has become a political democracy has become another important mark of Costa Rican culture. This democracy, although not without difficulty and imperfections, was firmly established after the enactment of the Constitution in 1949 and the subsequent elections of 1953. Since then, Costa Rica has conducted 14 presidential elections until 2018, when the Citizens' Action Party, which formed in 2000, won the second-round in the elections and the candidate Carlos Andrés Alvarado Quesada became the new President of Costa Rica. Moreover, since the 1950s, Costa Rica has established a relatively successful welfare system to address its population needs, especially in health and education.

Taken together, these conditions of long-term peace, democratic political stability, and lasting prosperity have been unmatched in neighboring countries. The analogy of Costa Rica as being the Switzerland of Central America, thus, may not come as a surprise to visitors who are familiar with Europe, as Booth (1999) states in his political analysis of democracy in Costa Rica.

Yet despite this, Costa Rica, just like any other country, is not immune to disputes and conflicts. “We do not have an army, but a war is underway here over water”, said Luís (Figure 2) in a poetry festival called *Un Rio de Palabras* [A River of Words] held on February 2014 in Pérez Zeledón, one of the 81 cantons into which Costa Rica is divided. Luís pronounced these

words as a representative of *Ríos Vivos* [Living Rivers], an environmental group with a growing presence in the communities of the area. His voice joined the flow of words generated in this event, in which poets recited poems about rivers, nature, Costa Rica, the excesses of Capitalism, and everything in between. Some of these poets and performers chanted slogans such as *la muerte de nuestros ríos es organizada* [the death of our rivers is planned] and *atrapar al río es atrapar nuestra sangre* [to catch the rivers is like catching our blood], which captured and piqued the attention of the public in the hall, including me. These slogans reflected the feelings and concerns of numerous people in the communities where a conflict had erupted over the damming of several rivers in the area. Certain aspects of this conflict are the focus of this dissertation.

**Figure 2: Luís addressing the audience in the *Un Río de Palabras* Festival held in San Isidro de El General, Pérez Zeledón, in 2014.**

At the center of this controversy are the plans to use various rivers to generate electricity. Throughout the last three decades, national and international private energy companies have created 60 plans to build run-of-the-river hydropower plants in Costa Rica, especially in the southwestern Pacific side of the country. These power plants create electricity facilitated by Costa Rica's mountainous terrain, which produces a marked angular gradient

between a river's source and its mouth, allowing the water to reach high speeds. In order to make these power plants function, a pipeline or canal diverts the flow of the river to an alternative path that delivers water to turbines that generate electricity without storing large quantities of water.

Together with large dams that store water behind it (usually known as impoundment facilities, like the Lake Arenal Dam, or the Lake Cachí Dam in Costa Rica), the river plants (with no reservoir), known in this dissertation with the technical term "run-of-the-river dams", represent a key source of electricity for Costa Rica. In total, hydropower accounts for about three-fourths of the country's electricity. Costa Rica ranks eleventh in the world for the percentage of its electricity produced from hydropower sources (World Bank, 2014), and, as I try to show below, this has come at very heavy price for some of the communities adjacent to the dams.

Despite the fact that this kind of infrastructure diverts but do not store water from rivers, I prefer to use the standard technical term "run-of-the-river dam" to refer to them because the term *represa* [dam] in Spanish is vastly used in the context of this conflict. In addition, the term run-of-the-river dam is widely accepted in the professional water sector (sometimes as "run-of-river dams" as well).

The recent plans for building run-of-the-river dams have sparked conflicts in different parts of the country. Such conflicts vary in intensity depending on each construction site. This is because each site is situated in territories with different social characteristics, which include differences, for example, in the level of protest organization in the different communities affected by run-of-the-river dams, and differences in the number of contacts made by local communities and environmental movements.

On the surface, this controversy is about the conflict between proponents and opponents of the hydropower plants. While private energy companies are the leading voice of the proponents of dams, the opponents include, among others, a variety of local communities, sub-communities often supported by environmental organizations, groups of activist students,

and agricultural unions. If we look more closely at this controversy, nevertheless, we find that it is more than a mere dispute between two parties with different interests. In light of increasing extractivism and the depletion of natural resources in Latin America (Gudynas, 2010), at stake in this controversy are, among other things, knowledge claims and practices (acts-of-knowing) articulated in Environmental Impact Assessment (EIA) processes, and contested within local communities in what I call "water worlds" (following Barnes & Alatout, 2012). I use the term water worlds both to transcend the limits of a human-focused notion of communities, and refer to the mutually sustaining confluence of relations between the materiality of water, human and non-human living beings, and acts-of-knowing, including their corresponding socioenvironmental imaginaries in particular physical territories and river water areas.

My goal in this dissertation is to elucidate acts-of-knowing that emerge in water worlds of the southern Pacific side of Costa Rica. In doing so, I want to show the underlying socioenvironmental imaginaries that underpin such acts-of-knowing, so that I can reflect on the specific ontological and epistemic conditions in which the sustainable development approach is implemented in the country, especially, through the Environmental Impact Assessment (EIA) process.

Following Freire (in Horton & Freire, 1990, pp. 101, 193), the term of acts-of-knowing implies a vision of knowledge claims and practices, which can take many forms and are "always in the process of being" in a dynamic and flexible way (Freire 2000, p. 31). This notion of acts-of-knowing can be related to the distinction made by the sociologist Andrew Abbott (2017), who distinguishes between objects, subjects, results, and activities of knowing and the more rigid sense of "content of knowledge". An act involves a process rather than a product, even though a process may become robust enough to become published or institutionalized in any form. But then again, as I will show later in this dissertation, knowledge products (text documents, art, and so on) typically become part of larger processes of knowing. Thus, I prefer to use acts-of-knowing as an umbrella term to refer to more general underlying processes of knowing rather than the more concrete and stagnant notion of knowledge. That said, I still use

the word knowledge in a traditional way in some instances throughout this dissertation to refer to things, for example, that are known or published.

The controversy over the run-of-the-river dams is mediated by diverse acts-of-knowing and being. These include environmental impact evaluations, local community gatherings where people discuss and challenge such evaluations, farmers who monitor the birds in their surroundings, and groups of Costa Rican undergraduate students doing research on behalf of people in the communities, to name but a few examples. These acts-of-knowing are not ontologically neutral. Rather, they project particular visions of knowers and the known, endorsing particular conceptualizations, relationships between human and non-human worlds, stories, and images of certain socionatures at the expense of others, all according to a series of dynamically evolving imaginaries. These are the focus of this study.

My central theoretical framework is the concept of imaginaries. This concept is becoming increasingly important, and is used in several areas of research such as tourism (Salazar, 2012); migration studies (Burns 2013); urban studies (Çinar and Bender Ed., 2007); queer studies (Tongson, 2011); media studies (Yar, 2014); and African-American studies (Lubin, 2014). As Adams et al. (2015) point out, such an increase in the use of the concept of imaginaries makes it a field of study by itself. However, while there is little doubt that the concept is becoming more popular for scholars in different fields, the concept by itself and its theoretical implications, I argue, can be too broad and vague to be meaningful without reference to specific bodies of academic knowledge and particular locales. In this dissertation, thus, first, I focus on the concepts of imaginaries as often used in the fields of study of Science & Technology Studies (STS) and political ecology. And second, I locate these concepts in particular socioecological and technoscientific fieldwork sites in which I conducted my research, where acts-of-knowing take place (see Appendix B).

The next section presents the background of this study in the broader context of Latin America and the subject areas related to it.

## 1.1 Background of the Problem

This study is a localised response to broader socioenvironmental challenges in Latin America. In light of what Burawoy calls a "third wave of marketization" (2007, p. 356), the pressure on natural resources is increasing globally, and especially in Latin America, where this trend is both more prominent and virulent than in many other regions in the world. This is readily apparent from two examples.

First, the Environmental Justice Atlas (EJAtlas) is an online collaborative effort to systematically identify, document and catalogue environmental conflicts around the world (Temper et al., 2015). The types of environmental conflicts of the catalogue relate to mining, fossil fuel industries, waste management, deforestation, and water management, among others. The EJAtlas is a response to "the need for global scrutiny of socio-environmental conflicts" (p. 261). In January 2019, the catalogue included 2693 "social conflicts around environmental issues" in the world, with almost a third of them, 794, corresponding to conflicts in Latin America. This includes the countries in "Meso America, South America and the Caribbean" according to the terminology of the EJAtlas. The degree of conflict varies from site-to-site, but in some cases, the costs of these conflicts are as high as direct physical damage to people, as I show in the following lines.

Second, South America is the deadliest continent when it comes to killings linked to environmental disputes. According to the Global Witness report, called *On Dangerous Ground* (2016), 185 people were killed for protecting land and territories in 2015 in the world, and among them, two-thirds of these killings occurred in Latin America. As the report shows, indigenous populations are overrepresented among people killed defending the environment both in Latin America and across the world. In 2015, indigenous peoples accounted for 40% of the total deaths among those killed due to environmental activism in the world (Global Witness, 2016).

These conflicts in Latin America are occurring over an increasingly inequitable land distribution. Despite Latin America having increased the percentage of terrestrial protected

areas from 8.8% in 1990 to 23.5% in 2018 (World Bank, 2019), the proliferation of *espacios basura* [wasted spaces] is turning into a major issue, as Alejandro Mantilla points out in his book *Estas Locomotoras necesitan Frenos: entre los Espacios Basura y el Mandato Popular* (2012). Alejandro defines *espacios basura* as areas that corporations exploit for several decades, especially by mining, industrial agriculture, and hydropower generation companies, and then they abandon these, leaving a series of losses and displacements often for several generations.

Byrne et al. (2002) persuasively argue that socioenvironmental conflicts are "symptomatic of systemic tendencies of globalization" and have "deep historical roots" (p. 8) in connection with poverty and inequality issues that have affected the region for centuries in the context of a "social ecology of colonization" (see Roberts & Thanos, 2003, pp. 6-12). Very often, these conflicts reflect dilemmas tied to fluctuating models of governance in Latin America, which are situated on a spectrum between the state, the market and the local, whose interests are difficult to reconcile with each other (see Castro et al., 2016). As many argue, these challenges, and the related conflicts arising need to be explicitly addressed because presently they are as pressing as ever in all the Latin America region (see e.g. Baud et al., 2011).

Costa Rica is no exception in the region and environmental disputes are on the rise too. For example, according to the *Estado de la Nación* report (Programa Estado de la Nación en Desarrollo Humano Sostenible, 2014, pp. 61-62), especially over the last decade, disputes involving the environment as the main issue are more frequent now compared to the past. The trend of environmental disputes is increasing in proportion to disputes with socio-economic focus, although, of course, here definitional demarcations between environmental and socio-economic issues may be controversial, given their many hybrid connections with each other.

Disputes occur under the umbrella of the sustainable development agenda in the country. The definition of sustainable development is often shaped by the logic of economics in Costa Rica, as well as elsewhere in the world. According to the Brundtland Commission Report, *Our Common Future*, of 1987, the goal of sustainable development is to "meet the needs of the present without compromising the ability of future generations to meet their own

needs" (p. 43). Although not without controversy, this report was key to the worldwide acceptability of this model in a context of increasing globalisation. For some, its archetypal aim is to transform nature into capital, what McAfee (1999), for example, calls "green developmentalism". For Aseniero (1985), "developmentalism" involves the endorsement of a Eurocentric perspective of development based on economic growth and the presumed benefits of capitalism to solve problems, regardless of context. Development in such term is "modernity on a planetary scale", as Peet and Watts point out (1996, p. 19).

Rooted in this vision of development as modernity´s expansion into "peripheries" (Harding, 2008), is the promise that universal science (and associated technological fixes) will be able to control and predict nature from a culturally neutral standpoint. This imaginary provides science with an exceptional character in society. For Harding, exceptionalism in this sense entails the modern assumption that only science has "the resources to escape the universal human tendency to project onto nature cultural assumptions, fears, and desires" (p. 4). These assumptions give science a privileged status in hierarchies of knowledge, which is not without consequences in epistemological and ontological terms. This scientific exceptionalism connects with developmentalism. For Kothari (et al., 2019), developmentalism involves the modern assumption that science and technology are "social panaceas", which marginalize "´other´ knowledge" (p. 27). Modernity, as Arturo Escobar (2010) astutely puts it, "is not only about the suppression of subaltern knowledges, but about the veritable suppression of other worlds*"* (p. 100).

This imaginary of modernity is related to the notion of "rational mastery" in the works of Cornelius Castoriadis. For Castoriadis, rational mastery represents the defining framework for modernity, which links the indefinite expansion of capital as end in itself to the "objectifiable" and "impersonal" immanence of technoscience in modern societies (1991, pp. 272-273). Focusing on the meanings of the parts of the term "rational mastery", it is worth stressing that, firstly, the act of mastering involves the dominion of capital not only over resources, but also over communities and their ways of living. Secondly, for Castoriadis, to be "rational", under a modern imaginary, is to be "impersonal (nonindividual)" and "inhuman

(objective)" (p. 246), suggesting the lack of self-reflection that has enabled a supposed neutral science to serve the purposes of capital expansion. Castoriadis emphasizes the need to rebalance this trend by posing questions that both challenge the own existence of science and expose its own limitations. This linkage of the "rational" and the "mastery" projects of modernity is relevant to this dissertation, as it focuses on STS (specifically the study of acts-of-knowing including science) and political ecology (study of relations between environmental issues and socio-political processes) respectively.

Costa Rica adopted a model of sustainable development in the 1980s in the context of the substantial debts that the country owed to international institutions and the subsequent introduction of debt-for-nature swaps (see Isla, 2015). A debt-for-nature swap is an "agreement that reduces a developing country's debt stock or service in exchange for a commitment to protect nature from the debtor-government." (UNDP, 2017, p. 1).

Costa Rica is not just one more Latin America country adopting this model of environmental governance, but rather, as widely accepted, Costa Rica serves as a leading example in the world in developing what some optimistically have called a "green growth success story" (Granoff et al., 2015, p. 10). The implementation of sustainable development in Costa Rica has given rise to a large body of research that assumes the legitimacy of compensatory mechanisms and technological fixes that this model includes, including the payments for environmental services (PES). PES are incentives provided to land owners, like ranchers and farmers, so that they consider the protection of ecosystems, when performing their work. In general, the goal of this research is often to find ways to assess and improve the efficiency of the sustainable development approach in the country (e.g. Pagiola, 2008; Sierra & Russman, 2006; Porras et al., 2013; Berbés-Blázquez, 2012). As Castro et al. (2016) note in the context of Latin America, this scholarship "fits well into the institutional ethos of a technocratic state apparatus, which tends to rely on blueprint institutional designs" (p. 10). In this case, broadly speaking, these designs involve putting a price on nature. This way of scholarship about compensatory mechanisms and technological fixes justifies both market-based mechanisms for

nature conservation and the unproblematic role of science and technology in shaping the sustainable development agenda of the country.

However, there is an increasing body of research that indicates that sustainable development, in conjunction with its related socioeconomic reforms, has led to a series of social problems in Costa Rica, such as the reinforcement of existing class structures (Matulis, 2013), as well as gender (Isla, 2015), economic (Matulis, 2016) and geographic inequalities (Herrera-Rodríguez, 2013). In addition, for example, Galt (2014) points out that this model has contributed to make Costa Rica the "world's most pesticide intensive" country in the world (p. 5), which has had enormous consequences for the health and wealth of Costa Rican workers, farm families and the ecologies of which they are a part (see e.g. Wesseling et al., 1999). This body of research, which has focused on the dilemmas and contradictions of the sustainable development approach in Costa Rica, is in line with critics of developmentalism and modernism in Latin America (see e.g. Escobar, 1995/2012; Gudynas, 2010).

### 1.2 Gap of Knowledge and Problem to Be Addressed

There is, nevertheless, an important aspect that remains largely unexplored within the sustainable development model in Costa Rica, namely the role of knowledge in sustaining the agenda of this model and the implications of it. Yet there are some valuable exceptions. First, in his article on the planning process of the Hydroelectrical Project El Diquís in Costa Rica, Campregher (2010) traces the interactions between workers, indigenous activists and researchers using an Actor-Network Theory perspective. And second, Isla (2015) draws our attention to the Canada-Costa Rica debt-for-nature swap programs through a case study in the Arenal-Tilaran Conservation Area. Isla comes to the conclusion that the debt-for-nature swap program has been detrimental to local communities in that area of Costa Rica. Among the harmful effects of the debt-for-nature swap program is the dispossession of knowledge generated by Costa Rican rural communities resulted from the global commercialization of knowledge through bioprospecting (and, similarly, see also Nygren 1998; Evans 1999).

Apart from these works, there is little research that looks at the way that scientific and non-scientific ways of knowing are involved and implicated in socioenvironmental controversies in Costa Rica in light of sustainable development. This is critical because a central aspect of the sustainable development approach is the production of (scientific) knowledge for assessing the requirements of sustainability. This demand of scientific knowledge has given rise to "unprecedented calls on expertise" (Yearley, 2005, p. 191) to demarcate the limits of a sustainable society from a supposed neutral standpoint. In Costa Rica, the Technical Secretariat of the Environment (SETENA) is the agency that has the power in deciding what acts-of-knowing are appropriate. SETENA also has the authority to determine if the projects are environmentally viable, based on Environmental Impact Assessment processes. Hired and paid by the hydroelectric companies, professionals from several disciplines conduct the assessments of projects, whose impacts may potentially affect the environment.

As a great deal of research in STS has shown in other contexts, what we can know about nature and how we come to know is far from being self-evident. Scientific (and other ways of) knowing, technology and innovation are never innocent (Hacking, 1999), objective (Porter, 1995), apolitical (Wynne, 2010), or value-free (Bronson, 2018). Fact-finding is not isolated from social and cultural norms and expectations. Rather, science co-produces knowledge in line with worlds that carry concrete social representations, identities, discourses, and institutions (Jasanoff, 2004, 2010). These instances of co-production enact and are enacted in relation to ways of collective imagining socio-natural worlds. As Wynne puts it, "prevailing scientific knowledge already carries tacit imaginations of human and social actors and capacities, and also (usually by default, without deliberate intent) imposes 'the' public meaning on the situation and its actors" (Wynne, 2010, p. 300). In this dissertation, I refer to these "imaginations of human and social actors" as imaginaries in a more collective sense, following Castoriadis. For Castoriadis, the social imaginary involves "the creation of significations and the creation of the images and figures that support these significations" (1975/2005, p. 238). Following this theoretical approach, the assumption is that such imaginaries are a constitutive part of (scientific and non-scientific) acts-of-knowing, which are articulated in a "multiplicity of organized pedagogical forms" (Giroux, 2011, p. 28). Such imaginaries are "endowed with

meaning, generating certain ways of seeing the self and its possibilities in the world" (Giroux, 2011, p. 28).

There is, thus, a need for more studies to elucidate how different actors articulate acts-of-knowing nature as particular imaginaries within the context of Costa Rica, where studies of this kind are scarce, despite the pivotal role of the country in the international agenda of sustainable development. My work explores this gap through a detailed elucidation of the imaginaries embedded in, and shaped by, localised and contextualised acts-of-knowing in relation to human and non-human living beings. In doing so, this dissertation adds to growing literature on sociotechnical imaginaries in STS and environmental imaginaries in political ecology (reviewed further in Chapter 2).

In addition, I engage with the literature on imaginaries in Costa Rica. There is a strong tradition in the study of imaginaries among Spanish-speaking academic authors, and Costa Rica is no exception in this regard. Previous work on imaginaries in Costa Rica has been prolific but limited to topics such as national (see e.g. Güendel, 2009; Camacho, 2012), regional (see e.g. Castillo, 2008), tourist (see e.g. Janoschka, 2011), and racial imaginaries (see e.g. Rodríguez, 2016). Nevertheless, despite their importance, imaginaries in relation to acts-of-knowing and the environment under the umbrella of sustainable development in Costa Rica, such as the ones I propose in this dissertation, have not been dealt with in-depth. Campbell (2002) is perhaps an exception, which studies narratives of wildlife conservation in Costa Rica.

My dissertation builds on recent converging developments in the fields of STS and political ecology. There has been growing interest in connecting literature in STS and political ecology over the last few years. For example, *Knowing nature* (Goldman & Turner, 2011) attempts to recognise ways in which debates about issues of justice and decision-making about natural resources relate to a variety of (scientific and non-scientific) knowledge claims. This move seeks to provide political ecology with appropriate tools to study the role of science, for example, in environmental controversies. As Forsyth notes, the integration of STS into political ecology aims at paying "reflexive attention of science to the political uses to which it may be put" (2003, p. 21). For political ecology, this implies problematizations of distinctions between

production, circulation and application of knowledge through discussions with STS (see Lave, 2012). Furthermore, there is need in STS to deal with a variety of sites of study out of scientific laboratories, a move which some have described as "research in the wilds" (see Callon & Rabeharisoa, 2003). This directs STS to pay more attention to issues of socioenvironmental justice, especially in, what are erroneously referred to as, developing countries.

### 1.3 Significance of a Post-mode of Attention

Although I do not believe that this dissertation is the last word on any of the discussed topics, I invite readers to view it as contributing to ongoing debates on issues that transcend the focus of a specific case study. In general terms, these issues include the absence of the social and interpretive sciences in framing environmental issues; the modest receptiveness of the social sciences to deal with environmental issues; the need to incorporate southern voices to challenge the academic debates that inform this work; and the increasing effort to establish a more activist-based agenda for STS. In such terms, this work aims to offer a post-perspective; a postpositivist, postexceptionalist, postcolonial, and postchurched mode of attending to the challenges of Costa Rica involving issues of environmental knowledge. However, I am perfectly conscious that these "post" academic labels are complex and contested, opening up more questions than final and conclusive answers. Certainly, it would be over-ambitious to claim that I have transcended well-rooted academic labels. In any case, in this dissertation, these labels and counter-labels represent dilemmas that the completion of this work has grappled with, and need further reflection. Below, I reflect on each of these four labels separately, though at times they blend together during the dissertation process.

#### *1.3.1 Postpositivist Modes of Attention*

In his well-known book *Risk Society* (1992), Ulrich Beck eloquently warns of the consequences of the development of narrow scientific agendas in response to major risks. Beck observes that "[the debate] on the destruction of nature and the environment in general, is still being conducted exclusively or dominantly in the terms and formulas of natural science. It

remains unrecognized that a social, cultural and political meaning is inherent in such scientific 'immiseration formulas'" (p. 24). Three decades later, this seems as pertinent as ever.

As some authors show (Pelling, 2001; National Research Council, 2005; Hanningan, 2006; Yearley, 2009), most studies on the environment have been carried out in a small number of scientific areas. The social sciences, except perhaps for economics, are often marginal to mainstream environmental concerns, and transdisciplinary approaches are often more wishful than realistic (see Klenk & Meehan, 2015).

The legacy of this hierarchy of disciplines has tangible consequences, as some have noted from normative perspectives. For example, Blaikie and Brookfied (1987) claim that one major drawback of measures to establish soil loss is that they miss social aspects of the environment that are key to understand natural dynamics. Similarly, Forsyth's research (2003) shows that lack of acknowledgement of the social in framing environmental issues undermines the proper understanding of biophysical processes. Furthermore, Urry (2011) points out that the dominance of physical sciences and economics in environmental issues, in this case in climate change, undermines the possibility of transitioning to a post-carbon energy society.

Costa Rica is no exception to this trend. Dominant analyses tend to ignore social sciences in environmental debates. An analysis of database data on scientific publications confirms the prominence of physical sciences framing research on the Costa Rican environment. The Web of Science[1] and SCOPUS[2] are good illustrations of this point. After selecting the key words "Costa Rica" and "Environment" and searching on the Web of Science platform, it shows that the physical sciences have the highest proportion of associate articles. The top ten disciplines that appear in the search results belong to the physical sciences. In relative terms, counting anthropology, sociology, and urban studies together (the social sciences), they yield a 3% of the published studies. Surprisingly (or not) business economics

[1] Web of Science. I searched for: TOPIC: (Costa Rica) AND TOPIC: (environment). Timespan: All years. Indexes: SCI-EXPANDED, SSCI, A&HCI. 1/15/2016

[2] SCOPUS. I searched for: TITLE-ABS-KEY ( Costa Rica ) AND KEY ( environment ) AND SUBJAREA (mult OR agri OR bioc OR immu OR neur OR phar OR mult OR ceng OR CHEM OR comp OR eart OR ener OR engi OR envi OR mate OR math OR phys OR mult OR arts OR busi OR deci OR econ OR psyc OR soci). Timespan: 1976-2016. 1/15/2016

has a higher percentage of papers than any other of the three mentioned social science disciplines. Similarly, SCOPUS shows that just over 6% of articles about "Costa Rica" and the "Environment" belong to the social sciences compared to the 69% of agricultural and biological sciences, environmental science, and earth and planetary sciences.

### *1.3.2 Postexcepcionalist Modes of Attention*

Parallel to the previously mentioned precarious roles played by the social sciences in framing environmental issues, several authors argue that the social sciences, and more concretely sociology, have actively contributed to the isolation of nature from society. For example, according to Martell (1994) and White et al. (2015), this attitude towards the natural environment goes back to the origins of sociology and the need by the founders (e.g. Durkheim) to find an identity for the new emerging discipline separated from other areas of study such as psychology and the natural sciences.

For Steve Fuller (2011), there is a socio-historical component to the strict demarcation between the social and natural sciences. The long shadow cast by Eugenics and the race-based murdering in the Second World War was still vivid in the second half of the past century. So, the study of human societies from a standpoint of biology became a taboo topic after the WWII. A landmark document is *The Race Question* (1950) by UNESCO in which the focus of the natural sciences is limited to life in general and a clear boundary is established between the natural and the social.

Catton and Dunlap (1978) call this condition the Human Exceptionalism Paradigm in sociology. To remedy this, they offer the New Ecological Paradigm as a way to create a more ecological sense of sociology by highlighting the relevance of the interactions between nature and society (Dunlap, 2002). However, as Hanningan (2006) has pointed out, although this is a relevant subfield within environmental sociology, the impact of this approach outside the discipline has been somewhat contained.

There are other approaches, apart from environmental sociology, that have challenged the autonomy of the social to provide an account of the social itself. For example, among others,

there is the well-known Actor-Network Theory (Latour, 1987, 1999; Law & Hassard, 1990), and its "weaker" versions (see Castree, 2002); notions of ecological regimes that include biophysical elements as an active element in relation to society (see Baercholer & Burger, 2010; Lachmund 2013); the term of "social metabolism" based on flows (see Fischer-Kowalski & Hüttler 1999); and the environmental imaginaries of liberation ecologies (Peet & Watts, 1996), on which I will elaborate later.

### *1.3.3 Postcolonial Modes of Attention*

Despite the increasing interest in technoscientific and environmental issues in Latin America as a subject of STS research, the majority of this research still continues to be conducted on topics related to the English-speaking countries in North America and western Europe (see state-of-the-art of Latin America STS in Anderson, 2002; Harding, 2016). The development of STS research communities in Latin America dealing with Latin-American issues is expanding rapidly, but as Kreimer (2007) argues, this is still insufficient to provide insight to the multiple socioenvironmental problems that these countries face (p. 5). This is especially problematic as these issues, which plague the entire world, are especially experienced in Latin America (Raftopoulos, 2017), and, despite some studies, it seems likely that these socioenvironmental problems generally remain without critical empirical scrutiny. I admit, I was astonished at the quantity of socioenvironmental conflicts I came to know while I was doing fieldwork in Costa Rica. For example, in March 2014, the protest, which I attended, against the dams in San José coincided with another march against the *pesca de arrastre* [bottom trawling] (Figure 3).


**Figure 3: A young protester during the march against the impact of bottom trawling over Costa Rican Marine Ecosystems. March, 2014.**

This dissertation hopes to make more visible environmental and technoscientific issues in Costa Rica and more broadly, Latin America. I am sensitive to problems that this may in turn foster, as some Latin-American authors have argued. For example, in his discussion of the status of the "social study of science" in Latin America in the 80s, Vessuri (1987) challenges the uncritical use of concepts from different (northern) contexts. Similarly, other authors are critical of the tendency to take STS research done in the North as a model in the South (see e.g. López & Verdadero, 2003; Rajão et. al, 2014). This is in line with Harding (2008), who urges to "move beyond inclusion" (p. 144) to open spaces of conceptual analysis, which interrogate theoretical assumptions. I do not want to overstate the "otherness" of Latin America from the rest of the world, but as any readers may see for themselves, STS is a predominately-western enterprise, which emerged in very different institutional and political landscapes than ones found in Latin America. For López and Verdadero (2003), this difference involves "a kind of asymmetry present in STS studies", which results in a situation in which less "attention" and "respect" is paid to scholars in the "South" compared to those in the "North" (p. 155).

So, in addition to making visible a socio-environmental controversy in Latin America, the findings of this study seek to contribute to open what Harding (2008) calls "pluricentric global dialogues" (p. 5). However, I am aware of the difficulties of such endeavour, especially when it comes to, for example, comparing the suitability of concepts developed in the North - which are the ones I am more familiar with - with already local epistemologies that I have found during my fieldwork. This would mean to end the "general cultural hegemony", in Vessuri's terms (1987, p. 547), and propose more balanced, more equitable accounts.

### *1.3.4 Postchurched Modes of Attention*

Some authors argue that STS has been divided into two orientations, one more scholarly oriented and the other more politically engaged and closer to social and environmental justice movements. Drawing parallelisms with religious institutions, Steve Fuller (1997) has called the former, the High Church, and the latter, the Low Church. Despite this division, according to Sismondo (2009), these two trends are becoming increasingly complementary to each other, moving STS to a more convergent approach that combines elements of both orientations. It is this approach that I call, metaphorically, a postchurched mode of attention, that is, an approach both theoretically informed and scholarly oriented, which also aims at achieving greater justice.

Similarly, David Hess (2001) suggests that a second generation of STS is replacing the notion of constructivism with the idea of intervention in the fieldwork. As Hess notes, "To restrict the ethnographer's voice to one of social scientific explanation or humanistic interpretation represents a failure of nerve when confronted with the prospect of intervention" (p. 13). However, these shifts to a more socially/environmentally engaged STS do not mean that this second generation of scholars has given up the idea of social constructivism. Instead, constructivism has become the starting point from which to analyze society, rather than the conclusion of the research work. In other words, for this increasing new generation of scholars in the field of STS, the main question is not whether socially constructed things are real or not (now we often assume they are), but rather whether these things can be changed, or improved, because they are socially constructed (see Hacking 1999; Fuller 2014).

A postchurched perspective reinforces these trends in STS and other related fields that call for research that sees the understanding of social processes as an opportunity to not only increase knowledge of the discipline, but to collaboratively grapple with social issues in a spirit of intervention and activism (see Alsop & Bencze, 2014). The legitimation of this postchurched perspective, nevertheless, is not only provided by this socio-historical context and the way my work fits into these trends, but also by the theoretical framework of this dissertation based on Cornelius Castoriadis.

In sum, my approach aims at overcoming inherent reductionisms of positivist, "humans as exception", colonial and neutral research agendas. However, in doing so, I found my own limitations in trying to overcome such traditional labels placed on the social sciences. Rather than celebrating the coming of a post-like world, I like to think about these labels as dynamic, messy and contradictory territories in epistemological and ontological terms. While aiming at moving from traditional labels to post labels, new challenges emerge. As the Italian philosopher, Rosi Braidotti (2015), eloquently pointed out in a keynote lecture speech, "[we cannot] imagine that any jump over the human (from traditional labels to post labels) is immediately and intrinsically liberatory, and to be posthuman does not mean that you are post-power, post-class, post-gender, and post-violence". So, by placing my work within these larger discussions is a way to raise more questions rather than to provide final and rigid answers. In the last chapter of this dissertation, I will reflect on the challenges and dilemmas that I encountered while situating this work between the two poles of each one of the aforementioned discussions that appeal to this research.

### 1.4 Primary Research Questions

The main questions of this dissertation are:

- What are dominant imaginaries associated with acts-of-knowing during controversy over run-of-the-river dams in southern Costa Rica?
- When, where and how are these imaginaries evident? What are their agencies? What are their associated politics of knowing, legitimisations and authorities?

In my attempt to address these questions, I focus on three different aspects: (1) the instituted and instituting imaginaries of knowers and the known surrounding an Environmental Impact Study (EIS) document (Chapter 4); (2) imaginaries related to water and rivers (Chapter 5); (3) and imaginaries in light of multispecies encounters (Chapter 6).

Drawing from Cornelius Castoriadis´ theoretical perspective on autonomy and self-limitation, the second goal of my dissertation is to elucidate the main political implications of such imaginaries in Costa Rica. This means to present further ideas for developing acts-of-knowing that might serve fruitful ways of collective emancipatory mobilisations in the location of my research, the country, and possibly elsewhere.

### 1.5 Theoretical Framework

The theoretical framework of this work is based on two philosophical moves: first, shifting broadly from positivist epistemologies to more situated, phenomenological philosophies and sensibilities. Second, shifting from phenomenological sensibilities, to more post-phenomenological sensibilities with posthumanist consequences. First, phenomenologists since Edmund Husserl have critically examined the way that the "positivistic reduction" (Husserl 1970 [1936], p. 5) of science leads to a "loss of its meaning for life" (p. ix), which results in a detachment of the world from experience in epistemological terms. To overcome this, Husserl attempted to recover experience for a phenomenological science, which would result in a contemplation of the world as an "actually existing world" (p. 337). That is to say, a world which is not isolated from experience but based on it.

Second, this work is sympathetic with further variations of phenomenology, and specifically, with those approaches that often go under the name of postphenomenology. In general terms, postphenomenology involves an extension (not an absence or denial) of phenomenology. According to Don Ihde (2009; 2012), postphenomenology pays attention to experience but not to an experience exclusively grounded on mere subjectivism, but rather based on a notion of interrelationality not only among human beings but also between human beings and the biophysical environment.

Nevertheless, despite the enormous influence of Ihde on postphenomenology, and despite the fact that I follow some of his basic principles, this work remains more closely focused on Cornelius Castoriadis. Whereas Ihde is mainly devoted to the study of human and technology embodied relations, Castoriadis provides a conceptual basis for elucidating socionatures based on a relational understanding of self-creating beings that problematizes the divide between nature and society. As Suzi Adams notes (2008), this involves a phenomenology of "vertical life", that is to say, a poly-regional ontology that acknowledges different modes of being "as heterogeneous and irregularly stratified" (p. 388). This means taking into account subjects and their experiences not in isolation, but in their interactions with other horizons of meaning according to their own worlds, "eigenwelt", that social individuals, institutions and non-human beings alike create. In short, this move presupposes focusing on a transsubjective and relational, instead of a subjective view of the world.

Moreover, Castoriadis work with his early project of autonomy, and his later move towards ecological self-limitation, has a normative aspect. This allows me to provide a normative dimension to this work that emphasizes the need to reimagine the acts-of-knowing, which are so often cast to the shadows within state practices and policy formations. Castoriadis´ work distinguishes between heteronomous and autonomous forms of society. Whereas heteronomous ones refer to societies which take meanings for granted without putting into practice exercises of self-reflection, the latter, autonomous forms, are connected with self-reflecting mechanisms that put into question their own foundations, and as a consequence can lead to further emancipation. In engaging with Castoriadis´ critique, this thesis links his normative dimensions to STS and political ecology, as I will show later. However, normativity does not mean that I have a privileged perspective on the issues of this dissertation, or that I seek to claim universal appeal. As Tovar-Restrepo writes (2012), "characteristics of the principle of autonomy in Castoriadis allow us to pose the normative question in a different terrain that does not imply transcendental figures, ethnocentric universalisms, or other modernist traps" (p. 130).

## 1.6 An Engaged and Postphenomenological Mode of Inquiry

My study is empirical, embracing my own participation in different settings such as, community halls, street demonstrations, *campesinos*' meetings, and Costa Rican talk radio shows on the environment, among others. As Scott et al. (1990) have pointed out in their study about scientific controversies, a position of research neutrality in conflict situations is difficult to implement, given the partisan nature of many conflicts. Furthermore, it was not my intention to be a mere observer of the situation. In these spaces, I not only gathered, but also generated data as an active subject that sought influence over the spaces in which I was conducting this research. In the context of the advocacy research adopted in this work, I argue that this engagement is a legitimate and justified way of inquiring, as I will show in Chapter 3.

As stated before, this dissertation represents a move towards an increasing postphenomenological sensitivity in the world. Postphenomenology does not have a fixed methodological framework, as Rosenberger and Verbeek note (2015), "there is no strict postphenomenological methodology that scholars could follow. Postphenomenology comes in just as many flavors as there are scholars in the field" (p. 10). It is for that reason that you might consider this work as a type of "jazz of practice", as played by Corburn (2005). This entails using known research tools, respecting basic methodological rules, but combining them in new unpredictable and creative ways. More concretely, this research project combines different techniques from textual and visual analysis, such as participant observation in dozens of formal and informal meetings in relation to this controversy, collection and collation of dozens of images, and 14 unstructured interviews, among other types of empirical practices. I combine these techniques under the approach of multi-sited ethnography.

Latour offers one of the most famous, influential slogans in science studies: "follow the actors" to where the action is (Latour, 1987). However, who the (human and non-human) actors are and where the action in socioenvironmental controversies actually is, is far from an easy question to answer. Indeed, following the theoretical perspective of this study based on a relational ontology, it is difficult to separate actors into well-defined categories and well-demarcated lands. Therefore, I sought to be sensitive to "critical spaces" where this controversy is unfolding in the water worlds of southern Costa Rica. In all these spaces, I not only meet and

talk with numerous people, but also analyse the complexity of human relations with non-human living beings, and the multiple dynamic mediations that these relations entail, forming ”many worlds in the same place”, using Solnit´s words (2010, p. 5). Yet, despite these potential ontological challenges, below is an attempt to demarcate parameters of the controversy.

### 1.7 Context, Parameters and Main Sites of the Controversy

In the beginning of the 80s, Costa Rica became the first Latin America country to suspend foreign debt payments. Since then, what Isla (2015, p. 57) refers to as “neoliberal policies” have been introduced in the country. This reinforced powers of the International Monetary Fund (IMF), the Inter-American Development Bank, and the World Bank to impose Stabilization and Structural Adjustment Programs (SSAPs), which were adopted by Costa Rican Governments during the 80s and 90s. In broad terms, the goals of the SSAPs were to privatize and open the markets of several sectors to foreign competition (Hidalgo, 1998). In the first place, this had enormous consequences for the organization of agriculture and the rural environment, but it also contributed to the process of openness of the energy sector, as I explain below.

In 1949, the new government of Costa Rica ended the foreign monopoly on energy, operated since 1929 by the North American Electric Bond and Share Company. The state favoured the nationalization of the energy sector to resolve the power outages caused by the poor maintenance of the private power stations (Hidalgo, 1998). In this context, the Costa Rican Institute of Electricity (ICE) was founded to “advance the well-being of the Costa Rican population” (Asamblea Legislativa, Ley 449, 1949) through the supply of public electricity. Energy supply became a matter not only of giving access to electricity for the population, but of national sovereignty for the new emerging Costa Rica after the civil war. Electricity remained within public hands until the nineties. Pressured by the SSAPs, Costa Rica implemented a partial privatization of energy in 1990, when the government passed the Law 7200, which allowed private companies to produce up to 15% of the total national electricity, but only through relatively small sources (up to 20 Megawatts).

Privatization was accompanied by the rapid trade liberalization of energy in what represents an extractivist approach towards development. Extractivism is form of economic accumulation based on extracting natural resources on an industrial scale, which is often accompanied by the liberalization of markets of such resources (see e.g. Raftopoulos, 2017). Extractivism differs from neo-extractivism. The latter is a form of extractivism that has expanded across Latin America in the last years, and is based on the extraction of nature's resources by the state (and not by international corporations) ruled by progressive and left-wing parties.

The implementation of the Mesoamerican Integration and Development Project (MIDP) and The Dominican Republic – Central America Free Trade Agreement (CAFTA) have opened the national market to a model of interstate exchange of energy. The MIDP seeks the integration of several sectors, including the energy sector, between Central America countries and southern Regions of Mexico, Colombia, and the Dominican Republic. On the other hand, CAFTA has operated in Costa Rica since 2009, and it is especially aimed at opening the market of Costa Rica to the North American market. These two agreements potentially turn energy into a good to be distributed across borders through the Central American Electrical Interconnection System (SIEPAC), an infrastructure that interconnects the power sources of six countries: Costa Rica, Panama, Honduras, Nicaragua, El Salvador, and Guatemala.

In addition to the privatization and liberalization of energy, the Clean Development Mechanism (CDM), has opened the door for private investments in hydropower plants in Costa Rica. Costa Rica is committed to carbon neutrality by 2021, and the CDM is one of the mechanisms used by the Kyoto Protocol to reach the goals of reducing the emissions of greenhouse gases. More than that, this mechanism has contributed to enhance the positive reputation of hydropower under the umbrella of sustainable development. Almost a third of CDM projects are focused on hydropower energy (UNEP Risoe, 2017), and in Costa Rica, around 10% of all projects in the last decade have been funded through this mechanism.

The influence of these processes of privatization and liberalization of energy on dozens of Costa Rican rivers is considerable. In the first decade of privatization of energy, from 1990 to 1999, thirty dams were built throughout Costa Rica. Since the 2000s, the number of proposals

to build hydropower plants has peaked dramatically, following speculative scenarios. Firstly, in 2011, the bill of law, known as Law of Electrical Contingency (legislative dossier 18093), was brought before the Legislative Assembly of Costa Rica. This law was called contingent to express future energy needs of the country, despite the fact that the country produces energy surplus to requirements. If this bill had been adopted, the percentage of private providers of electricity would have increased from 15 to 30% in Costa Rica. Though the bill did not go through the Legislative Assembly, private companies wanted to be well positioned in case it had been approved, and therefore, they formulated concrete proposals to build dams to ensure a place in an increasingly private and open-market model of energy. In particular, in February of 2014, a round of concessions were held in Costa Rica and 21 hydroelectric projects applied for the concessions. The result was an unprecedented period of development of projects for dam construction in Costa Rica, especially in the rivers of the south west Pacific side of the country, as I show in the following lines.

Although this work is not contained in a specific geographical location, the area of my fieldwork mainly includes two cantons, Perez Zeledón and Buenos Aires, located on the south west Pacific side of Costa Rica. This is one of the main geographical focal points of the dam controversy. There, private companies have planned the construction of 13 hydropower projects in ten rivers, as of May 2014. This was indeed a changing figure because private companies formulated new proposals for building dams in the area while I was doing this work. The ten adjacent rivers cover an area of approximately 65km in a straight line (see Figure 4) that goes across different districts between La Cordillera de Talamanca, a mountain range that includes both the Chirripó and La Amistad national parks, and the Pacific Ocean.

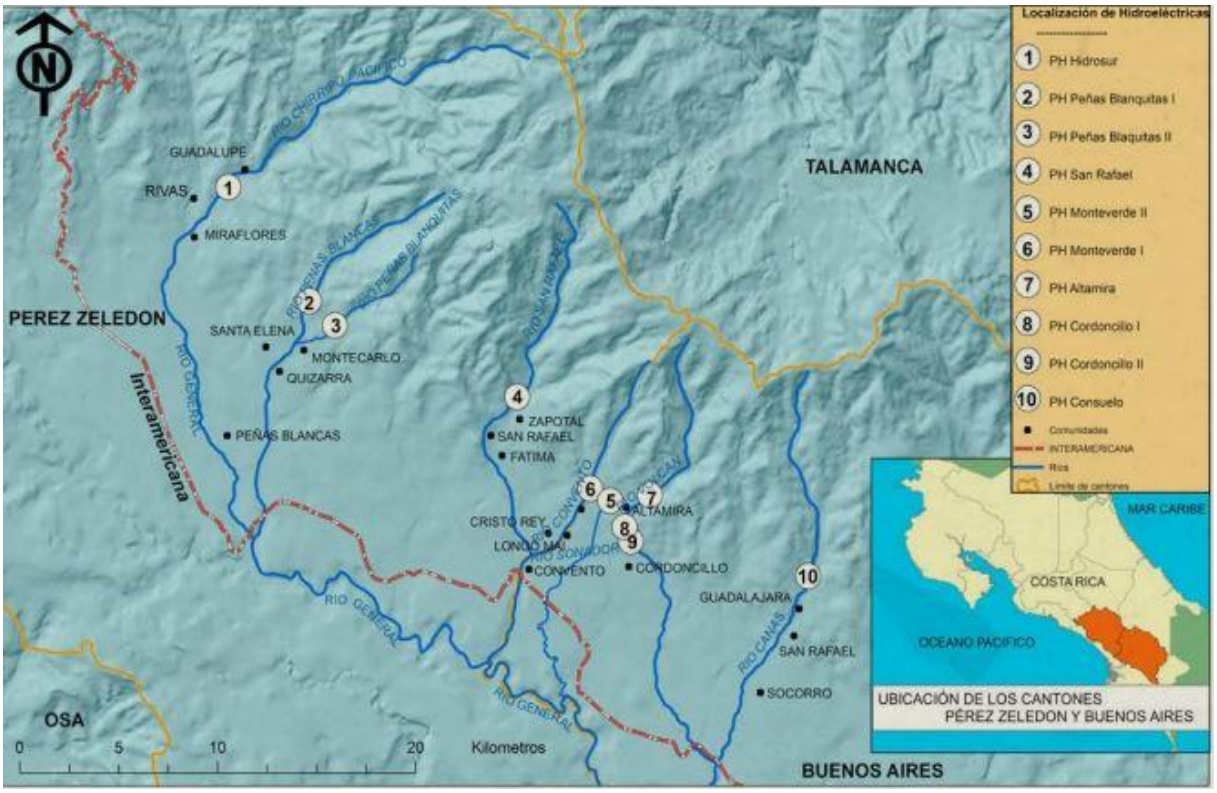



**Figure 4: Private Hydroelectric Projects in the cantons of Pérez Zeledón and Buenos Aires. Marco Espinoza & Dany Villalobos. Unidad de Información Geográfica, Programa de Vinculación Comunal, September 2013, based on Expediente de SETENA y Estadísticas de Generación Privada, Carlos Marín & Jiri Spendlingwimmer, April 2013. Cartographic Map: Atlas Digital, 2008.**

As we will see in the following empirical chapters, in this area there are different sites where the controversy takes place. For example, meetings between farmers and environmental movements (such as *Ríos Vivos*) to prepare the resistance to dams, and dialectical clashes between developers of and opponents to dams in town hall meetings.

In addition, I also spent time in the capital of the country, San José. There I attended some events related to this controversy, including demonstrations against the dams, and a meeting between the Minister of Environment, Energy, and Telecommunications (MINAE) and members of the communities affected by the construction of dams at the Legislative Assembly in 2014.

### 1.8 Overview of the Dissertation

The dissertation unfolds in three parts:

### *1.8.1 PART I: General Debates and Context of the Study*

In **Chapter 2,** I review selected literature about imaginaries in the fields of STS, political ecology and environmental sociology. Specifically, the next chapter will argue that there has recently been a confluence of these bodies of knowledge. In this emerging intellectual space, I explore the concept of imaginaries and propose a different way to understand imaginaries, building on Castoriadis´ postphenomenological and posthumanist ontological commitments.

The overarching goal of **Chapter 3** is to situate the methodological steps I have taken in this study. A central issue addressed here are relationships between the research questions, the qualitative methods and the specific empirical tools that I propose relevant for this study. Moreover, in this chapter I discuss the advocacy research approach I seek to adopt in this dissertation.

### *1.8.2 PART II: Findings and Analysis*

The second part of the thesis is analytical and based on primary and secondary data. In the three chapters of this section, I elucidate different regions where acts-of-knowing are co-created with different imaginaries within situated regions-of-knowing.

The aim of **Chapter 4** is to elucidate imaginaries associated with acts-of-knowing articulated in the engagement of local communities with Environmental Impact Assessment (EIA) in southern Costa Rica. The driving questions of this chapter are: What kinds of social individuals does the EIA articulate in relation to acts-of-knowing? And what tensions and contradictions are present when local communities engage with EIA? To answer these questions, firstly, I use discourse analysis to examine the instituted construction of social individuals present in EIA in their relations to acts-of-knowing. Using this as a context, secondly, I undertake a multi-sited postphenomenological ethnography and identify three main different variations on the way that communities articulate acts-of-knowing. These three variations involve attention to historical perspectives, embodied practices and ways to deal with

knowledge deficits. The variations suggest that the way in which local communities articulate acts-of-knowing does not correspond to the expected position of these communities in the EIA.

The goal of **Chapter 5** is to show imaginaries in relation to water worlds that emerge from acts-of-knowing, including, but not limited to, visual practices. First the chapter provides a review of the ontological assumptions about water and rivers made explicit through the notion of "environmental flow" by the developers of dams. The "environmental flow" is a mathematical expression which refers to the water not diverted from the main river stream to produce energy. In the case of the run-of-the-river dams of southern Costa Rica, developers use 90 per cent of the river, and give 10 per cent of the water flow back to the river to allegedly maintain the flow and the ecosystems. This means that the EIS documents articulate the imaginary of rivers as divisible, determinable by technical calculation, and not affected by the dams. There is, I argue, a symbolic purification of the run-of-the-river dams and their consequences through particular "technologies of representations" (Law & Whitaker, 1987, p. 160) articulated in the EIS documents. In contrast to these "purified" notions of water and rivers, I will show the messy water worlds that emerge from the communities in southern Costa Rica. In these water worlds, rivers are both constitutive of life and enablers of interconnections among and between human and non-human living beings. I will show such imaginaries of rivers as living beings mainly by exploring two sets of images co-created, respectively, in a meeting of neighbors opposed to the dams at Los Cusingos Bird Refugee in March of 2014 and in an environmental youth camp at the Montaña Verde´s eco-hostel in August of the same year. Finally, in the discussion section, I provide reasons for believing that scientific notions, like the one of "environmental flow", fall into the category of a particular "technical arbitrarity" (inspired by the idiom "environmental orthodoxy" by Forsyth, 2003), which is incompatible with the river imaginaries articulated in the communities. Thus, the implementation of "environmental flow" represents an attempt of "ontological occupation" (see Escobar, 2017, p. 67) to dispossess communities of their means and habits of life, which revolve around rivers.

**Chapter 6** is about relations between human and non-human animals in intimate and everyday encounters within water worlds. Concretely, it is about the presence and the absence

of animals in different situations related to acts-of-knowing. The chapter illustrates how this hydroelectric controversy is not merely a human and social controversy, but rather a multispecies controversy in which, "multispecies encounters" (Haraway, 2008) play a role in the way that acts-of-knowing and imaginaries are interconnected. As I will show, representations of non-human animals in Costa Rica emerge as a result of the creation of biodiversity classifications, where the life sciences play an important role. However, non-human species are not just passive elements of the controversy, or a simple form of representation, but rather, following Castoriadis, they create a world for themselves (a self-referential world) to which members of the communities often orient their acts-of-knowing. This chapter is an account of these unique encounters in which human and non-human living beings cross boundaries by sharing not only spaces but also affective states of being within water worlds.

*1.8.3 PART III: Conclusions, Recommendation of this Study, and Future Work*

**Chapter 7** reports the conclusions and recommendations of this study from a normative perspective. Although the topic areas and methods in each chapter varies, the use of Castoriadis´ concept of autonomy in the context of this work gives me ways to reimagine when, where and how knowledge, nature and society are bound up together in Costa Rica. In addition, this chapter also discusses the future work arising from this study, which points to the need to reconceptualise taking-for-granted notions in sustainable development, which incorporate new frameworks of studying complexities of water worlds in more-than-human communities through the concept of imaginaries.

Overall, this dissertation aims at elucidating imaginaries that shape acts-of-knowing in light of a specifically, contemporary socioenvironmental controversy in Costa Rica. In doing so, I fill a gap in existing research that can be observed in Costa Rica with respect to the study of imaginaries about acts-of-knowing in the context of sustainable development. In addition, this dissertation reviews the literature on sociotechnical and environmental imaginaries and elucidates points of confluence between both literatures using Cornelius Castoriadis' postphenomenological theoretical writings.

# Chapter II: Literature Review

This dissertation explores imaginaries that underlie several acts-of-knowing and being surrounding a socioenvironmental controversy in Costa Rica. In doing so, it re-examines concepts of co-production and sociotechnical imaginaries in STS (e.g. Jasanoff & Kim, 2009) and environmental imaginaries in political ecology (e.g. Peet and Watts, 1996), extending these analyses to include Castoriadis' postphenomenological perspective. Sociotechnical and environmental imaginaries are just a drop in the vast ocean of studies on imaginaries in a multiplicity of academic and cultural contexts. In this chapter, my attempt is to confine the theoretical review to the above-mentioned notions of imaginaries in STS and political ecology, without ignoring, nevertheless, major works on imaginaries that have had long-lasting influence in the development of the concept across disciplines (e.g. Anderson, 1983/2006; Taylor, 2004).

The purpose of this chapter, divided into three main sections, is to guide the reader through the theoretical foundations of this work. First, it begins exploring the idiom of co-production and related notions of sociotechnical and environmental imaginaries mainly in STS and political ecology. Second, the chapter introduces the theoretical framework, mainly based on the postphenomenological elucidations by Castoriadis. Lastly, within the conceptualization section, I will build upon the previous theoretical foundations and the literature review to establish the conceptual framework (in a loose way, to be sure) and research questions that will frame the empirical analysis.

## 2.1 Literature Review

### *2.1.1 Co-production*

In the field of STS, the idiom of co-production has become popular (since the mid-nineties) as a way to challenge traditional visions about knowledge in social sciences. For Jasanoff (2004) and Wynne (2010) co-production questions the rational choice approach based on a self-interest model of action; for Tuinstra et al. (2006), the notion of co-production

challenges those approaches that give unidirectional and deterministic explanations of science; according to Mahoni (2013), co-production disputes the validity of Polanyi´s account of science as an autonomous "republic"; and finally, for Boulau (2014), co-production calls into question both the positivist and the relativist approaches to studies of science and society.

There are three different, not mutually exclusive, senses of co-production in high-profile literature about science and society: (a) The sense of co-production, as an "interpretative framework" (Jasanoff, 2004), provides "analytical focus" (Wyborn, 2015) on the dynamics of science and society. In this case, co-production is a "sensitive tool" (Carrozza, 2015) to grasp the complexity of social phenomena in a non-deterministic way; (b) The sense when people with different backgrounds, for example, scientists and other stakeholders, collaborate to produce knowledge, usually with political implications (e.g. Edelenbos et al., 2011). This notion is popular in public management as a way to achieve social innovation (Voorberg et al., 2015). Hegger et al. (2012) claim that the different uses of co-production can be confusing, and proposes the denomination of "joint knowledge production" for this second sense of co-production to distinguish it from others; (c) The sense of co-production involving intervening on an issue of scientific and political dimensions, taking into account the inseparable dimensions of both spheres (e.g. Corburn, 2005).

Scholars working on these three ways of co-production share the beliefs that science is deeply intertwined with social and political life in a reciprocal and dynamic relationship of influence. In this review of the literature, nevertheless, I focus on the first mentioned sense of co-production, that is, the notion of co-production as a heuristic approach to see how science and other social spheres (like politics, law, etc.) reshape each other in dynamic ways. This sense of co-production goes back to Foucault and his idea that knowledge is related to power and power to knowledge. In this sense, Foucault emphasizes that "knowledge and power are integrated with one another… [and] the exercise of power perpetually creates knowledge and, conversely, knowledge constantly induces effects of power" (1980, pp. 51-52).

Since the mid-nineties, Jasanoff has developed the idiom of co-production in STS, in this heuristic manner. According to Jasanoff, co-production involves "the proposition that the

ways in which we know and represent the world (both nature and society) are inseparable from the ways in which we choose to live in it" (2004, p. 2). Following this line of thought, Jasanoff emphasizes that co-production "calls attention to the social dimensions of cognitive commitments and understandings, while at the same time underscoring the epistemic and material correlates of social formations" (p. 3). This implies a general assumption that science and other social spheres are related to each other in a co-productive way.

The ways that science and other social dimensions are co-produced are not self-evident but rather the result of multiple pathways "full of contingencies, uncertainties and unknown consequences" (Waterton & Wynne, 2004, pp. 87-88). The elements of co-production are difficult to discern without a thick understanding of the relationship of science with other social institutions at different levels. Co-production as the "interplay of the cognitive, the material, the social, and the normative" is discussed in Jasanoff (2004, p. 17), but how co-production is enacted is still an open question and some authors give more importance to some elements over others. For example, some works on co-production are interested in how boundaries between science and politics are negotiated in what is commonly known in the literature as boundary work. This term includes the notion of boundary spaces, where epistemic and normative issues are problematized and eventually resolved by drawing boundaries that stabilize what otherwise would be seen as messy relations between epistemic and social order (see Mahony, 2013).

Most of the literature on co-production in STS focuses on the relationship between science and the state, including its political and legal dimensions. Scholars have become increasingly interested in the way that science is carried out in response to social and political expectations of the state. For example, Bouleau (2014) describes the way that scientific categories of water science meet the expectations of the French political landscape during the second half of the 20th century; Donovan et al. (2013) show how British and American volcanologists in Montserrat have to accommodate the production of geological knowledge to the sociopolitical situation of the country; Doubleday (2007) has demonstrated that nanotech labs are not isolated from society, but rather reflect social values. In addition, other studies have focused on the co-production of science and the legal order, especially in the courts. Hilgartner

(2004) shows how the creation of genome mapping was a product of the lab as much as of the law-making process. Similarly, Lynch (2004) uses the idiom of co-production to illustrate how the category of expertise cannot be taken for granted in courts, but is rather constructed during legal processes that require the testimony of experts.

In addition to the state, regional and local administrations (e.g. Thomson, 2004; Lemos & Morehouse, 2005) as well as supra-state organizations, like the Intergovernmental Panel on Climate Change (Miller, 2004; Wynne 2010), increasingly have become spaces for the study of processes of co-production between science and particular political visions or ways of organizing society.

### *2.1.2 Sociotechnical Imaginaries*

The idea of sociotechnical imaginaries arises in STS as "products of and instruments of the co-production of science, technology, and society in modernity" (Jasanoff, 2015, p. 19). From this perspective, the goal when developing the concept of sociotechnical imaginaries is to show that the co-production of science and society is neither a determined nor a random social process, but rather influences and is influenced by imaginaries. While, as we have seen, studies on co-production show the multidirectional influence of science and the rest of society on one another, it is not at all clear why some countries, regions or administrative units choose a path of co-production and others choose another. In that sense, the concept of the imaginary fills the gap between "idealistic collective imaginations identified by social and political theorists and the hybrid… assemblages [of STS]" (Jasanoff, 2015, p. 19), showing that "there are no purely material or ideational things" (Eaton et al., 2014, p. 229).

Before the emergence of the concept of sociotechnical imaginaries in STS, there was some initial familiarity with the concept of imaginaries in the study of science. For example, *Technoscientific Imaginaries: Conversations, Profiles, and Memoirs* (Marcus, 1994) uses imaginaries to present how different post-Cold War scientific communities engage with scientific practices under various circumstances in different cultural settings. More remarkable perhaps is the pioneering use of the concept of (ontic/epistemic) imaginaries by Verran Helen

(1998) to refer to aboriginal knowledge systems in Australia as opposed to pastoralists' knowledge who "lived in a world where true knowledge has no imaginary" (p. 243). This latter notion of imaginaries does not serve my purposes here because it is about aboriginal people who "understand themselves as having a vast repertoire by which the world can be re-imagined, and in being re-imagined be re-made" (p. 242), and the genealogy of the notion of imaginaries that I review here is different. To be clear, when I refer to sociotechnical imaginaries in this dissertation, I do not mean a loose understanding of the concept that includes these previous works, but rather a specific one that is related to the mentioned idiom of co-production, and that I detail below.

Initially, Jasanoff and Kim defined sociotechnical imaginaries as "collectively imagined forms of social life and social order reflected in the design and fulfilment of nation-specific scientific and/or technological projects" (2009, p. 120). Backed by national and cross-national studies, sociotechnical imaginaries deal with the (more often implicit than explicit) social expectations that link science and technology with the broader socio-political atmosphere of a country. Within this research perspective, science and technology are far from being neutral, but rather they are intertwined with sociocultural elements that may differ in significance from one national context to another context. So, for instance, they cover topics such as the different modes of nanotechnology risk governance in the USA and Germany (Burri, 2015); the energy futures in Norway (Ballo, 2015); the emergence of modern South Africa (Kelleher, 2015); the notion of sustainability as it relates to the Austrian identity (Felt et al., 2016); and the development of nuclear energy in Korea and the USA (Jasanoff & Kim, 2013).

However, imaginaries can be related to more diverse entities than countries, and thus the concept has been broadened to include an increasing diversity of scales of analysis, including (non-state) institutions and other social collectives. In her recent review of the concept, Jasanoff, broadens her previous definition, defining sociotechnical imaginaries as "collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology" (2015, p. 4). Related to this, there are

a number of works on sociotechnical imaginaries that may include but go beyond the national levels and include, for example, the sociotechnical imaginaries of global health security and the challenges created by countries and more localized alternative visions of health (Lakoff, 2015); the absence of local and regional imaginaries in the sociotechnical imaginaries of energy security in the USA (Tidwell & Smith, 2015); and the attempts of some social groups ("sociotechnical vanguards") to exert influence in broader sociotechnical imaginaries that characterize the field of synthetic biology in the USA (Hilgartner, 2015).

### *2.1.3 Implications of Co-production and Sociotechnical Imaginaries*

The principal characteristic of this body of literature on co-production and sociotechnical imaginaries is that it is based on a deep humanist view of the world, usually related to an institutional context of big science in the Global North, or of the modern "power-houses of knowledge production", as Whatmore (2002, p. 6) sees it. As a consequence, the role of non-human natures is constrained; equally, the topic of nature in the context of socioenvironmental conflicts is mainly overlooked. I will deal with each of these concerns in turn.

Firstly, as shown before, in discussions of co-production, one central issue has been the relation between knowledge and power at different social levels, including, for example, identities, institutions, discourses, or representations (Jasanoff, 2004, p. 38), or "institutional configurations", in Hagendijk´s words (2015, p. 224). Whilst the co-production approach explicitly aiming at avoiding "the charges of both natural and social determinism" (Jasanoff, 2004, p. 3), it has nevertheless tended to focus on human worlds, and, thus, there has been little discussion for how the approach of co-production could be extended to include the active role of non-human natures in the analysis of acts-of-knowing at the intersection of science and politics. In this regard, I am aware that for Jasanoff (2004) the "material" is a potential site of co-production too, different from the "social", but as Wyborn (2015) judiciously observes, these terms have been defined in a too broad sense in this literature, without specifying their attributes.

In his account of the co-production of politics of nature conservation and science in Berlin, Jens Lachmund provides an exception to this trend in the literature by exploring the nature regime which, in addition to institutions, discourses and practices, includes the role of "portions of the non-human world" (2013, p. 5). However, the role of this material forms of non-human nature is limited to placing "constraints and affordances", and thus, "intentions and knowledge-ability" are seen by Lachmund as an "exclusive realm of the human participants of these practices" (p. 238). As I will show later, human worlds are intertwined with non-human beings in a way that may exert influence over the articulation of acts-of-knowing.

Secondly, not only the role of the non-human world as an active constituent of the social has been limited in this literature, but also the non-human world as a topic in the context, for example, of environmental crises. As Yearley (2008) notes, despite the increasing attention of STS to issues surrounding nature and the environment, most of this attention has been merely confined to climate change and the role of expertise in institutions such as the IPCC. He argues, thus, that the environment as a topic in STS has "not [been] taken as forcefully as we might wish" (p. 922). There is, therefore, a "need [for STS] to direct attention to different social contexts where environmental knowledge is continuously produced" (Goldman & Turner, 2011, p. 14). In this line, Goldman and Turner argue that despite that the "joint production of nature and society" (p. 18) shows great promise for cross-fertilization, the influence over STS scholars to adopt perspectives from political ecology has been limited.

As might be expected, there are exceptions to this. For example, Forsyth (2003), and similarly Ramisch (2011), note that environmental activism and socioenvironmental movements have developed through an engagement with the science of ecology to create a co-produced "enlightened political intervention" (Forsyth, 2003, p. 122) in environmental issues, and as a consequence, this may have promoted some environmental discourses at the expense of others, which are not as close to ecology. Despite this and other efforts, there is still a need for an integrative approach which involves more careful and sensitive considerations of non-human articulations of imaginaries in society. Here follows a review of environmental imaginaries mainly associated to the field of political ecology.

*2.1.4 Environmental Imaginaries*

As Pee and Watts put it (1996), "there is not an imaginary made in some separate "social" realm, but an environmental imaginary, or rather whole complexes of imaginaries, with which people think, discuss, and contend threats to their livelihoods" (p. 37). More recently, Adams (et al., 2015, p. 35), similarly, notes that "what is often taken as the other of the social – nature – is gravely at risk and there is an urgent need to interrogate the various imaginaries of nature in modernity as well as the images of nature that underpin current debates concerning the environment". In the context of the literature on co-production and sociotechnical imaginaries, this means a move away from the view that scientists produce knowledge in a vacuum, and thus recognizing that ways of knowing are embedded in networks "rooted in specific territories and geographic locations" (Rocheleau, 2016, p. 213). Below, I review work on environmental imaginaries, which may address the mentioned concerns with respect to the exceptional character of the literature on co-production and sociotechnical imaginaries.

A variety of definitions of environmental imaginaries has been suggested, and for the purposes of my arguments they can be grouped into two different categories which I call "social-constructivist environmental imaginaries" and "posthumanist environmental imaginaries". The former is connected with the broad idea of social constructivism, and is, in that sense, a more human-centered approach to the understanding of the environment. Under this approach, the tendency is to see the environment (territories, landscape, or forests) as largely a matter of socially constructed discourses. Edward Said is not known for his works on the environment. However, his concepts of "orientalism" and "imaginative geography" illustrate well the idea of how discourses can shape what people think about particular environments. In his acclaimed book, *Orientalism* (1979), Said shows how the dominating Western cultures construct discourses about the Orient to homogenize the peoples and territories of the East and Middle East. This demarcation, Said tells us, is achieved through processes of "othering", which contribute to colonial domination. Within this research tradition of the Middle East and North Africa, Davis (2011), inspired by this notion of Orientalism, defines environmental imaginaries as "the constellation of ideas that groups of humans develop

about a given landscape, usually local or regional that commonly includes assessments about that environment as well as how it came to be in its current state" (p. 3).

This idea that environmental imaginaries represent social constructions about the environment can be found in several other works devoted to various topics. For example, MacCallum et al. (2011) explore the environmental imaginaries associated with discourses about climate change. They define these environmental imaginaries as "dominant reifications of the human-nature relationship which delimit the scope and complexity of the problem and limit our range of concrete responses" (paragraph 7). Similarly, Levy and Spicer use the idiom of climate imaginaries to refer to "shared socio-semiotic systems that structure a field around a set of shared understandings of the climate" (2011, p. 660). In general, these works show how the multiplicity of institutions and actors surrounding climate change centre around a limited number of environmental/climate imaginaries. In some cases, a dominant imaginary prevails at the occlusion of another, like the dominant imaginaries associated with the principles of sustainable development (McCallum et al., 2011) and the "technocratic and risk-management-focussed" imaginary in climate change (Levy & Spicer, 2011).

A number of scholars have related this type of imaginary to materially place-based (see e.g. Nesbitt & Weiner, 2001; McGregor, 2004), and urban-situated (see Millington, 2013; Hagerman, 2007) environments, but they, in my view, still represent a socially constructed approach to environmental imaginaries, which treats the biophysical environment as the backdrop of policies and values underpinning social discourses. In that sense, this notion of environmental imaginaries remains quintessentially human-centered, and in a sense, this matches the exceptionalist paradigm, to which I eluded in my critique to the co-production and sociotechnical imaginaries approach.

On the other hand, I would describe the second notion of environmental imaginaries as a posthumanist approach to the study of imaginaries. This second notion is not in contradiction with the first one. It does not exclude the possibility that social discourses frame how we understand nature. However, it emphasizes the idea that the environment also shapes social constructions about territories and living beings, and that "non-humans engage with us

to produce it [he refers to produce knowledge]" (Gabriel, 2014, p. 45). As Peets and Watts (1996) tells us, this notion of environmental imaginaries contributes to "counter-balance the social construction of nature with a profound sense of the natural construction of the social" (p. 263) and highlights the "complex interplay between natural and social construction with the environmental imaginary as centerpiece" (p. 268).

Following this notion of imaginaries, Cidell (2010) writes that environmental imaginaries "explain how the natural environment shapes the attitudes, discourses, and practices of the people who dwell there" (para. 1). In this sense, environmental imaginaries show that "discourses which environmental and other social movements contend, do not arise on the head of a pin or in a de-natured ivory tower. Rather, the environment itself is an active constituent of imagination, and the discourses themselves assume regional forms that are, as it were, thematically organized by natural contexts" (Peets and Watts, 1996, p. 37).

A number of scholars have related this notion of environmental imaginaries to the politics of nature in urban environmental contexts. For example, Gabriel poses the need to incorporate post-structural and post-human perspectives, which take into account non-humans, into urban environmental decision-making (2014). Others have focused on how plant movements around the world shape different regional environmental imaginaries. Kull and Rangan (2008) show that when plants are introduced to new environments, they play a role not only in reconfiguring the markets of different places, but also in changing, for example, environmental policies, as was the case in some parts of Australia when the drought-tolerant plant called *acacia colei* was introduced. Lastly, Whitridge (2012) studies how the environment (e.g. stones and fauna) is an active element in the way that Inuit peoples in Newfoundland and Labrador, Canada, organize their daily practices and articulate their livelihood conditions.

### *2.1.5 Implications of Environmental Imaginaries*

The "social-constructivist environmental imaginaries" approach does not take into account the environment as an active force in the emergence of collective imaginations. In that sense, this literature has similar limitations to the co-production and sociotechnical imaginaries

approach because it puts human and culture at the center of our understanding of imaginaries, with a limited place for non-human agency. Although these studies contribute to identify dominant narratives about the environment (or the climate), and their political rationale behind it, they do not necessarily elude to the possibilities that the non-human environment exerts influence over the way society constructs the social. In that sense, this approach can be defined as an exceptionalist view of the world.

The second notion, which I call posthumanist environmental imaginaries, gives another meaning to the "environment" by acknowledging the potential influence of the non-human nature over society. Yet one of the main issues in our knowledge of this notion of environmental imaginaries is that these studies are scarce; yet intriguingly, they have been conducted mainly in the global North, as Cidell astutely notes (2010). Few have looked closely at the environmental imaginaries in countries of the global South, and even less when it comes to conflicts where science and other forms of knowing nature play a relevant role.

### 2.2 Theoretical Contribution of This Dissertation

To sum up, much of the literature on co-production and sociotechnical imaginaries has been limited to the study of social dimensions of scientific knowledge in the Global North rather than in other sites where science plays a role, like for example in rural sites of less industrialized countries. Moreover, it has limited the agency of non-human actors. Despite the literature on co-production and sociotechnical imaginaries aims at avoiding social determinism, research in this area has concentrated on social identities and institutions. Trying to find a confluence between sociotechnical and environmental imaginaries represents a way to overcome the exclusionary humanist orientation of this literature. However, ways to integrate socionatures are far from obvious, and in this dissertation, as previously mentioned, I propose an ontological framework based on Castoriadis´ postphenomenological approach. A posthumanist approach aims at diversifying the main characters of this literature to include the active agency of non-anthropic entities. This would address some postexceptionalist concerns outlined in the introduction and broaden the literature on co-production between science and society.

In addition, as also mentioned in the introduction, studies of co-production and sociotechnical imaginaries often lack of normative commitments. As already shown, the identification of ways of co-production between science and other social institutions in relation to larger social visions is the focus of this literature. This is a literature, which often does not offer normative standards by which to judge the value of co-production. Indeed, as Jasanoff recognizes, the normativity within the co-production approach merely means "revealing unsuspected dimensions of ethics, values, lawfulness and power within the epistemic, material and social formations that constitute science and technology." (Jasanoff, 2004. p. 4). Several authors have expressed doubts about this sense of normativity. For example, Steve Fuller claims that this, more theoretical and less activist, high-churched lineage of STS "has aversion to normative judgments and even an open antagonism to the adoption of "critical" perspectives" (2000, p. 6). Remarkably, the high-churched approach has also been explicitly called into question by scholars working in the South. López and Verdadero (2003) argue that given the sociopolitical contexts in which Latin American countries are situated, it is time to depart from the High Church approach and to focus on a new way of doing STS that includes a more activist agenda for the South. This is in line with David Hess (2011), who proposes a "postconstructivist" STS which should make the field more "prescriptive" in the studies of science.

The next section describes the concept of imaginaries as provided mainly by Castoriadis, together with an exploration of his ontological commitments for the purposes of this dissertation.

## 2.3 Theoretical Framework

### *2.3.1 A Brief Genealogy of the Imagination and the French Roots of the Imaginary*

Although it is not my intention to provide a detailed review of the imagination throughout history, it is interesting to note that ways of imagining the imagination may differ through time, but it has relevance and historical presence in Western culture. For example, the classical Greeks find a place for the imagination in their philosophy. For them, the imagination

belongs to doxa, that is, the sphere of opinions and beliefs, often in opposition to logos, or reason (see Castoriadis, 1994). In this understanding, there is something suspicious about the idea of imagination as a way to discover the truth. On the other hand, Immanuel Kant stresses the significance of the creative potential of the imagination (Rastovic, 2013). Kant regards the process of synthesis, or the unifying of representations, as a product of the imagination, which is "a blind though indispensable function of the soul, without which we would have no cognition at all, but of which we are seldom even conscious" (Kant quoted in Rastovic, 2013, p. 6). The imagination for Kahn remains an intangible mystery, but a mystery that is present in its effects in a creative way (Adams et al., 2015).

In a more contemporary context, the French intellectual tradition has had significant impact on the development of the concept of *l´imaginarie*. For Carretero (2010), the book by Emile Durkheim in 1912, *The Elementary Forms of the Religious Life*, is pioneering in this tradition in that it provides ways of understanding the links between the individual and the "collective consciousness" (Durkheim, 1912/1995, p. 224). In Durkheim´s terms, religious representations reflect collective realities that "maintain, or recreate certain mental states of those groups" (p. 9), transcending the sum of individual representations. Durkheim left a legacy with influence in the humanities, especially within several intellectual movements in France.

The idea of *l´imaginarie* has been prominent in the French structuralist and poststructuralist traditions. Gilbert Durand, Jean-Paul Sartre, Paul Ricoeur, Maurice Merleau-Ponty, Gaston Bachelard, and Jacques Lacan are just but a few names related to *l´imaginarie*, although with different interpretations of its meaning and implications. Especially, Lacan´s approach is relevant because it contributes to the expansion of the term of the imaginary in different academic circles outside France (Adams et al., 2015). For Lacan, the imaginary, mediated by language, was just one of the psychoanalytical orders together with the symbolic and the real. The imaginary, according to him, represents the ideal image of the self, and hence a distortion of the real situation. This vision implies negative connotations for the term in the sense that it represents the internalized ideal that never can be reached. But interestingly for this study, Lacan did not see the individual and the collective as mutually exclusive, but rather he

was able to “think these discontinuities in a radically different way” (Jameson, 2003, p. 10). This has enormous influence in extending the study of the imagination beyond the individual level, legitimating the view of the imagination in a collective sense, and thus having some resemblance, as just mentioned before, with Durkheim´s work (see Pettigrew & Raffoul, 1996).

This French intellectual legacy was particularly influential on Cornelius Castoriadis´ development of the concept of social imaginaries. Then again, drawing from other influences, such as his post-Marxian thoughts, his work on Greek philosophy, and his engagement with ecopolitical philosophy, Castoriadis took this legacy in a very different direction, developing the concept in intrinsic association with a theory of autonomy and radical self-creation. In the pages below, I focus on Castoriadis´ theoretical framework and his different ontological turns over time

### *2.3.2 Castoriadis´ Postphenomenological Ontologies*

There is a renewed interest in the work of Castoriadis in recent intellectual developments in the social sciences. These works have tended to focus on his concept of imaginaries, especially as developed in his seminal book *The Imaginary Institution of Society* (1975/2005), rather than the rest of his wide-ranging work, which includes not only an ecopolitical philosophy, striving for autonomy, collective emancipation, and ecological self-limitation, but also a poly-regional ontological perspective that interrogates traditional ontological demarcations. This dissertation attempts to address this gap by putting Castoriadis in dialogue with STS and political ecology not only through the concept of imaginaries but also through his broader poly-regional ontology of modes of being.

Castoriadis´ work can be divided into two main ontological turns (see Adams, 2008). The first turn involves the departure from his earlier Marxist materialist position to a focus on the imaginary “as manifested indissolubly in both historical doing and in the constitution, before any explicit rationality, of a universe of significations” (Castoriadis, 1975/2005, p. 146). In doing so, he develops the concept of the radical imaginary, which has two ways of existence, the radical imaginary as the social-historical and the radical imagination as the psyche/soma.

The radical imaginary as the social-historical includes a "magma" of imaginary significations on which the region of society is self-instituted. Here radical has two meanings. First, it involves the contention that the self-institution of society creates *ex-nihilo*, or in ways that are not determined by external factors. Second, the radical imaginary is creative for-itself. Influenced by Francisco Varela and with his term of *autopoiesis* (Varela et al., 1974), Castoriadis notes that society is self-creative, and that means that despite the influence of historical and natural contexts, the representations of a society are self-given, not being determined by external (e.g. cosmical or religious) laws. On the other hand, for Castoriadis, the radical imagination involves "the emergence of representation (phantasying) and the alteration of representation" (1975/2005, p. 146). Alteration means the emergence of "newness" in each "representative/affective/intentional flux" (1975/2005, p. 255), and therefore the impossibility of determination. In other words, radical imagination represents "that which in the psyche/soma is positing, creating, bringing-into-being for the psyche/soma" (1975/2005, p. 369).

In his second, and less known, turn, Castoriadis develops both a natural philosophy and political ecology of living beings. His natural philosophy includes a rethinking of nomos and physis in a way that living beings become self-creative, or in other words, they become modes of being "for-itself" or of "being one's own end" (1997, p. 143). For Castoriadis, there are three main characteristics in living beings. The living being is "for-itself insofar as there is self-finality, insofar as it creates its own world, and insofar as this world is a world of representations, affects, and intentions" (1997, p. 148). This move represents, as Adams points out (2011), a departure from mechanistic explanation of living beings behaviour and a "critique of the hegemony of modern forms of reason or rationality" (p. 139).

Living beings for Castoriadis are not in ontological isolation, but rather they are part of a world that includes different overlapping regions or strata. All regions, human and non-human alike, are self-creative of an eigenwelt, and as Adams notes, they "can be interpreted as 'alive', though in different ways" (2008, p. 390). The question then is how the region of living beings relate to the other regions that Castoriadis proposes in his model. In his poly-regional world, the different human and non-human regions can be grouped into two levels. The first

level, the "merely real" one, consists of the regions of (already mentioned) living beings, the human psyche, the social individual (which represents a socialized human psyche), and the social-historical. Whereas the three later regions (human psyche, social individual, and the socio-historical) belong to the first turn and are related to the radical imagination and the radical imaginary, the first region (living beings) is the "archetypal" region of the "for-itself" because is the condition for the other levels to exist.

**Table 1: Poly-regional ontology by Cornelius Castoriadis**.

| **Merely Real type of regions** | **(Potentially emerging) Non-real type of regions** |
|---|---|
| Living beings | |
| Human psyche | |
| Social individuals | Human subjects |
| Social-historical | Either Autonomous or Heteronomous societies |

The second level consists of the non-real type of regions. They are non-real because they have emergent capacities and are contingent upon the regions of the first level. This second level includes human subjects, and either autonomous or heterenomous societies. According to Castoriadis, a subject "is to be made and it makes itself by means of certain conditions and under certain circumstances" (1997, p. 143). These conditions and circumstances include processes of "reflectiveness" and "deliberate action". Similarly, the notion of "autonomous societies" refers to the capacity of societies not only of being for-themselves, but the emergent capacity of "reflecting on itself and of deciding after deliberation".

These regions are neither real, nor are they well demarcated because they do not constitute fixed identities. Rather, they have a magmatic relation, which means a relation that "it is not exhaustively and systematically ensidizable" (Castoriadis, n.d., p. 370), that is, not "reducible to elements and relationships that pertain exclusively and in homogeneous fashion to ensidic [internal] (ensemblistic-identitary) logic" (p. 370). In other words, here Castoriadis highlights that these levels are not determinable by an environment, neither by themselves in a

purely self-referential manner, but rather they "lean on" each other.

In other words, for Castoriadis, the real regions are living beings, human psyches, and social individuals. If humans can engage in deliberation and to generate self-reflective consciousness, then they may become human subjects, and thus autonomous beings. If not, they are just social individuals, who follow a particular role or expectation imposed by a given society. The collective dimension of such reasoning is that only those societies, which are self-reflective and impose own limitations, become autonomous societies. If not, they just are heteronomous societies, which are embedded by a particular imaginary without self-scrutinizing their social foundations. For example, a society, which pursues a relentless quest for economic growth without any self-reflection about why this occurs, falls within the category of heteronomous society (that is, a society with lack of autonomy).

This second ontological turn I read as falling within the scope of a relational postphenomenological approach. Castoriadis distanced himself from phenomenology, which he described it as a "realistic delusion", which is based on an "egocentric" view of the world (see Castoriadis, 1994, p. 141). Instead of a phenomenology of "first-person" experience, Castoriadis stressed the significance of recognizing "an indefinite number of others [and] a multiplicity of 'first person' collective 'experiences' among which there is, at first glance, no privileged one" (Castoriadis, 1994, p. 141). In Adams´ view, the challenge of phenomenological categories about subject-oriented approaches by Castoriadis supposes a "reworking of phenomenology" and a "broader move toward post-transcendental phenomenology" (2011, p. 5), rather than an outright rejection of it.

## 2.4 Conceptual Framework

### *2.4.1 A postphenomenological Framework*

In this section, I develop an empirical framework within which to put sociotechnical and environmental imaginaries into dialogue with Castoriadis´ elucidations about anthropic and non-anthropic regions. This overcomes the previously mentioned limitations associated with these areas of study about imaginaries and provides new directions towards a

postphenomenological rethinking of sociotechnical and environmental imaginaries based on imaginaries associated with acts-of-knowing.

There is no a one-size-fits-all way of developing a conceptual framework based on Castoriadis' work, and here I provide just an outline that fits the empirical needs of this work, having in mind that concepts and terms are "always transitory and eminently relative", as Castoriadis would see it (1975/2005, p. 329).

As stated in the introduction, this dissertation seeks to answer the following research questions:

What are dominant imaginaries associated with acts-of-knowing during the controversy over run-of-the-river dams in southern Costa Rica?

To address this question, first I have to raise another question: what do I mean by imaginaries in this dissertation?

The social imaginary is defined by Castoriadis (1975/2005) to mean "the creation of significations and the creation of the images and figures that support these significations" (p. 238). This creation involves also acts-of-knowing. In this sense, Henry Giroux (2004) regards the work by Castoriadis as "the crucial acknowledgment that society creates itself through a multiplicity of organized pedagogical forms", which enable a "field of cultural and ideological representations through which social practices and institutional forms are endowed with meaning, generating certain ways of seeing the self and its possibilities in the world." (p. 28). For Giroux, one of the main intellectual achievements of Castoriadis consists in linking notions of autonomy with ways of civic education.

Symbols provide the relation between such significations, and images and figures, being present in all the institutional components of a society, including language and the broader notion of discourse. Symbols, for Castoriadis, are never innocent nor neutral, rather, they are always constituted in a particular way. Every symbol thus has an imaginary component in a reciprocal way as every imaginary is provided with symbols "to pass from the virtual to

anything more than this." (1975/2005, p. 127). Symbols, for Castoriadis, refer not only to quantity but to quality, that is, "extension and intension", using his own words. As Taylor notes, "while nourished in embodied habitus, [the imaginary] is given expression on the symbolic level" (2001, p. 189). Without symbols that hold together imaginary significations there would be no society, but only "undifferentiated chaos". These symbols and these imaginaries, nevertheless, are not rigid. They have their own tempo, which respond to different dynamics (see Gaonkar, 2002).

However, society cannot be only reduced to its social symbolic dimensions. As Castoriadis tells us, while society is oriented towards its own self-creation in a "reproductive" way (using my own term), it is, nevertheless, not isolated, but rather "bound up with nature and bound up with history" (1975/2005, p. 125).

Importantly for this dissertation, then, the component of the imaginary is also present in living beings. For Castoriadis, non-human living beings create also their own world. They do not find a world, but shape it, according to a "subjective instance [that] creates a unity and an interior [and] a world of (proto)meaning" (Adams, 2008, p. 398). Living beings, in their creation of their own world, may also "create further strata of being that have meaning for them and exist for them, but do not necessarily exist as such in other regions of being" (Adams, 2008, p. 397). For Castoriadis, living beings are not trivial mechanisms, but possess three key interrelated attributes: the capacity of self-finality, creation of their own world, and the "Eigenwelt", which includes representations, affects, and intentions. The characteristics of the "Eigenwelt" involve that living beings have an imaginary capacity. However, there are, for Castoriadis, still differences between anthropic and non-anthropic regions. Despite that, both types of regions are products of self-creation, only the anthropic regions may strive for social and cultural autonomy.

I will draw on these definitions when developing the specific research framework of the empirical chapters.

*2.4.2 When, Where and How Are These Imaginaries Evident?*

A central assumption of this dissertation is that imaginaries are omnipresent in the different regions that Castoriadis sees as constitutive of the world. As mentioned in the problem statement, in this dissertation, I look at the imaginaries involved in acts-of-knowing, where (credential) science, in the form of Environmental Impact Assessment, together with other forms of knowledge, plays a role in the sustainable development approach of Costa Rica. In doing so, I attempt to transcend the divide between the literature on sociotechnical and environmental imaginaries by examining the constellation of imaginaries articulated across living beings, social individuals and the social-historical in their relation to acts-of-knowing. This has implications for thinking about the regions of human subjects, and either autonomous or heteronomous societies, which represent for Castoriadis patterns that emerge according to different situations, as I showed above.

I will call this postphenomenological understanding of imaginaries across different regions "socioenvironmental imaginaries". Each chapter will focus more on some regions than others, but when viewed as a whole, such regions express socioenvironmental imaginaries associated with different acts-of-knowing that are embedded in the water worlds that this dissertation deals with.

To explain this process in more detail, I will proceed as follows:

In Chapter 4, I will focus my attention on the imaginaries of social individuals (using Castoriadis´ term) articulated in EIA process and EIS document (focused on the one of the San Rafael River) in relation to acts-of-knowing. The social individuals are "fabricated in view of a particular end" (Adams, 2011, p.98). And as Castoriadis notes, "social individuals are made, as standing for individuals and as serving for certain social 'roles', 'functions' and 'places'" (1975/2005, p. 261). However, for Castoriadis, "individuals are made by the instituted society, at the same time as they make and remake it" (1991, p. 271). This means that the fabrication of social individuals in EIA does not necessarily determine how individuals are involved with acts-of-knowing. Thus, it is necessary to study not only the "social individuals" co-created in

EIA, but also whether such "social individuals" transcend the expectations of the EIA, becoming then, using Castoriadis terms, "human subjects", that is, autonomous subjects with the capacity of self-reflection.

In Chapter 5, my study are the imaginaries associated with water and rivers associated with different acts-of-knowing. In doing so, this chapter gives focus to the multiple ways of articulating water, for example, either as a scientific notion in the EIA process or as a drawing made by kids in a school. Such different articulations of water are reminiscent of different water worlds.

In Chapter 6, I will look at encounters of human and non-human living beings using Castoriadis notion of non-human animals. In a way that these encounters mediate acts-of-knowing and the related imaginaries in the water worlds of this dissertation. In Chapter 6, I will show the unexpected findings when human and non-human beings meet and the implications of this.

All chapters include also an elucidation of the "socio-historical", or the "anonymous collective whole" in Castoriadis terms (1975/2005). That is, a reflection about the trajectories of the webs of significations that constitute a society.

In sum, by using this trans-regional sensibility by Castoriadis, this study aims at transcending the boundaries of sociotechnical and environmental imaginaries. As we shall see later in this dissertation, this means, first, to explore and enact not only the instituted imaginaries about the knowers articulated through EIA, but also the alternative models of acts-of-knowing articulated by local communities and environmental movements. Second, it means to look at the ways that imaginaries about water and rivers relate in particular ways to a variety of acts-of-knowing. And third, it means to look at the imaginations of living beings in their relation to humans and their acts-of-knowing. Lastly, I will elucidate about the implications of the intersections of social individuals, human subjects, living beings, and the socio-historical, in the water worlds of this dissertation. But it is worth mentioning that I refer to these terms in a loose way without any ontological enforcement.

*2.4.3 What Are The Agencies of Imaginaries?*

As mentioned in the literature review, imaginaries are "products and instruments" of the co-production of knowledge (see Jasanoff, 2015, p. 19). Using Castoriadis´ poly-regional ontology, the agencies of imaginaries are multiple and based on different anthropic and non-anthropic regions, as reported above. This approach can be defined as a way to reject determinist views of anthropic and non-anthropic beings, which "must be considered not homogeneous but heterogeneous" (Jasanoff, 2015, p. 19). With this in mind, I find necessary to rethink the concept of co-production, as I show below.

For Castoriadis, production and creation have two different meanings. The production of something involves producing differences in a way that "the resultant 'new' form can be reduced to or predicated on its antecedents; it is determinable" (Adams, 2008, p. 390). For example, assembly lines produce cars in a pre-defined sequence. Each produced car is different, but only slightly different because each of car is determined by the parameters of the assembly line. Simply put, each car is a variation of the same car. Similarly, societies may produce particular social institutions, identities or discourses according to particular instituted sociohistorical contexts.

On the other hand, creation goes beyond the production of differences and reaches what Castoriadis understands as the state of alterity. In Adams words, creation for Castoriadis means that "the new 'creation' cannot be reduced or predicated on its antecedents—it is not determinable by what precedes it" (2008, pp. 390-391). Unlike production, creation, for Castoriadis, involves contingency and radical "newness", *ex nihilo*.

One of the key implications of this distinction for the purposes of this dissertation is to distinguish between co-production and co-creation in STS scholarship. That is why in the next pages, I use co-production to denote the instituted character of some acts-of-knowing, which are produced in relation to particular social expectations in a particular (modern) sociohistorical context. For example, as I will show in Chapter 4, the EIS study of the San Rafael River produces a particular vision of the inhabitants near the river and their knowledge

capacities. Also, Chapter 5 shows how the notion of "environmental flow" is co-produced in relation to what I will call later an "technical arbitrarity" that stems from the 1970s work on hydrology. Co-produced acts-of-knowing are usually presented in documents and determined by the conditions in which they were elaborated according to (usually) dominant imaginaries.

On the other hand, I use the term co-creation to refer to instances when communities articulate instituting acts-of-knowing through a variety of strategies and activities. The notion of co-creation implies that communities are able to challenge or reinterpret instituted (and co-produced) acts-of-knowing in a way that cannot be determined by the conditions of a particular context. And hence the creation of radical "newness".

This distinction between co-production and co-creation is, of course, neither clear-cut nor dichotomic. In a given society there are co-productive and co-creative trajectories that very often collide with each other, and boundaries are often blurred. For the purposes of this dissertation, nevertheless, this distinction contributes to make clearer how important is the role of inhabitants and environmental movements affected by the dam projects to break through glass ceilings that have been put over them to politically limit their contributions to decision-making. As I will show below, the co-creative imaginaries of the (more-than-human) communities challenge the instituted co-productive imaginaries reflected in the EIA process.

### *2.4.4 What Are Their Associated Politics of Knowing?*

To address this question, I use a normative framework based on Castoriadis´ project of autonomy, which has explicit political connotations. Castoriadis distinguishes between heteronomous and autonomous societies. The former refers to those societies where the "closure of meanings" distorts a society (Castoriadis, 1991, p. 151). In such societies, answers to basic questions such as "Who are we as a collectivity? What are we for one another? Where and in what are we?" (Castoriadis, 1975/2005, p. 146) are absolute, which means that the "orientation of a society" cannot be called into question. Castoriadis notes, "[societies are heteronomous when they] are enslaved to their own creation, their law, which they posit as intangible, as it proceeds from a qualitatively other origin (usually religion) than living men

and women" (1994, p. 150). Social heteronomy means thus an overlap between a given dominant imaginary and the symbolic network that holds a society, which in Castoriadis terms represents a socially instituted reality, that is, "universal, symbolized and sanctioned ways of doing things." (1975/2005, p. 124).

Related to social heteronomy is the notion of instituted society. The instituted society is the given or explicit organization of a society at a given point in time, or in other words, when "systems" become "solidified" (Bronson, 2018, p. 12). Instituted may be related to social order and explicit forms of power, and in some cases, these forms of power may lead to domination, if "an asymmetric and antagonistic division of the social body is instituted" (Castoriadis, 1991 p. 150). In his analysis of Castoriadis, Klooger (2009) underlines that instituted societies have a tendency towards perpetuation, in the sense that they achieve closure of meanings without further interrogation of why this closure is attained and what the alternative might be. In some cases, instituted forms of society are associated with closure of meanings and heteronomy. This could be associated with the notion of co-production that I elaborated above.

On the contrary, autonomous societies base their legitimacy both on political forces that strive for collective emancipation and an active role of philosophy in creating the conditions for explicit self-reflection. In autonomous societies, there are continuous processes of self-creation, which means that historical or natural conditions do not determine the symbolism of a society. Instead, an autonomous society is not derived as a conclusion from a given context. Following the mentioned notion of co-creation in this dissertation, radical imaginary means that the creations of an autonomous society should be *ex nihilo*, or in other words, an autonomous society should always interrogate its own foundations out of nothing. In this sense, the self-creation is not only implicitly but also explicitly articulated. Otherwise, a society may result in heteronomy, which happens when the functions and institutions of such a society are dependent upon a given imaginary without any kind of self-reflection, as I just mentioned above.

I will use these elucidations about autonomy and heteronomy, instituted and instituting, and co-production and co-creation to draw empirical distinctions and reach normative conclusions.

# Chapter III: Methodology

This chapter has two main sections and draws upon different traditions within qualitative research. The first section is a reflection on my engagement with this research project, on my role in the different spaces where I have been working, and on my relations to others as a doctoral researcher. As I will show in what follows, these types of engagements fall within the ambit of advocacy research. Based on the theoretical elucidations of the previous chapter about postphenomenology, the second section deals with the methodological choices that shape the research agendas of the following three empirical chapters in this dissertation (Chapters 4, 5, and 6).

## 3.1 Advocacy Research

### *3.1.1 My Background*

During my master´s thesis completed in 2011 in Germany (Rodríguez, 2011), I used closed-ended survey and quantitative techniques to measure different degrees of public participation in science shops. Science shops are organizations that provide knowledge on behalf of citizens, and in addition, contribute to the participation of citizens in research processes. Although I identified a variety of models of public participation in these institutions, the social features of public participation were left somehow ambiguous. In other words, I was able to measure perceptions about public engagement in a variety of institutions, but the implications of such public engagement activities were not critically investigated from a qualitative perspective. In this dissertation, I see, then, a necessity to use qualitative strategies to go deeper in the subject and, as Denzin and Lincoln (2000) note, reveal social phenomena that remain unknown to other forms of inquiry, such as quantitative approaches.

By using a qualitative approach, I wanted to engage with the participants of this project in a different and more radical manner than I had done before. A radical stance does not imply that this work is more marginal or extreme than others, in the sense of being less academically

relevant, or at the margins of the social sciences. As Schostak and Schostak note, "there are also positive associations to the term radical [in research]… [as it] implies a focus on the essential assumptions, foundations or values of some view, way of life, way of thinking" (2007, p. 6). This notion of radical is close to one of the meanings of the term in the Oxford Dictionary of English, which characterizes it as "related to the root of something" (2014).

Going back to the spatial and temporal roots of this research project I am reminded of my first impressions when I arrived in Costa Rica to begin the fieldwork in August 2013. From the beginning, I engaged lots of Costa Rican (and non-Costa Rican) people in conversations in a variety of places. Different "Costa Ricas" in different places mattered because they not only enriched my knowledge, but also made me realize that they influenced the ways I, and many of my interlocutors, thought about the environmental controversies involving water. On the one hand, I felt sympathetic toward the environmental movements and local communities who argued against the building of the dams. The more I knew about the issues at play, the more I situated my perspective not outside of the controversy but within it. At the same time, I found my own thoughts reflected in the views of some of the environmental activists. For example, when I listened to people talking about the environmental impact evaluations, I felt that part of my ideas about the social construction of science were permeating the ways in which some of these people looked at the issue. Although I was far from proselytizing any point of view during my research, I was not able to control the meaning and scope of my interactions with other people after working together for several months. In sum, I was an active actor during the course of my study.

This shows that doing research, and in particular, qualitative research, produces an "arousal effect" on the participants and researchers involved with the practices derived from it. Brown and Tandon define this effect as the way that the "interaction between researcher and subject in the interview [affects] the subject's perceptions of and feelings about the topics of discussion" (1978, p. 200). There are, perhaps, two polarized ways of dealing with this effect. One way is to ignore or deny the implications of it. Another way, which I adopt, is to recognize it and accept it as a part of an iterative process of learning that informs both this work and the

people involved with it during the research trajectory. This implies that the research methods of this work not only are ways to identify or explore imaginaries, but also are ways to support the existence of these imaginaries, in a performative and interactive manner, at the expense of other imaginaries (see Law, 2004).

This attitude challenges traditional positivist approaches. Instead of limiting my role as a detached researcher to avoid a conflict of interest, I was, in a "border crossing" mode (Giroux, 2005), negotiating different roles in different "communicative spaces" (Wicks & Reason, 2009) that I have been filling through this research as learner, teacher, spokesperson, demonstrator, activist, and everything in-between. But to play these roles in the context of a research project, some conditions had to be met. In this case, I took the perspective of advocacy research, whose trajectory is described below.

### *3.1.2 Situating Advocacy Research*

There is little agreement on the origins of advocacy research, and different versions operate under different names. Zuber-Skerrit (1992) points to the work of the German-American psychologist Kurt Lewin to mark the beginnings of action research. Lesha asserts that he was the first to coin the term action research in an article of 1946 about problems of minorities in the USA (Lesha, 2014). Jim McKernan (1988) goes even further back in time and relates these practices to reform movements in education and social policy of end of the 19th century. Of great importance in this period is the influence of John Dewey and his view of the potential active agency of the public in society (see e.g. Dewey, 1927/1954). Dewey believed that the egalitarian participation of people in the promotion of social change serves as a key indicator of democratic societies (1916), in opposition to a society ruled by experts, as the journalist Walter Lippmann claimed.

Interwoven with emerging feminist, anti-racist, postcolonial and ecological discourses of the 60s and 70s, waves of activist research challenged the traditional positivist canons of science up to this day. Protest and civil rights movements supported these forms of advocacy, which, in some cases, permeated science, reconfiguring its power distribution. Examples of this

includes black communities (Nelson, 2011) and HIV/AIDS activists (Epstein, 1996) challenging the biases of mainstream medicine and contributing to new pathways to do medical work and research in the United States; students and reformist researchers devoting their work to their local communities in the Netherlands of the 70s and laying the ground for the science shops movement (Mulder et al., 2006); Rachel Carson in the sixties challenging the use of DDT and the sciences that uncritically legitimized and glorified this insecticide (Dunlap, 2008); and charity institutions acting in underprivileged areas and founding community-based research units (Raloff, 1998), to name but a few. The alternative models of science presented in these cases developed differently in the last decades. For example, while some of them were institutionalized (e.g. groups of HIV/AIDS activists), others did not have much institutional support.

### *3.1.3 Recent Trends in Advocacy Research in the Social Sciences and STS*

There are innumerable calls in the social sciences and philosophy to rethink what science is. Here it is worth mentioning the meritorious attempt by Jane Kourany to reform the philosophy of science and make it more accountable for its role in society (2010). Perhaps a more vivid example of this turn in the social sciences is the rise of public sociology in the last decade after Michael Burawoy became the President of the American Sociological Association in 2004. Public sociology seeks the participation of sociologists in issues of local communities, to engage with all members of the society. According to Burawoy, such public conversations should be reflexive, addressing matters of public concern and involving "a process of mutual education" (Burawoy, 2005, p. 264). Burawoy distinguishes between traditional and organic sociologists. Whereas the traditional ones may influence society through the media or bestseller books, the organic ones are available to talk with the public to know their needs and help them to articulate their voice under different circumstances.

As I said in the introduction, the question has been raised whether STS should be a more engaged field. The role of this dissertation is unambiguous in that regard. My goal is to reinforce trends in STS towards a more engaged scholarship. This involves dealing with normative issues without hesitation and engaging with the participants of this study according

to an advocacy research agenda. As I try to show below, I am aiming at doing a more organic STS too.

### *3.1.4 Principles of Advocacy Research in the Context of This Project*

I link my choice of qualitative research to my determination of doing advocacy (activist) research as well (see Alsop & Bencze, 2014). Actually, qualitative and advocacy research are historically associated. Ever since qualitative strategies have been employed, they have been used in the context of reformist programs of research (Stake, 2010, p. 38). The Chicago School of the 20s and 30s combined early developments in ethnographic fieldwork with reformist practices (Warren et al., 2015). However, this does not mean that advocacy and qualitative research can be employed together in an uncritical way, nor that advocacy necessarily leads to satisfactory research results (see Martinelli, 2008). The case remains to be made for the present dissertation.

Advocacy research can take many forms. Code states that "advocacy practices… include representing, arguing for, recommending, acting or engaging in projects of inquiry and intervention in support or on behalf of someone or some group of people" (2006, p. 169). According to this view of advocacy, people or groups of people, are the focus of advocacy. This approach to advocacy may thus imply taking a partisan stance towards a particular group of people or movement. In the context of my dissertation, however, taking a partisan stance is especially difficult because the lines defining groups of people, members of the communities, and environmental movements are hazy, and the diversity of people is remarkable in terms of interests in and opinions about the same issue (Star et al., 1989). Indeed, instead of easily recognizable and localized groups, individuals are part of complex networks of communication (Rainie & Wellman, 2012). Moreover, people - and I include myself here -may change their perspective about an issue or event. As a result of this, I needed to broaden the concept of advocacy to include, but go beyond, people.

A useful approach to select forms of advocacy that ease my concerns is to combine different forms of advocacy within this work. Stake (2010, p. 201) identifies six main ways of advocacy in the literature. Three caught my attention for this dissertation, namely:

1. Taking care of the necessities of the people who participate in the research (see Appendix C for a list of specific activities performed during and after fieldwork in the context of this principle of advocacy research as understood in this dissertation).
2. Predilection to change situations of injustice.
3. Favoritism for a more democratic society.

These forms of advocacy are useful for my work because they include people but also principles that go beyond people. In this sense, Greene (1997) argues, "[advocacy] implies a value commitment rather than a partisan stance toward a… stakeholder group" (p. 26). This allows advocating for groups of people, but not unreflexively or uncritically. These three forms of advocacy include a human aspect as well as they appeal to the principles that drive this research and shape the methodological choices. This is in line with Becker (1967, in Denzin 2012, p. 21), who states that, for the sake of transparency, the point of view of researchers advocating for someone or something has not only to be clearly expressed, but also linked to broader ideologies and values. My research is, then, guided by these principles of advocacy.

An example of my involvement with the subject of this work is when I was invited to appear on a regional radio program in Costa Rica to talk about environmental law and policies in August 2014. At first, I was invited to provide a background to the issues raised during the show by the environmental activists, but soon I understood that by describing relationships between local and global environmental governance in the context of this controversy I was, willingly or not, prioritizing values of nature and advocating for one ‘side’ of the issue, namely the side of those defending the rivers against the dam projects and their rights to participate in environmental decision-making processes. My participation on this radio program, thus, has elements of the three senses of advocacy that I employ in this research: I agreed to participate in the program and respond to the necessities of those locally affected by the dams; during my

interventions I talked about situations of injustice, and I defended the rights of people to be involved with more democratic processes related to the controversy.

### *3.1.5 How to Conduct Advocacy Research*

Code (2006) and Stake (2010) note that detractors of advocacy research overemphasize the potential bias of this approach. Instead of a limitation to my work, the need to protect myself from bias is an opportunity to refine my methods and arguments and "prevent phenomena from being forced into preconceived interpretive schemes" (Lather, 2003, p. 188). This involves the rethinking of the meaning of validity in research and embrace trustworthiness and rigor as criteria for methodological decisions in a postpositivist context (see Lincoln & Guba, 1985).

Following Lather (2003), efforts to achieve trustworthiness and rigor in this dissertation include: (1) Triangulation, that is, the combination of theories, methods and sources in qualitative research. This approach is increasingly common, but its origins are not new (see e.g. Denzin, 1978). There are different ways of achieving triangulation and the potential combination of what and how can be triangulated is almost endless. Triangulation calls for a flexible research approach, but in a systematic way; (2) Systematized reflexivity, which means both to explicitly consider my own positioning on the different spaces I have visited, and sometimes created, to collect data, and to avoid the appearance of reflecting a view from nowhere. This, of course, has methodological consequences, namely, a need to document my experiences, linking my attitudes to a broader context, as I go through the different phases of my work and share ideas with people. This is also related to research transparency and the need to justify my analytical decisions (see Padgett, 2008, p. 10); and (3) Member checking or face validity of the research process and outcomes, which is key to ensure the trustworthiness of the study (see Lather, 2003; Padgett, 2008). In practice this means that I explained the goal of my research to all people I encountered in the context of this project, and that some participants validated the final versions of this dissertation. In particular, this means that I arranged online meetings with the participants to show them this dissertation so that they could potentially enrich and/or challenge my interpretations and understandings. Another strategy that Lather

proposes is catalytic validity, which is focused on the need that participants in the study "gain self-understanding and, ideally, self-determination through research participation" (2003). This seems related to the notion of "conscienzation" by Freire. However, I see this process more as a dialogic move where co-learning happens between the participants of the study and me. Therefore, I relate this strategy with the above mentioned "arousal effect" and mutual influence between the participants and me.

In sum, reflection and transparency in choosing a qualitative approach is as important as is triangulation and flexibility. What follows is an elucidation of the qualitative approach adopted following strategies of transparency in contexts of a flexible postphenomenological research of imaginaries.

### *3.1.6 Transparency and Flexibility*

Transparency involves paying as much attention to what is included and excluded in an analysis. The opposite of transparency is when qualitative research is only about doing interviews and showing pieces of it in a selective and indiscriminate way. To avoid this trap, transparency thus requires consistency by identifying and applying a "tradition" (Creswell, 1998) or "strategy" of inquiry (Denzin and Lincoln, 2000) that addresses research questions. As I was doing advocacy research, one of the "strategies" of inquiry on the table was Participatory Action Research. PAR is a participatory method that aspires to have communities solving local problems, in my case, with the help of the scientific community. According to Susman (1983), there are five stages of that characterize PAR: diagnosis (of problems), action plan (to tackle the problems), action (against the problems), evaluation of it, and specific learning. Comparably, McIntyre (2008) divides PAR into the stages of questions, reflection, investigation, development, implementation, and refinement, and Zuber-Skerrit identifies stages such as planning, acting, observing and reflecting (1991). Doubtless, some of these stages overlap with my work, but in the context of my research focusing on an already existing controversy with complex ramifications, a linear research planning like the one proposed by PAR is more valid for long-term projects, rather than for a dissertation of limited temporal scope.

So, although I continue to be inspired by approaches like PAR, I had to look for other candidates. I base this dissertation on empirical case studies. Adapted from Yin (2009), I define case study as an empirical endeavor that explores a "phenomenon in depth and within its real-life context, [especially suitable when], the boundaries between phenomenon and context are not clearly evident" (p. 18), as is the case of this study on imaginaries of knowing and being. Case study has been a fruitful approach in much STS work. However, there are other empirical approaches to STS that have shaped the field. One of them is (multi-sited) ethnography, which will also be adopted within this dissertation. Of course, these are not mutually exclusive methods of inquiry, as they rarely appear in their "purest form". But if used as ideal types (Weber, 1949), they serve as guidance to differentiate, and find similarities, between my approach and others. Multi-sited ethnographic case studies, then, will provide the empirical guidance for this work (but I stress not in a rigid or restrictive way).

Second, flexibility could be similar to what Small (1995) coins as "methodological eclecticism" in research. Eclecticism, however, is not simply a panacea for solving all methodological challenges. In that sense, Fuller and Collier caution about the "fallacy of eclecticism"; "the belief that many partial methods add up to a complete picture of the phenomenon studied" (2012, p. 35). But there is a difference between an eclectic and a flexible approach. While the Oxford Dictionary defines the adjective eclectic as an act of "deriving ideas from diverse range of sources" (2014), flexible means something "able to be modified to respond to altered circumstances" (2014). Flexibility then means to have an initial plan and adapt it to contingencies as they occur rather than simply picking a variety of methods from the beginning without knowing exactly the variety of conditions of the fieldwork. As Charmaz notes, it is adequate for researchers to "leave openings in their proposals that allow flexibility for such strategies as adding methods or returning to earlier settings and participants" (2012, p. 131).

Of course, adapting to circumstances involves choosing different methods at some point of the process, but in this case, only as a consequence of having an established, but flexible, plan. Methodological flexibility is rooted in the origins of qualitative research from its

earlier days. But still today, flexible strategies are given credit for adding cogency and deep meaning to qualitative approaches (Charmaz, 2012 p. 129). An example of a flexible agenda is the triangulation movement of the seventies, which focused on mixing methods within the qualitative paradigm (Denzin, 2012).

In short, I offer this work as transparent in the sense that it adopts a particular strategy of inquiry, multi-sited ethnographic case study, which offers possibilities for coherence and continuity throughout the research process. However, to move in the different directions that this project took, I used different sources. This makes this qualitative inquiry not only transparent, but also flexible in methodological terms. Below, I articulate why I have chosen a particular strategy of inquiry in the context of a postphenomenological approach.

## 3.2 Empirical Strategies

### *3.2.1 Postphenomenological, Multi-sited and Ethnographic Case Studies*

Postphenomenology is an approach related to the philosophy of technology and materiality. This approach has methodological implications. First, postphenomenology focuses on interrelational ontologies, which take into account but also look beyond linguistic-centered approaches. In this regard, Ihde (2009) notes that "human experience is to be found ontologically related to an environment or a world, but the interrelation is such that both are transformed within this relationality" (p. 23). Postphenomenology involves a focus on the multistabilities of phenomena, which means attention to the mutual mediation of entities (see Rosenberger & Verbeek, 2015). Bearing this in mind, I now outline empirical tools of this dissertation, which are based on multi-sited ethnography.

Ethnography probably is the method most related to the field of STS since the publication of *Laboratory Life* by Bruno Latour and Steve Woolgar in 1979 (Latour, 1986). They originated the field of *laboratory studies*, which has become one of the most important contributions of STS. Latour has been known by his iconic motto: "follow the scientists" (1987, p. 210). In spatial terms, that claim was true in the literal sense of the word. Especially the early laboratory studies were located in well-defined spaces with recognizable actors. In that sense,

ethnography is ideal in exploring questions that involve such spatial boundaries. Creswell notes that typically, ethnography "is appropriate if the needs are to describe how a cultural group works and to explore the beliefs, language, behaviors, and issues such as power, resistance, and dominance" (1998, p. 70). Usually, the study of a particular cultural group, and not an extended network, involves for the researcher to focus their work on a single well-defined location.

However, unlike many of the early ethnographic works in STS, my dissertation is neither about scientific communities in well-defined institutions, nor about spending a long period in a particular location. Instead, this dissertation places emphasis on different spaces and times where imaginaries are articulated in light of a socioenvironmental controversy. My strategy for inquiry had thus to be coherent with these circumstances, which means, in light of "more complex objects of study" (Marcus, 1995, p. 95), the adoption of multi-sited ethnography.

What does it mean to use a multi-sited ethnographic strategy in terms of space and time? In multi-sited ethnography, the uses of spaces and time that researchers employ are more selective and flexible. Indeed, as Marcus argues, temporality becomes more important than place in multi-sited approaches. In this sense, Beaulieu et al. (2007) have shown that the combination of different social settings is more relevant than focusing on localized physical spaces. As a result, she has focused on the notion of co-presence, which does not require physical presence, rather than on the co-location of the researcher, in the context of research agendas that do not have clear spatial boundaries (Beaulieu, 2010). In this dissertation, co-presence means to negotiate and explore my participation in different events related to the socioenvironmental controversy, even though, for example, I was not physically present in such events.

Ethnography, in its origins, requires long periods to be immersed into the life of social groups to discover their underlying cultural patterns. Time is not, nevertheless, something "out there" that restrains, or enables, the work of researchers. As Latour notes, "time is what is counted" (1999, p. 88). Temporal scales of research are socially constructed through selective couplings between the researcher and the different sites that he or she has chosen to physically

or virtually visit through the fieldwork. Thus, I had to be aware of the "temporal cycles of research" (Beaulieu, 2010, p. 462). That is, I had to identify flows of information in multiple settings that have different temporal patterns, which include for example, online forums of debate, which is continuously updated by dozens of users of the environmental groups, and a radio program, which weekly deals with the socioenvironmental controversy. My strategy was not to collect all possible data at some point before the analysis, but to be present in the moment in which it was generated. Following Beaulieu (2010), this meant avoiding anonymity and voyeurism toward data, and instead making my presence felt in these different sites over time.

A good example of co-presence and the creation of unexpected temporal cycles of research is when I was called during a protest of frontline communities who were in front of the city council meeting in San Isidro, Costa Rica, while I was back in Canada. They told me they did not have access to the meeting. So, they asked me whether I knew examples of peaceful ways to stage public protest based on my experience with First Nations communities in Canada at that time. This reminded me of the importance of the body in protests organized by First Nations.

In 2012, the *Idle No More* movement led by First Nation communities in Canada emerged to protest against Bill C-45 and the exploitation of resources in the First Nation territories. This issue was interesting to me because I had just passed my comprehensive exams and one of the topics of the exam was the relationship between First Nation communities and the health care system. I attended several First Nation communities' events at the University of Toronto. That is where I learned the value of the body to these communities, and in this particular case, I gained an understanding of how, in light of First Nation protest movements, each person's body symbolizes the last available means of protest when all else is lost.

So, spontaneously, I told people demonstrating in front of the city council in San Isidro that the simple fact of being there, in a peaceful way, and being seen was important to be counted. I did not tell them what do, because they were already doing it, but I put their actions into a particular context that legitimated their way of protesting and linked it to a broader framework of protest traditions in America.

### *3.2.2 Imagining Research on Imaginaries*

As Salazar notes (2012), the study of imaginaries remains a challenge. As mentioned in the last chapter, understandings of imaginaries continues to be a work in progress, and there is little agreement on their relevant levels of study. It is no surprise then that there is a diversity of methodological frameworks used in studies on imaginaries. The characteristics of each study influences choice in methods. However, there are some general patterns, which I now explore.

As can be expected, most of studies on (spatial, environmental, scientific, energy, sociotechnical) imaginaries have employed interpretative methods of research. The three main techniques used are interviews, participant observations and content analysis of texts. In the context of sociotechnical and environmental imaginaries, there are studies that combine at least two of these techniques (e.g. Nesbitt & Weiner, 2001; Levidow & Papaioannou, 2013; Eaton et al., 2014). Others rely more on a single technique to do empirical research. For example, McGregor (2004), in his article on Australian environmental imaginaries, acknowledges that focus groups are well-positioned to grasp imaginaries because imaginaries are collectively shared in public and therefore individual interviews are not appropriate to explore imaginaries. Furthermore, Burri (2015) analyzes policy documents to identify the sociotechnical imaginaries of nanotechnology in Germany and the United States.

In general, these studies are based on discourses, either written or oral, and practices. With this approach they often overlook the importance of visual representations to illustrate imaginaries. Although the existence of visual studies in STS and History of Science is unquestionable (see e.g. Lynch & Woolgar, 1990; Daston & Galison, 2007), this area of scholarship is still limited compared to text and oral-based approaches, and has been based on scientific representations, rather than on the intersections of scientific and non-scientific visual imageries, as this dissertation proposes in Chapter 5, for example.

This dissertation responds to the challenge of combining visual and non-visual sources. Despite the multiple forms that imaginaries can take, studies specifically on sociotechnical and environmental imaginaries are notable for the absence of research projects that combine

methodological resources. No doubt, these studies are meritorious in identifying underlying imaginaries, but they are based on few methodological perspectives, compared to the "multiple conduits through which [imaginaries] pass and become visible in the form of images and discourses" (Salazar, 2012, p. 867).

This is what I call the ontological-methodological gap in the study of imaginaries. On the one hand, as the literature has shown, imaginaries are present in multiple spheres of life, but on the other hand, the evidence is derived from few sources. Due to the lack of methodological diversity, in this dissertation, I aim at developing a research project that provides insight into the diverse visual, oral, written, and tacit forms in which imaginaries become enacted across diverse temporalities and spatialities. A multi-sited approach informed by Castoriadis´ poly-regional ontological assumptions seems ideal to elucidate complexities of imaginaries in socioenvironmental controversies.

### *3.2.3 Practices of Analysis and Interpretation*

The empirical tools of data collection that informed this research are various. While I used participant observation, informal interviewing, and unstructured interviews in all the three following empirical chapters (4, 5, and 6), I used, specifically, discourse analysis in Chapter 4 and visual analysis in Chapter 5. In the next paragraphs, I am going to describe these techniques in the context of this dissertation, highlighting the way in which I triangulated each of them.

#### 3.2.3.1 Participant Observation

Participant observation is an ethnographic tool I use to gather information on the different activities and events in which I participated during fieldwork. Schensul and Lecompte are of the opinion that events "are activity sequences that can be bounded in time and space". In this sense, events are "larger, longer, and more complex than single activities that take place in a specific location." (2013, p. 94). In the present dissertation, participant observation means observing what people do during their activities, with special emphasis on the meaning they attach to it. Unlike the traditional sense of ethnography, however, my approach is closer to the multi-sited ethnography that I mentioned before. In this sense, Marcus (2007) has gone some

way towards changing the understanding of participant observation, and this means to engage with the participants in a way that "ally complicitly in mutual awareness of a motivated interest" (p. 7). Collaboration is the key to doing research under the multi-sited notion of participant observation. As Schensul and LeCompte (2013) argue, participant observation varies according to the degree of participation.

#### 3.2.3.2 Informal Interviewing

This dissertation includes informal interviewing understood as "interactive conversations that take place between researchers and others in the field settings in the course of daily activities" (Schensul & Lecompte, 2013, p. 103). As I stated earlier, I did not take the perspective of an outsider, but rather I engaged and contributed to shape the activities and events of the participants in this study. For example, during the activities and events observed in this research, I often gave my opinion about several issues and news related to the controversy. This does not mean, nevertheless, that I fully understood all these issues that happened in the communities. In some cases, I did not hesitate to ask people of the communities to interpret their own opinions, actions and behavior in case of potential ambiguity.

#### 3.2.3.3 Unstructured Interviews

In addition, I conducted unstructured interviews. This involved dialogues for about one hour in order to interpret how daily life stories are associated with experiences and actions in the socioenvironmental contexts in which my participants live. Unstructured does not mean chaos. The interviews are unstructured because, I want to focus on "the most important influences, experiences, circumstances, issues, themes, and lessons of a lifetime" (Atkinson, 2002, p. 125), either in the past or the present. An advantage of unstructured interviews is that they "allow more fluid interaction between the researcher and the respondent" (Marvasti, 2004, p. 20). In doing so, "respondents are not forced to choose from a pre-designed range of answers; instead, they can elaborate on their statements and connect them with other matters of relevance" (pp. 20-21). The conversation included some guiding topics, but I did not apply strict interview rules. This allowed me to know, for instance, why this person has decided to join an

environmental group, the life experiences of this person with rivers and other forms of life, and his or her knowledge practices, among other topics. I asked participants to elaborate more about their responses, instead of rapidly jumping to the next topic. In doing so, I shifted some of the leadership in the conversation over to them.

In total, I conducted 14 unstructured interviews - five women and nine men who are opposed to the development of run-of-the-river dams. The participants live in San Isidro del General and nearby towns such as Quizarrá, San Pedro, Palmares, and Longo Mai. One of the participants lives in Canada, but he is from this area of Costa Rica, which he visits often. The participants work in a variety of professions, including farmers, students, artists, scientists, homemakers, and those who have "different small jobs to survive", as one participant told me. About a half of the participants identified themselves as part of environmental movements. Usually they are members of *Ríos Vivos* in Costa Rica. And then there is representatives of other environmental associations such as COCOFOREST (Comité de Conservación Forestal). In some cases, participants have multiple memberships in a number of such environmental groups.

I transcribed the interviews myself in Spanish language. Following Lapadat (2000), who questions the neutrality of transcriptions, I approach these transcriptions as problematic. Translating and transcribing dialogues into a written copy is not a straightforward activity. I am, thus, explicitly concerned with the conventions that apply to the transcriptions of this dissertation in light of a post-positivist approach. When transcribing, I took into consideration the gestures (of which I took notes while conducting life stories), interruption, intonation, pace and pause in the conversation. As Lapadat notes, specifying the principles that apply to transcriptions provides a "shared understanding between researchers and readers" (p. 205), and in addition, it allows a more consistent interpretation of each transcription.

Participants signed an informed consent form in Spanish, which is included in Appendix F.

3.2.3.4 Participant Checking

At the end of this dissertation, I wanted to conduct a participant checking. Before finalizing dissertation chapters, I pre-circulated versions to get feedback from members of the communities where I conducted research. Finally, this was reduced to one person, who is an active member of *Ríos Vivos*. In any case, I kept several members of the communities informed about the content and development of this project.

*3.2.4 Discourse analysis*

In Chapter 4, I conducted a discourse analysis of a document. Documents also reflect imaginaries. By document, I understand, following Shankar et al. "any artifact that includes substantial references to the social processes through which it was produced and reproduced" (2016, p. 59). I used discourse analysis to explore an Environmental Impact Study conducted in the development of dams in southern Costa Rica, in particular, in the San Rafael River.

The literature relating to discourse analysis and environment policy is vast and spans several disciplines. Especially since the 90s, discourse analysis has been widely used as an analytical framework not only to understand, but also to change, the way to study environmental policy. Feindt and Oels (2005) have identified five main contributions of discourse analysis to environmental policy: first, the way that discourse shapes our understanding of nature. Second, the power effects that such discourse about nature may have. Third, discourse analysis has challenged taken-for-granted notions of time and space in environmental discourses. Fourth, discourse analysis has opened possibilities for institutional reflection based on the identification of present and absent discourses in environmental policy. Finally, and perhaps most importantly, discourse analysis has been also involved in the mapping of subjects and identities within environmental policy and legislation.

This latest contribution is the most related with the present paper. However, even though the position of "others" in specific ways within environmental discourses has been a fruitful topic in policy and legislation, it has been rarely employed to explore EIA. In that sense, identities articulated in EIA have become blackboxed. Of course, some papers relate discourse

analysis to EIA, but largely they have focused on discourses of different stakeholders about EIA. For example, Rozema et al. (2012) and Runhaar (2009) have identified discourses surrounding EIA that emphasize particular normative and legal aspects over others. They show how discourses influence the way that EIA is perceived and used for decision-making. This means that, for the most part, discourse analysis has been mainly used to explore the social context of EIA, and thus the discourses that are embedded within, and not about, EIA, remain mainly unexplored.

#### 3.2.4.1 Triangulating Discourse Analysis

Can I triangulate discourse analysis with a postphenomenological multi-sited ethnographic approach? The answer is yes, but it requires theoretical justification. As it is well known, Foucault places emphasis on discursive formations as constitutive of social reality. The formation of particular discourses is key to understand the constitution of regimes of truth, which, for Foucault (1977), involve "a system of ordered procedures for the production, regulation, distribution and circulation of statements [which form discourses and subjectivities]" (p. 14). In her analysis of Foucault, Tovar-Restrepo argues that this may lead "to a linguistic idealism that [denies] the world any external reality independent of language or discourse, and that [denies] the subject any agency in the creation of social reality" (2012, p. 134). Castoriadis does not deny the importance of discourse. Indeed, similarly to Foucault, for Castoriadis, discourses, constituted by symbolic networks, are constitutive of "collectivities and [an] image of the natural world" (1987), which are not neutral. But whereas for Foucault the subject cannot take an independent perspective outside discourse, Castoriadis places discourse and the subjects in a broader context defined by his poly-regional ontology, and especially his notion of social individuals. As reported in the conceptual framework (in Chapter 2), Castoriadis develops a theory that rejects deterministic reduction of social individuals and aims at rethinking their role outside discourses. Importantly, this involves a normative perspective based on autonomy and heteronomy, which is absent in Foucault´s work. Drawing on the empirical findings generated in the present chapter, this normative aspect will be discussed in Chapter 7.

Taking into consideration the above paragraph, the question now is how I can triangulate sources of data discourse analysis with ethnographic research tools such as participant observation and unstructured interviews. The triangulation of sources of data refers to the collection of data from different sites, at different times and from various sources of information. As Denzin (1978) notes, while triangulation does not necessarily involve an increase in the validity of research, it allows, at least to some extent, to learn more about different aspects of a same topic. For example, in Chapter 4, combining sources of data allows identification of imaginaries articulated in instituted documents like an EIA through discourse analysis, and at the same time, an elucidation of variations of these imaginaries in other sites where they are articulated using ethnographic research. As Lima says (2010), "ethnographers may use discourse as way to understand participant´s social context" (p. 5), that is, a "thick description" using Geertz´s term (1973). This gives a more dynamic and less static perspective to discourse analysis. This is ideal for my research study based on a postphenomenological and multi-sited agenda guided by an interrelational ontology.

### *3.2.5 Data Interpretation*

The process of data interpretation (of participant observation, informal interviewing, unstructured interviews, and discourse analysis) is based on a recursive process, which goes back and forth between data and theoretical assumptions as laid out in Chapter 2. For LeCompte and Schensul (2013), recursivity means exploring "data both from "top down" (deductively, using predefined coding categories for analysis) and from "bottom up" (inductively, developing newly identified codes/analytic categories)" (p. 83). In practical terms, this involves dividing interpretations into two "coding cycles" (Saldaña, 2009) to transcend inductive and deductive reasoning.

In this first cycle, I analyzed data (reading notes and transcriptions several times) paying attention to basic topics and relations related to the research questions of each chapter. In doing so, I prioritize identification of relationships between and among actors (or actants) over the study of isolated categories that emerge. Whereas most qualitative research focuses on exploring discrete categories, the analysis of connecting strategies is less common (see Maxwell

& Chmiel, 2014, p. 27). This first cycle acts as a filter to reduce the complexity of data into a few relations among categories. This is an open-ended process, whose goal is exploratory, and can be related to what Saldaña calls “descriptive coding” (2009, p. 70).

In the second cycle, after revising the theoretical foundations of this work, I go back to the data refining the connectivity of different codes. For Saldaña, the second cycle coding methods are “ways of reorganizing and reanalyzing data coded through the first cycle” (p. 149). Among the different methods proposed by Saldaña in this second cycle, I chose to apply the “pattern coding” one (p. 152). As Miles and Huberman say, pattern coding is about pulling “together a lot of material into a more meaningful and parsimonious unit of analysis” (1994, p. 69).

The repetition of topics and terms was as important as their quality. In that sense, in his overview of qualitative research, Mike Crang affirms that “what is generally of interest is not so much the codes as the text they denote, not how often they occur but what is in them” (Crang 1997, p. 188). In any case, this is not a mechanistic process, but flexible and synergistic to some extent. Sometimes, this process does not involve an easy transition from one cycle to the other, but rather complex ways of recursively approaching both cycles. Indeed, the documentation of ethnographic research is particularly difficult due to its open and flexible design.

I used ATLAS.ti 7 to organize, manage and analyze data throughout this research project.

### *3.2.7 Researching Visual Images*

Images matter in this dissertation. As mentioned above, not only texts convey imaginaries, but also images. Indeed, images are relevant to the study of controversies because they may be “primary sources of insight into the imaginations of non-state actors such as corporations, non-governmental organizations, and popular movements—many of whom do not produce official documents, records, or histories” (“Program on Science Technology and Society”, n.d.). This is especially important in this research because environmental groups and

local communities place considerable relevance to images to articulate visions of water worlds. This is in line with what Emmanuel David has called "visual resistance strategies" (David, 2007).

However, despite this relevance of the visual, images have not been a popular focus of social analysis, perhaps with the exception of anthropology (Emminson & Smith, 2000). This has fostered an intellectual environment in the social sciences dominated by "discipline[s] of words" (Mead, 1995), and the "invisibility of the visual" (Fyfe & Law, 1988). Yet images have not been completely ignored, and if one looks, for example, at the second half of the 20th century, there are exemplary works on the role and application of images in several areas (e.g. Mead, 1963; Collier, 1967; Berger, 1972; Goffman, 1979), and a growing interest in using pictures as a means of social critique (see Stanczak, 2007).

Nevertheless, it was not until the 90s when images became a popular tool for social researchers. This is what has been called the "visual turn" in social sciences (Burri, 2009), which has contributed to the rapid growth in number of journals and handbooks dealing with this topic. As Przyborski and Slunecko (2012) point out, "'image is booming in the most diverse fields of [social] enquiry" (p. 40). Nevertheless, this increase in visual methods is still modest, and we are far from having a unified visual research program. Indeed, the separation of the different ways to understand visual methods is, if you will forgive the repetition, well visible and product of different epistemological, ontological and methodological assumptions within the social sciences (see Pauwels, 2015; Stanczak, 2007).

#### 3.2.7.1 Aspects to Consider When Researching Images

Visuality, according to Foster (1988, p. ix), refers to "how we see, how we are able, allowed, or made to see, and how we see this seeing and the unseeing therein" (Foster, 1998a, p. ix) within particular scopic regimes. For Rose, scopic regimes involve "the ways in which both what is seen and how it is seen are culturally constructed" (2001, p. 6). I would add that, in line with the postphenomenological approach of this dissertation, such cultural construction has a world referent that is active and creative.

Rose distinguishes between the conditions in the production of the image; the image itself; and how a particular audience sees the image, as the most important aspects of visual artifacts. Notwithstanding the lack of agreement in the literature as to what is the most relevant layer for analysis, Rose believes that the three of them are relevant, but, importantly, this depends on the circumstances of each site where forms of visuality emerge.

Thus, images need to be interpreted according both to their own characteristics and the possibilities of access I had to them. For example, it is not the same to study visual artifacts in found documents like an Environmental Impact Study as it is to study in situ the creation of collages in a workshop. These limitations highlight the difficulty of comparing different sets of visual materials using the same standards.

#### 3.2.7.2 Limits of Visual Research

Following the principles of a multi-sited postphenomenological analysis, instead of focusing on a single site where visual artifacts are used, I seek to interpret several sets of images co-created in different spaces at different times. As Rose argues, "interpretation of images is just that, interpretation, not the discovery of their truth" (2001, p. 2). In determining the empirical procedure of this section on visual research, thus, I am far from claiming that I have discovered the ultimate meaning to the multiple visual artifacts present in the controversy over run-of-the-river dams in southern Costa Rica. Instead, my more modest goal is to show some of the main visual variations in the emergence of forms of visual water worlds, and its consequences.

In the literature, there is a distinction between found and generated visual materials (Pauwels 2015). In the context of this dissertation, I find this distinction problematic because even though I explore visual protest generated in events, I mainly explore it through the lens of images generated by me. This means I use representations, for example, of collages and other images. Borrowing a term from Grossi (2007), these pictures are the "I" through my eyes, and thus a representation of the visual material, not a replication of it. In this sense, Collier and Collier (1967) have keenly observed that while using a camera is mediated by the expectations

of the operator, in this case myself, once the photo has been taken, there are unexpected appearances in a picture that the operator cannot realize beforehand. In other words, one can have some control over the framing of the picture, but the outcomes are unexpected, and open to analysis.

Below I provide criteria for interpretation of images in the context of this particular research project. In doing so, I combined different approaches to visual research mainly including a first impression analysis developed by Stefan Müller-Doohm (1997) and a procedure to interpret images divided into three steps by Panofsky (1955). I adapted the latter to the characteristics of a multi-sited postphenomenological research approach.

#### 3.2.7.3 A First Impression Analysis

Purposely, I did not analyze all the visuals in each site. Instead, I presented a selection of images, known as prototypes, based on a way to classify images developed by Stefan Müller-Doohm (1997, pp. 81-108). He uses an analytical procedure as follows:

1. Beginning with this first step, the goal is to identify and enact patterns of meaning across a particular set of images, including their potential accompanying text and words. Müller-Doohm terms this process as a first impression analysis, whose purpose is to provide a first overview based on the elements, arrangement, and style of the represented images and the primary messages of the text, in case it contains it.
2. The second step consists in considering the different possibilities of meaning within the collection of visuals and texts that I have sorted out in the previous step. Once I have done so, I will choose a visual prototype as a reference, which visually illustrates the meaning that I want to focus on here.

#### 3.2.7.4 Interpreting a Prototype in Three Steps

Once I have a prototype, the goal is to provide a more in-depth analysis of it. In my treatment of the prototypes in Chapter 5, my focus is on both their content and their socionatural relations to other webs of signification. As many have argued, the content and composition of

images are not the only relevant dimension of images. For example, in his critique to formalism in the arts, Whitely notes that the study of the visual composition should be "conjoined to other types of analysis so that the visual scrutiny of what can literally be seen can be studied in relation to reception, meaning and content" (1999, p. 107). In making this comment, Whitely urges us to perform "a reorientation to the scrutiny of the visual" (p. 122), and thus, to open to other various interpretations beyond the strict limits of the visual composition.

With this in mind, I divide the analysis of each prototype into three steps. This way of analysis is reminiscent of Erwin Panofsky´s work on iconography, in which he divides the study of visual images into primary or pre-iconographic, secondary or iconographic, and intrinsic or symbolic categories (see e.g. Panofsky, 1955). However, I did not strictly follow this model, and instead I used a variation of Panofsky's procedure to adapt it to the theoretical and ontological settings of this dissertation. In any case, I refer to these steps using Panofsky´s terminology, but again, used in a loosely manner to adapt it to my ontological viewpoint mainly based on Castoriadis:

1. Primary. The first step corresponds to the analysis of the "configurations of line and color [which serve] as representations of natural objects such as human beings, animals, plants, houses, tools and so forth" (Panofsky, 1955, p. 28). In Rose's words, this involves a visual "compositional interpretation", that is, a very careful look at the "content and form of images" (2001, p. 37). I am far from including a comprehensive set of compositional elements, but in following Rose, some aspects that are relevant for the study of the content of visuals include its content, color, spatial organization, and the chosen point of view. Bohnsack (2008) defines this step as a study of the denotative message of images. However, given the theoretical framework of this dissertation, the distinction between denotation and connotation is problematic. Castoriadis conceives meaning as occurring within a web of significations that necessarily relate to imaginaries. The relation between a denotative and connotative is, for him, arbitrary and necessarily conventional (see Adams, 2011, p. 106).

2. Secondary. The second step involves, thus, a more refined interpretation of the visuals through a deeper consideration of "a mental construction of actions and stories that might have taken place in the picture" (Philipps, 2011, p. 11). This means an identification of "a specific cultural orientation or expression, if all particular meanings of visual and textual elements are coherent with each other" (p. 10). Making use of the association of the image with the surrounding discourses and practices, this step presents "the world of specific themes or concepts manifested in images" (Panofsky, 1995, p. 29).

3. Reflexive-comparative interpretation. For Panofsky, the meaning of an image can be "apprehended by ascertaining those underlying principles which reveal the basic attitude of a nation, a period, a class, a religious or philosophical persuasion" (1955, p. 30). Given the theoretical foundations of this dissertation, instead of looking at the intrinsic meaning of an image, I look at the meaning in a broader horizon. In this sense, Fyfe and Law (1988), argue that the study of a "visualization" requires an understanding of "its principles of inclusion and exclusion, to detect the roles that it makes available, to understand the way in which they are distributed, and to decode the hierarchies and differences that it naturalises." (p. 1). In this dissertation, this means a study of the context of dislocation of images, which according to Ferrell and Websdale (1999, p. 240), refers to the idea that despite the locality of the creation of images, their meaning is located in more dispersed spatialities within intertextual dynamics. In this sense, Ferrell and Websdale claim that his approach aims at capturing "particular patterns of meaning and style, but in doing so follow[s] no set of temporal or geographic order" (1999, p. 240).

### 3.3 Last thoughts

I divided this chapter into two parts. In the first part of the chapter, I showed how I situated my own perspective within this project. I relate this perspective to an advocacy research approach. I argue that taking this perspective has methodological consequences for my study,

including a need to acknowledge that this project has to be “transparent” and “flexible”. In establishing a transparent and flexible agenda in light of an advocacy research approach, I adopt a research tradition, but in a flexible and unrestricted manner.

The second part of the chapter was about the choices and decisions that I face in the empirical part of my dissertation. In alignment with the theoretical framework of Chapter 2, I use multi-sited ethnography to examine multiple locations in which I conduct research. I use different ethnographic techniques such as participant observation, informal interviewing, and unstructured interviews. I also apply discourse analysis to interpret an Environmental Impact Study (EIS) of a dam, and introduce the visual methods that I employ in this dissertation.

# Chapter IV: Imaginaries of Knowing and Knowers

The San Rafael River is one of the rivers targeted by developers to build a run-of-the-river dam in the south Pacific side of Costa Rica. In May 2015, I was sitting on a stone by this river in the San Pedro district, when Jorge, a local farmer, said (Figure 5):

> If we stay at home, we are unlikely to win this battle against the dam. All battles can be won but only through effort and care, otherwise it would be very difficult to do so here in the San Pedro district.

**Figure 5: Meeting on the stones of the San Rafael River.**

The San Pedro district belongs to the Pérez Zeledón Canton and comprises 16 rural villages crossed by the San Rafael River. Jorge is a farmer and an intermediary between the local communities of the San Pedro district and activists of *Ríos Vivos* who live in adjacent districts. He plays this role, in part, because the local resistance to dams in the San Pedro district took longer to be organized than in other communities with a more activist militant approach, like Quizarrá (El General district) and Longo Mai (Volcán district).

Most members of *Ríos Vivos* come from Quizarrá and Longo Mai. Quizarrá is part of the Biological Corridor Alexander Skutch, established in 2005. This means that communities in the corridor have contacts with international networks and organizations that promote environmental research and have interest in ensuring that no dams are built in the area. Similarly, dams planned adjacent to the Longo Mai community have a strong opposition due to the historical links of members of this community with social movements that go back to the 70s and 80s. Today, Longo Mai is a platform project for arts, ecological education, and alternative agriculture, among other activities. Perhaps unsurprisingly, given longstanding relationships with international ecological and social movements and organizations, members of Quizarrá and Longo Mai´s communities took the lead in the fight against dams through the articulation of the *Ríos Vivos* movement. This was the case, at least, during the period of my fieldwork 2013-2015. Later on, neighbors of the San Pedro district created the Commission in Defense of the San Rafael River [Comisión Pro Defensa del Rio San Rafael] and increased their level of organization.

And yet despite this, residents of San Pedro are also familiar with ecological struggles of this kind. Despite having fewer international relations and less-support from well-established ecological and social movements, the San Pedro community has precedents in struggling for the recognition of their forms of being and knowing in light of ecological changes induced by humans, as I show later in this chapter with the example of a landslide that affected the community in the nineties.

Sitting on stones in a circle, near the stretch where the run-of-the-river dam had to be built according to the plans of the developers, I was not alone with Jorge, but also with other members of the community including farm families with their kids and their dogs. We were between 25-35 people in total. There were also two members of *Ríos Vivos*, whom I had accompanied to the gathering. We were eating tamales, a Mesoamerican dish, which local residents shared with everyone present near the river. Even though this scene in the river looks calm and tranquil, I sensed that there was some uneasiness in the environment given the importance of the issue at play here.

The goal of the meeting was to prepare a public appeal against an Environmental Impact Study (EIS document) of the dam of the San Rafael River. The EIS document is the report, which is part of the process of Environmental Impact Assessment (EIA). The EIA process includes the whole process necessary, including the EIS document, to obtain the environmental viability of a project.

The two members of *Ríos Vivos* have experience in dealing with EIS documents from other run-of-the-river dam projects in the area. So, they wanted to share their know-how and insights with the members of the San Pedro district, who were shocked by the fact that the dam developers had successfully passed the EIA with no major objections, and thus the hydroelectric dam on the San Rafael River had been approved in environmental terms.

This made me think about the power that a document such an EIS document could have over the life and fate of the community. Indeed, that day I asked myself about the origins of this mechanism of decision-making and under what conditions it had been circulated and adopted in Costa Rica. This is what I show in the following paragraphs.

### 4.1 Environmental Impact Assessment, from the US to Costa Rica

Where does EIA come from? How does it travel? Who does it involve and who does it exclude? How is the EIA (re)contextualised in the context of Costa Rica? Tracing the genealogy of EIA takes us to the US at the end of the sixties, when **t**he establishment of the National Environmental Policy Act (NEPA) introduces Environmental Impact Assessment. The Act mentions that the impact of activities likely to have effects on the environment should be assessed through a "systematic and interdisciplinary approach" in order to inform "decision-making" (National Environmental Policy Act of 1969). Considered by some as the Carta Magna of the environment (Council on Environmental Quality 1993), the NEPA, and its numerous revisions, is now firmly embedded in the political culture of the US.

Despite recent debates about its status (especially after the presidential election of 2016 in the US), several cases of court litigation have strengthened the enforcement of EIA in the past decades. For example, a remarkable seminal case is the Calvert Cliffs' Coordinating

Committee v. United States Atomic Energy Commission in 1971, which has been known as the Calvert Cliffs Decision (Walker, 1992). The litigation was between those responsible for the construction project of a nuclear power plant in Maryland and its opponents. To resolve the controversy, the court decided that the agency in charge of the development of the plant had taken insufficient interest in the importance of EIA (known as Environmental Impact Statements in the American context). As a consequence, the NEPA requirements are enforceable "to the fullest extent possible" for the agencies developing "policies, regulations, and public laws of the United States" (NEPA, 1969, as amended, Sec. 102 [42 USC § 4332]). This move represents a reinforcement of the environmental considerations in American political and economic development. One of the consequences of the Calvert Cliffs Decision is that the EIA gained authority to define and assess the environmental considerations, which should orient not only the political but also the economic development of the US.

And yet, how is it that it became the standard for many countries to be applied, including Costa Rica? A number of intergovernmental treaties and organizations contribute to the expansion of EIA well beyond the US national boundaries. In 1972, EIA was presented as an instrument with universal appeal at the United Nations Conference on the Human Environment in Stockholm (see Baya-Laffite, 2016). The first international document that included EIA requirements was the OECD´s "Declaration on Environmental Policy" of 1974. At that time, several countries adopted EIA procedures like, for example, Australia (1974), Thailand (1975), France (1976), and Philippines (1978).

However, it was not until the 1990s, with the adoption of a top-down oriented procedure (see Modak & Biswas, 1999), that the regulatory frameworks of many countries, especially in Latin America, formally introduced the EIA within the context of sustainable development approach. The World Bank not only supported this initiative, but also was key initially in defining what constitutes the norms applicable to EIA, and later in the expansion of EIA as an environmental governance tool around the world, as I show below.

As Baya-Laffite maintains (2016), the World Bank is a "nearly unchallengeable authority" (p. 242) in establishing the epistemic conditions and criteria for producing

environmental knowledge for EIA. Similarly, Goldman (2005) has shown in his book, *Imperial Nature*, that the World Bank produces its "own style" of environmental knowledge and epistemic tools through "assembly lines of knowledge production inside Bank headquarters" (p. 103) that provide guidelines for EIA procedures around the world.

For the World Bank, environmental knowledge produced in light of development projects is a priority, especially since the conflict over the failed construction of a dam in Narmada, India, in 1990 (see Goldman, 2005). The local communities in Narmada accused the World Bank of false information about the consequences of the dam, and forged alliances with national hydrologists to provide alternative information about potential effects of the dam over the Indian communities. Given the dynamics of the conflict, the World Bank was forced to cancel the project. Especially thereafter, the World Bank feared that "any [future] project without rigorous scientific support could evaporate under social movement pressure or presidential fiat" (Goldman, 2005, p. 153). So, the World Bank organized a review panel, in which Thomas Berger, the deputy chairman of the independent review panel, who in his report complained about the omission of the downstream consequences of the project.

The expansion of EIA around the world has now reached more than 120 countries (Baya-Laffite, 2016). Goldman has linked this expansion to global capital investment that needs to manufacture "consent" (2005, p. 149) regarding potential uncertainties that an investment project may present, especially when it is linked to the World Bank. This has raised many questions about whether EIA is used for the interest of project developers in some countries, instead of promoting better environmental decision-making. As some argue, EIA loses its original meaning when it is exported to other countries, including Latin America. For example, as noted by Sánchez-Triana and Enriquez (2007), the EIA in Latin America plays a quite different role than it does in the US. They basically argue that while the role of the EIA in the US is to facilitate decision-making about the environment in a process under public control, in Latin America the EIA becomes more an environmental management tool for private developers to gain control over processes under the umbrella of transnational organizations like the World Bank. Similarly, in her analysis of the expansion of EIA around the world, Hironaka

(2002) comes to the conclusion that in the Global South, EIA was mainly adopted because of international pressure to establish standardized and controlled procedures in environmental matters.

In Costa Rica, the adoption of the sustainable development model of organizing nature is associated with the debts that the country owed to international institutions in the eighties and nineties. The transformation of this model into a specific network of institutions, policies, and epistemic techniques, mostly occurred during the ECODES conference in 1988, which was promoted by the USAID, under the influence of the "Our Common Future" report (see Isla, 2015). The conference set the institutional and epistemic foundations of the sustainable development model in Costa Rica, which included, the institutionalization of ways of knowing nature.

In particular, delegates of the conference focused on creating the National System of Conservation Areas (SINAC), which would depend on the newly created Ministry of Environment, Energy and Telecommunications (MINAE), heavily funded by foreign donors, such as the Natural Capital Project (NCP) and the Worldwide Wildlife Fund (WWF). MINAE was vested with the Technical Secretariat of the Environment (SETENA), an agency which would have full authority in matters of environmental knowledge, when it comes to determine the environmental viability of projects. However, in principle, the SETENA would not produce knowledge to verify the impact of these projects through an EIS document, rather they would outsource the work to private consultation firms paid by private developers, who aim at obtaining the viability of a project. The General Environmental Law 7554 of 1996 granted these procedures but revised in 2006 to include "state-of-the-art review essays of research published in Europe" (La Gaceta, 2006). This Law contains eight articles that transfer exclusive responsibility to private "interdisciplinary group of professionals" (Article 18) for monitoring and judging the consequences of human activities for nature, such as dam construction in rivers.

These procedures for monitoring the environment are offered as general guidelines, which seem to act as mechanisms of public control over such privatization and outsourcing of knowledge. My interpretation is that these guidelines standardize the elements to be used in the

impact evaluations of different infrastructures regardless of the local context. In this sense, these "standardized packages" bring procedural stability (Guston, 2001), at the expense of developing the particularities of each construction site. The case is that the adoption of EIA in Costa Rica is offered as a supposed neutral instrument of decision-making. For Castoriadis this assumption of neutrality is not a taken-for-granted social process, but rather "is an integral part of the contemporary institution of society", and "the dominant social imaginary of our age" (1980, p. 8).

And yet despite this instituted authority and power of EIA in matters of establishing environmental knowledge in Costa Rica, the community members of the San Pedro district resist being used as passive objects of study by the EIS document, and do not accept the conclusions it draws about them and their environment. Below I show an example of this resistance through the case of a landslide that affected the San Pedro district in the nineties.

### 4.2 Making Visible the Invisible through Historical Insight

After we had eaten tamales in a relaxed manner on the stones of the San Rafael River, Gabriel, one of the two members of *Ríos Vivos* present in the gathering, read the appeal of the EIA out loud, so that people were able to add information, or just make comments on the several issues raised. This was part of the process of the petition of appeal by the community and was based on several grounds directed against the most controversial issues in the EIS document.

Soon I noticed that there were two main kind of reasons for appeal. First, those which refer to general problems of the EIS document that were common with other EIS documents conducted in other rivers in the area. The two members of *Ríos Vivos* who were present in the gathering know very well about the problems that the EISs conducted in the area have in common, namely, they completely overlook local and regional social, environmental and economic differences. For example, some were plagiarized by copy and paste of some sections from other previous EIS. These are what local communities consider to be technical flaws in the EIA of the different rivers.

But, second, perhaps more interesting, there are reasons which specifically apply to the EIS document about the San Rafael River. Among this set of specific grounds, the issue of the landslide focused the attention of several participants in the gathering, including Jorge.

Jorge brought a geological study with him to the river gathering: *el Deslizamiento Zapotal en Pérez Zeledón, Angustia de una Población* [Zapotal´s landslide, the Anguish of a Community] (Peraldo & Rojas, 1996). Zapotal is just another mountain community adjacent the San Rafael River and within the San Pedro district. The mentioned study encapsulates worries that have concerned this community since the 1990s when Hurricane Cesar–Douglas hit the San Pedro district. The study shows the relationship between landslides in the area and Hurricane Cesar-Douglas, and it criticizes urban development in that particular area for being a dangerous zone given the terrain where it is located.

There are many reasons why for Jorge this particular study matters. Pointing with his finger to a hill, he said:

> In the mid-ninetees, there was a pulpería (grocery store), a church, and a football pitch there, but the area was abandoned due to a landslide event. A geological fault created a kind of stair steps on that hill, and this event has been completely ignored by the EIS as if nothing had happened in the past.

The study shows the consequences of the landslide disaster in 1996, providing historical perspective to the current debates about the community. The study first addresses the geological characteristics of the landslide, and second, it collects qualitative experiences of the neighbors of the area affected by the landslide in the nineties. Jorge describes how he was ignored when he made this knowledge available to dam developers:

> I was told by the developers of the dam that the authors of this study were not the adequate professionals to conduct such studies, and thus they would not include it in the EIA.

Who are the professionals that did the study? The authors, Giovanni Peraldo and Ernesto Rojas, are researchers at the University of Costa Rica (UCR), and together with two students, Hector Zúñiga and Jonathan Chichilla, they conducted this study not only on behalf of the community, but with the community in a co-creative way.

This was not the first time that I had heard of San Pedro's landslides. Indeed, I had encountered accounts of this precise combination of events occurring in the past. To mention a couple of examples: one year before the gathering in 2014, I attended a workshop in San Pedro (Figure 6). The event, which was organised by *Kioscos Socioambientales* [Socioenvironmental Kiosks], was aimed at facilitating discussion and debate about the "positive and negative aspects of the hydroelectric project". Although the organisers presented their stance as non-biased, describing the workshop as, "a nonpartisan and value free dissemination activity", it came across to me that they were against the dams.

During the discussion, several controversial topics arose, including the lack of importance given to the landslide in the EIS document. During the workshop, Samuel, a farmer of the community, asked:

> Why the [geological] fault did not participate in the EIA? The EIA should include everything. [La falla, ¿Por qué no participa en el estudio? Hay que meter todo en el estudio]

His question found no response among the people present. But the silence was uncomfortable enough to realize the importance of the Hurricane Cesar–Douglas, and the provoked fault-related landslide. Samuel attributed agency to a fault, and in doing so he acknowledged the interrelationship between living and non-living entities in a specific locality.


**Figure 6: Workshop in 2014 where Samuel raised question about the EIA process.**

Second, during a walk in the area in February 2015, I met Gabriela, a neighbor who always talked with me when we came across each other by chance. That day, we were talking about everyday things, but as we crossed a bridge over the San Rafael River, she recalled how the San Pedro district had gone for a month without tap water after a fatal combination of meteorological circumstances. When I asked her to give details of what happened, she gave me more details of the same event that I already knew about, the hurricane Cesar-Douglas, but from a perspective and a consequence that was unknown to me until then: the increase of size of the river and the difficulty to access safe water due to mud flood. She provided me with another example of historical memory attaching to the present events of San Pedro district. This was, once again, an articulation of the hurricane in the present by the community.

Yet, despite the many ways that Jorge, Samuel, Gabriela, and others, challenge the denial of San Pedro's landslide, the EIS document remains silent on it, except to say that "Zapotal´s landslide" is "a small reactivation of a paleo-landslide in 1996" (p. 54). Period. According to the EIA, there was no anguish, no displacement, no community affected, and no buildings abandoned. The EIS report failed to recognise the significance of the landslide for the community. On page 83 of the EIS document, there is the testimony of a person who claims to be concerned about "past cracks in the ground and the fragility of the bridge", but there is no further mention that such hazards were mainly caused after the hurricane hit the local communities in the 1990s.

I get a sense that the hurricane and its different consequences shifted the view that the members of the community have in their relation to the physical environment in which they live. In light of future infrastructural changes of their environment, they articulate their memories based on the lived, everyday experiences of devastation and resilience caused by the hurricane Cesar-Douglas. Instead of seeing their relation to the biophysical environment as stable, they see the river and the territory as a dynamic – an organic entity embedded in a changing environment. They fear the potential material damages and associated health risks of development of a run-of-the-river dam in the community.

And yet, I asked myself, given that the EIS includes "participatory mechanisms" of the communities in decision-making, why were the communities not able to articulate their concerns about the hurricane and the landslide in the EIS through these participatory mechanisms? In response, the following section, explores ways in which members of this community participated in the EIS in the case of the San Rafael river. But before focusing on the EIS of the San Rafael River, I show what the law says about the participation in environmental decision-making in Costa Rica.

### 4.3 Acts-of-knowing Co-produced in Instituted Environmental Decision-making in Costa Rica

There are regulations that shape the way that communities participate in the EIA process in Costa Rica, and they go back to the nineties. As a result of the Law 7554, the Regulation on the Procedures of the Technical Secretariat of the Environment (Decreto No. 25705-MINAE (RSPS)) was approved in 1997, including a legal basis for public participation in environmental decision-making in Costa Rica. This was the decade that for some has become known as the era of the "participatory turn" in light of the erosion of expertise knowledge and the crises like the BSE "mad cow disease", genetically modified crops, and nuclear waste, among others (Behrer et al., 2016).

Nevertheless, as some critics have suggested, the first version of Law 7554 in Costa Rica was questionable for three main reasons: first, Jiménez and Jiménez (2008) highlights the need for improvement in the efficacy of SETENA when it comes to monitor the application of the EIA in the communities. Secondly, they also urged for a rethinking of what kind of activities should be assessed trough EIA. Last but not least, the mechanisms of local participation in environmental decision-making came under criticism. As Sequeira notes in his review of the EIA in Costa Rica (2002), the methods that SETENA employed to encourage participation of local communities were limited. As a result of these and other limitations years later, in 2004, the most important revision of the EIA in Costa Rica came through the General Regulation on the Procedures of Environmental Impact Assessment (Decreto No. 31849 MINAE-S-MOPT-MAG-MEIC (RGPEIA)).

Among other purposes, the RGPEIA aims at improving participation of the civil society in environmental decision-making through EIS. Stemming from the RGPEIA, the Decree No. 32966-MINAE specifies the steps of the EIA through the Handbook of Technical Instruments for the Procedures of the EIA. The Handbook promotes the participation of local communities in EIA process as following:

1. Any person has the right to review the drafts and the final version of the EIA (see Decree No.32966-MINAE). To facilitate such access to information, developers have to disseminate a copy of the EIS report to all stakeholders and the public.

2. At any time, members of the communities may file an *apersonamiento* [appearance] to litigate any of the issues they may find in the EIS document. In that case, SETENA resolves any litigation disputes. However, local communities do not have formal support, in the form of, for example, scientists corroborating the knowledge claims of the local community to file an appearance. In other words, they have to challenge the claims in the EIS document using their own resources and networks, as I show in this chapter.

3. A so-called "interactive" public meeting has to be held, in which developers, stakeholders and local communities are present. The public meeting, financed by the developers, is aimed at encouraging the interaction between developers and the public. While, according to the Decree of 1997, SETENA had the power to decide whether a public meeting is organized, according to the new procedures, SETENA has to organize the meeting in any case where an EIA is conducted.

4. The EIS document must include the perceptions and opinions of the population in the potential impact area of the project. This includes quantitative and qualitative techniques to collect data about the population. On the one hand, developers have to be in contact with local organizations. Through interviews, it is their duty to ascertain the position of community leaders. On the other, in the quantitative study, developers have to conduct a survey asking local residents to share their view about the project.

This revision of participatory mechanisms has not escaped criticism in Costa Rica. Jiménez and Jiménez (2008), for example, contend that the 2004 amendments are still limited in achieving public participation of Costa Ricans in EIA. They call into question whether participation, as stated in the new amendments, involves the meaningful involvement of the communities in decision-making of EIA. So, despite attempts to increase the participation of local communities in EIA in Costa Rica, there are still discrepancies based on how people participate in it. This chapter supports this line of criticism.

And yet, my above review of participatory mechanisms in EIA in Costa Rica says nothing about how public participation is put into practice in concrete contextualised terms. Nor what assumptions about the knowledge capacities of the communities underlie this process. So, I asked for a copy of the EIS document of the San Rafael River in the San Pedro community and read it with a focus on the kind of social individuals that these documents articulate in relation to acts-of-knowing.

### 4.4 Acts-of-knowing Co-produced in the EIS of San Rafael River

The EIS document (Estudio de Impacto Ambiental del proyecto hidroeléctrico de San Rafael) is a document of 161 pages published in 2013 (EXP. D1-10685-13, SETENA). The EIS document gives a positive assessment of the project "from a socio-environmental point of view" (p. 1).[3] Below, I show the acts-of-knowing and the epistemic hierarchies that the EIS document endorses (at the expense of others) through a discourse analysis which focuses on the kind of acts-of-knowing co-produced in the document. By document, I understand, following Shankar (et al., 2016), an "artifact that includes substantial references to the social [and ecological] processes" through which it is produced (p. 59). In this section, my focus is on the instituted co-production of particular social individuals (in Castoriadis terms) in their relation to acts-of-knowing.

I start with the obvious claim that EIS document is not neutral in its articulation of particular imaginaries of local communities in their relation to knowledge practices. As can be

[3] [El proyecto da una valoración positiva del punto de vista socio-ambiental]

seen in the table of contents (pp. 150-154), the EIS document clearly demarcates the social and natural sciences. In particular, the EIS document has a section for physical environment, another one for biological environment, and lastly, one for socio-economic environment.[4] This reflects a vision which divides knowledge arbitrarily into three realms, the inanimate and animate non-human world, and the human.

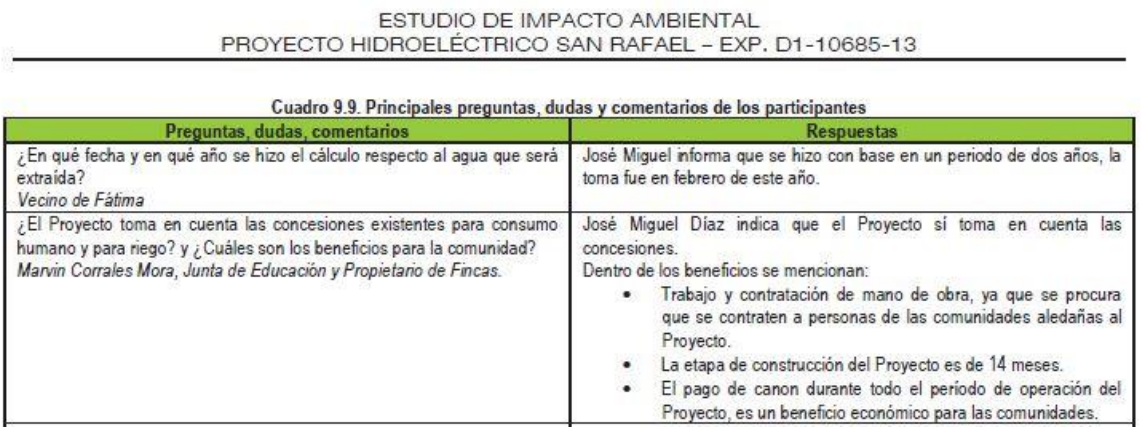
For the EIS of San Rafael, the "Proyecto" is the most significant agent in the shaping of imaginaries about the communities. The EIS document refers to the hydroelectric project as the "Proyecto" in capital letters, breaking orthographic rules of capitalization. This is announced on page 1, "this report corresponds to the Environmental Impact Study (EIS) of the project called San Rafael Hydroelectric Project (PH San Rafael), hereinafter "the Project"…".[5] The word "Proyecto" appears about 600 times in the EIS document. Other nouns such as community, landscape and environment, remain in lowercase. I suggest that the authors seek to highlight the importance of the project above other considerations through capitalization. In that sense, the "Proyecto" resides at the top of the hierarchy (by writing it with an initial capital) compared to other human and non-human aspects of the community. For example, on page 83, the EIS document mentions the "relationship of the Project with basic services, public services and communal furniture" of the community and the "relationship of the Project with the landscape and the environment".[6]

The EIS document portrays local communities first as a source of doubts and concerns about the project, and second, of knowledge when it comes to answer closed-ended survey questions about the acceptance of the project. A so-called *proceso participativo – interactivo* [participatory and interactive process] (p. 86) is reduced to a questions and answers session, in which members of the communities raise questions and the representatives of the developers answer them. This implies the articulation of an imaginary where knowledge is

[4] [Ambiente físico, ambiente biológico y ambiente socioeconómico]
[5] [El presente documento corresponde al Estudio de Impacto Ambiental (EsIA) del proyecto denominado Proyecto Hidroeléctrico San Rafael (PH San Rafael), en adelante "el Proyecto"]
[6] [Relación del Proyecto con los servicios básicos, los servicios públicos y el mobiliario comunal" and "Relación del Proyecto con el paisaje y el medioambiente]

compartmentalized between those who know (developers) and those who have ignorance (the local communities).

Second, consultants ask local communities for their perception of the project through a questionnaire in a sample of 60 people of the community. These are the "socio-economic aspects" (p. 66) of the EIS document. The survey reveals that 42% of the population is in favour of the development of the dam, but by the time that the survey was conducted (in July 2013), 78% of this population did not exactly know about the characteristics of the project (p. 84), according to the same survey. I have not had access to the questionnaire and the questions. In any case, most members of the community I talked with were not given the opportunity to participate in this survey.



ESTUDIO DE IMPACTO AMBIENTAL
PROYECTO HIDROELÉCTRICO SAN RAFAEL – EXP. D1-10685-13

**Cuadro 9.9. Principales preguntas, dudas y comentarios de los participantes**

| Preguntas, dudas, comentarios | Respuestas |
|---|---|
| ¿En qué fecha y en qué año se hizo el cálculo respecto al agua que será extraída?<br>*Vecino de Fátima* | José Miguel informa que se hizo con base en un periodo de dos años, la toma fue en febrero de este año. |
| ¿El Proyecto toma en cuenta las concesiones existentes para consumo humano y para riego? y ¿Cuáles son los beneficios para la comunidad?<br>*Marvin Corrales Mora, Junta de Educación y Propietario de Fincas.* | José Miguel Díaz indica que el Proyecto sí toma en cuenta las concesiones.<br>Dentro de los beneficios se mencionan:<br>• Trabajo y contratación de mano de obra, ya que se procura que se contraten a personas de las comunidades aledañas al Proyecto.<br>• La etapa de construcción del Proyecto es de 14 meses.<br>• El pago de canon durante todo el período de operación del Proyecto, es un beneficio económico para las comunidades. |

**Figure 7: Figure in the EIS document of San Rafael River (p. 87), which includes two sets of questions (left) and answers (right).**

On the other hand, the knowledge of communities is ignored when it comes to knowledge about their biophysical surroundings. Outside of the project parameters, local community expertise cannot contribute to create environmental knowledge. The EIA consultants are the only ones responsible for knowing about nature. In this case, the Gestión Ambiental de Proyectos (GAPRO) company made the assessment of the hydroelectric project in the San Rafael River on behalf of the developers, the H.Solis construction company. Ten consultants authored the EIS document, including two biologists, two civil engineers, a social worker, a geographer, a geologist, a forest engineer, an archaeologist, and a geophysicist (see San Rafael River EIS document, pp. 157-158).

The EIS document is dominated by the assumption that the only valid knowledge about the natural sciences is provided by the consultants, who establish, for example, whether endangered species live in the area. This was expressed on page 95 of the EIS document, "no endemic species, with reduced or endangered populations for both the flora and fauna, were found in the project area".[7] This sentence includes also passive construction, which means that the subjects or knowers of natural knowledge are hidden in the EIS document. Passive style in the EIS document obscures not only the actors of the action process but also the specific methods of the assessment, which include, for example the duration of the observations of these species. Later in this chapter, I will focus on how communities challenge this claim about endemic species.

Thus, the EIS co-produces a particular way of imagining social individuals in their relation to knowledge practices. There is a clear boundary established between the knowledge that local communities can and cannot provide. While communities can participate in the "social part" of the EIA, the production of environmental knowledge, in the form of ecological assessment lies only in hands of the consultants. The EIS document locks social individuals into a particular form of act of knowing that has consequences for the kind of knowledge that it is generated.

To turn to the language of imaginaries, the instituted imaginary of EIA about local communities, then, includes a-priori assumptions about what they know, and what they do not know based on dichotomous and compartmentalized visions of acts-of-knowing and what is deemed relevant expertise. This is close to the notion of "unimagined communities", which Nixon (2011) defines as "communities whose vigorously unimagined condition becomes indispensable to maintaining a highly selective discourse" (p. 150). In this case, to draw a boundary between the potential epistemological contributions of local residents is a way to ignore their knowledge. As I will show later, this may have political consequences because

[7] [No se encontraron especies endémicas, con poblaciones reducidas o en peligro de extinción tanto para la flora como para la fauna del AP]

ignoring the knowledge of local communities is ignoring the identification of some species, whose presence in the EIS reports may cancel a project due to their status as endangered species.

My point is that while social individuals may participate in some acts-of-knowing, they have no voice in other affairs, like for example when it comes to acts-of-knowing which link the experiences of the community with their non-human environment. In other words, the environmental knowledge of local residents is rendered inadmissible, and this includes embodied practices of these residents, which I identify as one of the major drivers for articulating acts of local environmental knowing, as I attempt to show below.

### 4.5 Embodying is Knowing

Embodied practices mean that ways of imagining acts of being in a place and knowing about the place are related to each other and mediated by first-hand material and sensorial experiences. Turning now to such embodied experiences, I go back to the early moments when the development of dams in this part of Costa Rica became public, the role of the EIA in providing a reference, and the embodied ways in which people gave meaning to the EIA, respectively.

In early 2013, a local resident noted an increasing presence of cars in the streets near the Consuelo River. These cars brought professionals, equipped with instruments, who spent considerable time near the river taking measurements. After talking with other neighbors and public workers of the municipality, this neighbor learned that a hydroelectric project was underway in the Consuelo River. But it was not until months later, when neighbors received a copy of the EIS, that they realized not only the plans of the developers, but also how their communities were represented in the EIA. As Francisco said:

> When we read a copy of the EIS, we felt that we were not present in it, as if our lives did not have any value for the people who made the EIS. My feeling was that our people felt ignored at best and invisible at worst.

The reading of the EIS and the oral communication among the communities had consequences in a sense that it raised the alarm among some neighbors, becoming a reference point for articulating alternative ways of knowing. For example, some residents looked for

alternative sources of information, like the Internet, to know the parameters of the "environmental flow" of the river, which is the amount of water left after the construction of a run-of-the-river dam. The issue of the "environmental flow" will be treated in Chapter 5.

Others, in an attempt to know better about the situation, sought feedback from those who already had experienced life near dams in Costa Rica. That is the case of the people living near the San Carlos river basin in the north of the country. In the 1990s, following the first stage of privatization of energy in Costa Rica, developers focused on that area to build run-on-the-river dams. As the consequences of the run-of-the-river dams became felt and known, a movement called Asociación Unión Norte por la Vida (UNOVIDA) emerged. Otto was President of UNOVIDA when he learned about a new wave of dam construction in the south. As Mariana commented:

> Otto heard about the plans to build run-of-the-river dams here in the south through mutual friends who share the same concerns. One day, we invited Otto to come to a meeting of the communities in the south and show us what the first-hand experience in the north was like.

As such statements suggest, residents of these communities rely on witnesses of other communities to gain knowledge about the situation. In doing so, their acts-of-knowing go beyond their local circumstances and thereby expose the universalising claims of the EIA. For doing so, they cultivate interrelational spaces where they can co-create knowledge with historical depth and embodied experience. Otto is a key figure in bridging these spaces. As Mariana said:

> In a moment of doubt [she refers to when they had read the EIA and they had no alternative sources of information], Otto brought us evidence that rivers become dry, the landscape is destroyed, and that the environmental impact evaluation is false.

Otto visited several times the south of the country. In one of his visits in 2014, Otto spoke on his experiences with dams in the north (see Figure 8). The presentation had an enormous effect on the attendees, which mainly included representatives from different rural communities. After hearing his presentation, residents of the south became shocked by "the images of the dams in the north". Otto did not come alone, but with other people from the north,

who also shared their experience on the dams. Otto and his friends know perfectly well what it means to find oneself deprived of a river.

But in addition to seeing images of the dams and taking witnesses seriously, residents of the south wanted to see and feel in situ the conditions of living with dams. They suggested Otto guide them to visit various dams in the San Carlos river basin in the north of the country.


**Figure 8: An event organized in 2014 so that people living in the communities of the south may meet and collect information from Otto Méndez, who is a local leader and an agricultural technician with knowledge and experience with the development of dams in the north of the country.**

When this happened, it became a life-changing knowledge experience. I noticed that the visit to the dammed rivers of the north had a big impact on their understanding of the consequences of dams. As Mariana told me in an interview months after her visit to the north:

> This was for me the most important experience because it allowed me to see in situ what would happen to us if dams are finally built in the south.

This is a similar experience to the one that another visitor from the south of Costa Rica had when she saw the consequences of a run-of-the-river dam in the north. Pamela became shocked when she saw the diversion of the river into a pipeline:

> Was this a river, or a pipeline? I would say that was a river in the past but not now. This is a pipeline, and not a river. This is not a game, this could happen to our rivers in the south if we do not wake up. I want rivers alive, not dead.

An embodied and situated experience in the north allowed members of these communities in the south to extend their experiences, identifying the scope of the problem. Instead of imagining a dam and a river as an abstract projection in the terms of the EIA, they learned to identify and experience first-hand the infrastructure systems that are required to operate dams in the San Carlos river basin. This includes exposed pipelines, fences in the land and the river, signs of no trespassing, a ban on fishing, dam´s powerhouses, impassable roads due to the diversion of rivers and the consequent flooding of the margins, sewage treatment plants, sewage sludge, diggers removing smelly sludge, the impossibility of bathing, and no backpackers around, among a few other interconnected parts involved with the embodied experience of living with dams in the north. As Mariana said:

> When I visited the sites of the dams in the north, I wanted to cry, my hair stood on end. It was a very ugly and frightful experience indeed. I did not understand how such an environmental disaster can be allowed with Government permission. This was enormously impactful for us.

The impact of the situated experience in the north is also reflected in the comments by Santiago:

> When my neighbors travelled and saw the failures of dams there, they became convinced that dams are damaging for the communities here.

Others, like David, even doubted about the possibility of living with dams:

> Not only is the dam the problem, but the surroundings and the way that people have to adapt to new circumstances. Look at north, since the dams were built, I know people who tried to migrate from there, because there is no life in dammed rivers. Well, there is life, but not a life that many want to live, you know what I mean.

This comment by David made me think in particular about life in the absence of dams, that is, a life in which the communities are closely related to free rivers. A life "that many want to live" is a life that makes sense because the relations with rivers are strong and stable. He knew I knew what he meant because I had once gone to bathe in the Peñas Blancas River with him and his friends. So he took for granted that I knew what a good life was, one with access to the rivers.

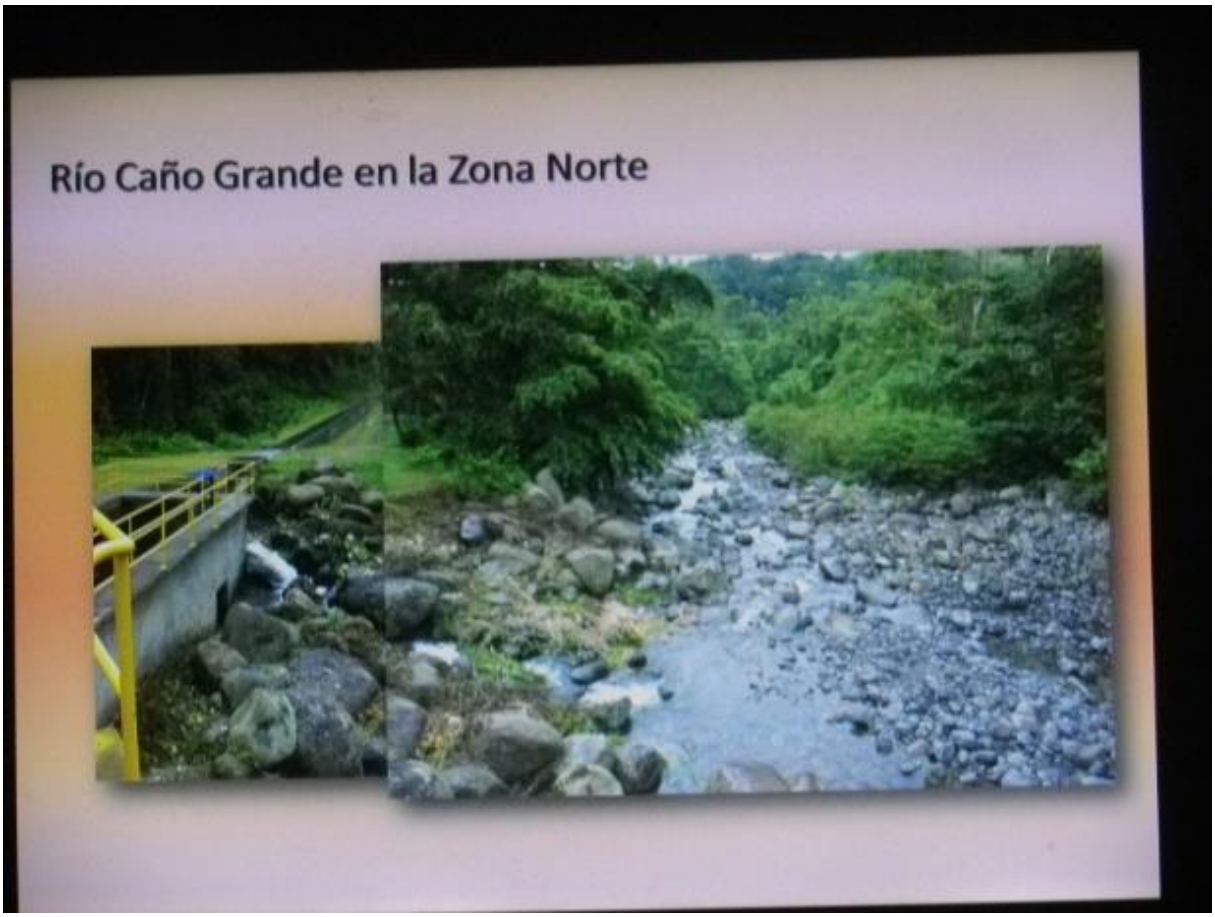



**Figure 9: Those who visited the north took pictures of rivers that were used in presentations of the communities in the south. Pictures show the consequences of dams.**

In any case, certainly, visiting and being there with communities in the north, creates a context of knowing, which makes a difference in the perception concerning the way that dams are fitted into local socio-natural environments. In this sense, those who visited the north did not only gain evidence to contest the other evidence showed in Environmental Impact Assessments done in their communities, but more importantly, they incorporated the EIA into new frames of reference. It is from their sensorial body that they learned about the effects of

the run-of-the-river dams, not their mind. Drawing on the pedagogical experiences in the north, they discovered new dimensions about dams that remained invisible in the EIS document. Such dimensions are not reducible to cognitive individual capacities to learn, but rather, I argue here, they are articulated through sensorial manifestations mediated by interrelational ways of knowing that transcend local and temporal borders.

### 4.6 On Knowledge Deficits

Acts-of-knowing involve as much assumptions of knowing as unknowing. While I was doing fieldwork, focusing my attention on acts-of-knowing, I found that the presence of the topic of ignorance was pervasive. This includes ways of imagining what ignorance is, what its implications are, and some tensions associated with it. For example, going back to the scene of the gathering in the San Rafael River, as Gabriel, the member of *Ríos Vivos*, dealt with some topics that were considered technical, he acknowledged that the lack of technical information presented a challenge for the ongoing discussion about the appeal process. As he said:

> It is difficult to engage on some technical issues, as for example on biology matters [he refers to the potential existence of endangered species in the river], because we do not have all the information that we require to challenge the EIS.

By acknowledging the gap between technical ("the EIS") and non-technical issues ("we", the local residents), Gabriel reproduced the instituted epistemological division of the EIS, consisting in normative criteria about what knowledge can people produce or not.

For example, the EIS of the San Rafael River includes a transcription of a meeting between developers and local residents. The transcription consists of a question and answer session where the developers address questions by the local residents on several topics related to the consequences of the project, but the knowledge of the local residents is not deemed relevant.

The meeting took place on November the 9$^{th}$, 2013. This meeting was portrayed in the EIS document as a "participative and interactive" event. However, the declared goals of the meeting seem distant to achieve such interaction in practice. Namely, the two goals are, first, to present the development, construction and subsequent operation of the project to the

community (a one way communication model), and second, to know the concerns, doubts and questions of the assistants, in order to clarify the required information. However, as one neighbor said, a representative number of communities was not present in the event, and in addition, none of the goals of the event emphasizes the role of the local community in decision-making. This is a unidirectional model of consultation, a deficit model, akin to a Freirian "banking model" of education in which local developers address concerns, but are not represented as part of a learning process. This reinforces the authority of developers to divide between those who can give answers and make decisions, the knowers, and the rest, the knowing subjects.

Back to the scene in the river, based on the way Gabriel looked at the crowd as he talked about the technical and non-technical issues, I thought that he wanted others to recognize the need to bridge such division and face such dilemmas through community action. This represents a self-reflective move about the potential acts-of-knowing that local communities may articulate. That there are different ways of knowing, technical and non-technical, natural and social, does not mean that people cannot cross boundaries. As I show below, people did not refrain from exploring technical issues because such issues are already present in their daily lives in two ways.

First, a way to cope with technical issues is by collaborating with other experts, but only those who have the trust of the community. As I showed earlier, Jorge brought to the meeting a copy of a technical study on the landslide conducted on behalf of the community. This shows that opposing the claims of the EIA is not a move in what might be described as an anti-scientific or antidevelopment direction. This is a type of accusation that was regularly made (by developers) against those who oppose to the construction of dams. I will illustrate this using

two examples: one from a meeting in the municipality of San Isidro in late 2013 and another from a neighbor meeting near the San Rafael River in 2014.


**Figure 10: A food bag given by the dam developers to people present in a meeting in 2013. This image was sent by a member of *Rios Vivos* through instant messaging.**

In a meeting in the municipality of San Isidro in November 2013, dam developers of the Hidrosur Company gave food bags to those people who were willing to support the company (see Figure 10). The bags include the following message: *no se deje paquetear* [don't let yourself be lied to]. The food bag also has a "thumbs up" sticker that positively associates *desarrollo para el sur* [development for the south] with clean energy, as represented by hydroelectric projects. This propaganda does not seem a way to directly promote the hydroelectric projects by showing, for example, their potential advantages over other sources of energy. Rather, it seems a way of instilling in people a kind of modern imaginary associated with the development model in the South. As Castoriadis would put it, this is "the idea of development for development sake" (Castoriadis, 1991, p. 197). In other words, this is the legitimization of development without, in this case, any kind of self-reflection about the "whats" and "whys" of damming water.

In another meeting in 2014, a neighbor, who is a leader of a community association in San Rafael, accused those who oppose dams of being "anti-development". Based on the number of signatures presented and a count of those present at the meetings on dams, it can be said that the majority of the communities' residents are opposed to the dams. However, there are some leaders of associations that defend the dams in some of the communities. This is due to the dam developers' strategy of contacting key people in the community to convince them of the suitability of dams, sometimes through the assurance that there will be economic benefits derived from hydroelectricity for particular interest groups. These accusations of being anti-development against those who oppose to the dams did not have a broader impact over the course of this meeting of 2014. This was not a focus of discussion. However, these accusations show how of the dichotomy "progress" versus "anti-progress" is articulated to attempt the denigration of protest movements against dams. This is in line with the increasing systematic criminalisation of people who are at the forefront of defending territories and life against extractivism in Latin America (see e.g. Raftopoulos, 2017).

In any case, the crucial point here is to show that those who oppose the dams collaborate with trusted professionals. In doing so, they are indirectly challenge the existing imaginaries about knowledge that are instituted in the EIS. As I said above, the instituted imaginary of the EIS document conceives local communities isolated from other sources of technical knowledge. Indeed, the EIS collects the local perception of the project. Those who made the EIS report use such collected data to highlight the "identification of lack of knowledge about the project within the community". And thus, they aim at dedicating resources and providing information with the hope that this would have influence over the communities and the viability of the project. This articulates a deficit model in the understanding of knowledge, that is, a "model of understanding where the public is conceived of as empty vessels which need to be filled with right answers to make good the deficit" (Broks, 2006, p. 121).

Far from it, I want to stress that local communities want to engage with science as long as it makes sense with their own frames of reference. Below I will use two other examples to show collaborations between researchers and the communities.

Back to the gathering scene in the San Rafael River, Gabriel asked the people for information regarding the presence of species of endangered fish in the river. As Jorge answered:

> There is a biologist in our community and I have his phone number. When he was an undergraduate student, he collected samples in this river (San Rafael) to do research. So, we are going to ask him whether he can help us so that we can include his information in the written appeal. It is a good opportunity to supplement the information he collects with the information obtained by us.

Jorge bridged the gap between local and technical expertise by imagining acts-of-knowing nature, in which people with different professional backgrounds collaborate with each other mediated by the potential endangered fish that live in the river. Jorge thought that fishers in the community could identify the species endemic to the river, but since he was not sure about it, he recalled the work of the biologist to find complementary information. So, the modern imaginary that highlights science as different kind of knowledge that requires some kind of special validation is also present in the community. But more than a barrier, this is an opportunity for communities to articulate the relational basis of their existence and use their networks to share knowledge with trusted scientists. The source of this trust does not depend on universal scientific authority, but on the quality of the relations that such scientists have with the inhabitants of the communities, either, for example, as relatives or friends.

Second, another way to challenge issues of knowledge deficits, is by directly reducing such deficits through community coalition formation in order to compile the knowledge that people already hold about it, with different members of the communities helping in various ways. Unlike the species of fish, I noted that the knowledge about mammals in the area was less exclusive and more accessible. The presence of *perros de agua* [otters] in the area illustrates this point. The otters entered into the debate as Luis, another member of *Ríos Vivos* present in the gathering, stressed again the importance of identifying endangered species in the area. Luis lives near Quizarra, in the Alexander Skutch Biological Corridor, 8 km on the west of Zapotal. “Are there otters in this river?” Luis asked. While many answered “yes”, Luis said that “it would be important to find otters because they are protected by international treaties, and according to the EIS document, there are no otters here”. It is in that moment that three people

shared the embodied experience of their encounter with otters in the river. For example, Castro, a neighbor, said:

> There are *perros de agua* in this area. Indeed, we [by we he refers to himself, a member of *Ríos Vivos* and other neighbors] saw an otter on these stones there during a meeting we had last month. It is fascinating to see otters here because they are scarce as you [the member of Rios Vios] just said.

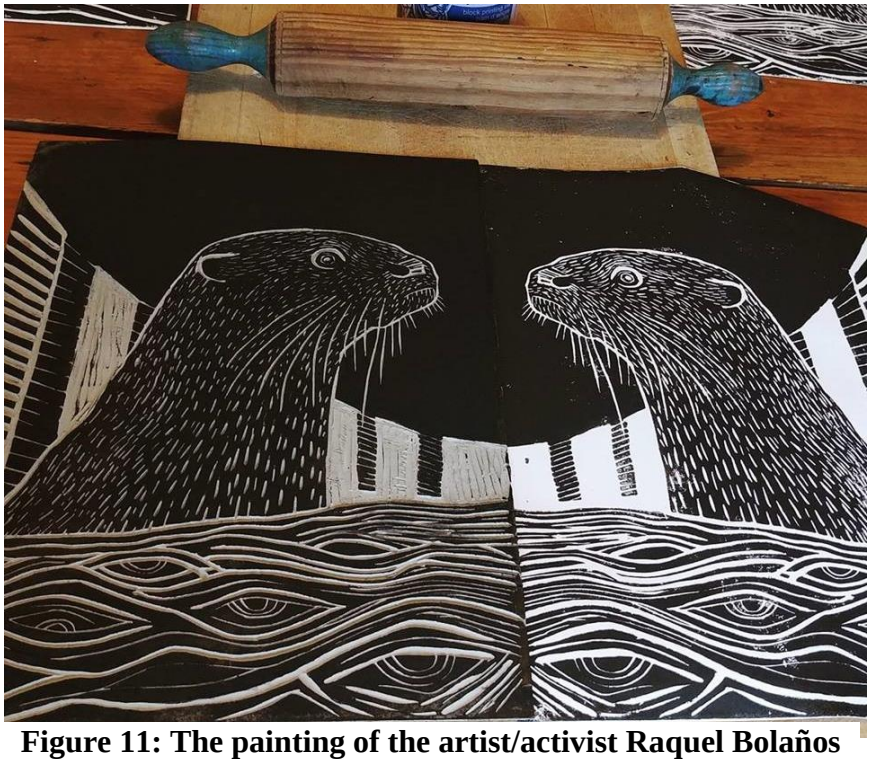


**Figure 11: The painting of the artist/activist Raquel Bolaños that shows otters fenced by a dam. Otters were present in the spaces of resistance against dam projects.**

Days after I had the opportunity to hear other neighbors speaking about these animals. In a conversation with a member of the *Ríos Vivos* movement, a neighbor said:

> I have spoken to some of the residents of Zapotal and San Jeronimo who usually go fishing in the San Rafael River and they assure me that they have seen many of these animals called otters. They are going to try to photograph them to get proof of that.

This identification of otters directly challenges the knowledge about endangered species that appears in the EIS document. According to the consultants of the EIS document of the San Rafael River, there are no endangered species in the area. If those who created the EIS document had asked community members about the existence of *perros de agua* in the river, they would know that they exist and many of their habits. Or at least, they would be more forced

to include them in the document. This seems to indicate that the kind of acts-of-knowing used to observe the river has influence over the factual observations of otters in the San Rafael River. In the EIS document, the supposed absence of evidence becomes a kind of evidence of absence.

The strategy of mobilizing neighbors to obtain information about the environment was also used in the Longo Mai communities. The members of the Commission for the Defense of the Waters of the Convento and Sonador Rivers, in their brief against the EIS of the Monte Verde Hydroelectric Plant I and II projects, used the knowledge of neighbors and fishermen to demonstrate that the local communities knew more about the fish in the Convento and Sonador Rivers than those included in the EIS documents. According to these documents, there are only two species of fish in those two rivers, *Characidae* and *Ciclidae*. However, based on fishers' knowledge, the neighbors claim to know more species in these two rivers. The neighbors presented their information about fish as credible knowledge and used it to reject the EISs of those two rivers.

As I showed in the analysis of the EIS document, the knowledge of the communities about their environmental surroundings did not constitute part of the content of the document. However, through the direct observation of otters (or fish) in their daily lives, residents in the area showed that this species is scarce but present in the communities. The absence of otters (or fish) in the EIS report tells more about the imaginaries associated with the acts-of-knowing used to study them than the ways that otters live in these rivers. As already mentioned, there are various testimonies that point to the existence of otters in the San Rafael River. These testimonies extent the observations made in the EIS report to the point where they co-create a different water world in which (endangered) otters live and have to be cared for. Local residents had no choice but to become messengers for the otters.

Mobilizing both their own local ways of knowing and ways of knowing of technical experts working in the area on behalf of the local communities, they were able not only to complement the information of the EIA, but to outweigh it. In the end, the engagement of people involved in the controversy with technical problems exceeds the constraints that participatory

mechanisms of the EIA, which are based on a strict demarcation between natural and social knowledge.

### 4.7 Reflection

This chapter reveals three variations about instituting acts-of-knowing that transcend the instituted ones articulated in EIS. The multiple ways that communities participate in acts-of-knowing in their communities challenge the narrow participatory channels of EIS. With EIS, the instituted imaginary of social individuals does not exist other than in the expectations and beliefs of "participatory mechanisms" represented in a textual form. Through actions and relations with others, I have shown examples where social individuals are able to reconfigure the expectations about them in relation to acts-of-knowing. For the communities, knowing nature is based on knowing about their daily life surroundings and knowing how to articulate relations that link present acts-of-knowing with previous sites where these acts-of-knowing have been already articulated in a different context but in similar circumstances, like in the case of the dams in the North.

Thus, rather than just adjusting to the parameters of participation included in the EIA, there are members of the community who look for alternative ways of knowing exceeding EIA's instituted expectations about their role as knowers. They do not only put into question the results of the EIA, but also its instituted epistemological and ontological foundations. Implicit in the acts-of-knowing reported above are imaginaries of knowing and being that link past embodied experiences with the present and link them with plans to influence the decision-making process. In doing so, they make visible knowledgeable objects that otherwise would have remained invisible, like the endangered species.

What a hurricane, a landslide, the past experience of spending a month without water, and endangered otters teach me is that the ways that people know about nature emerge from everyday embodied and relational experiences, which can be related to co-creating acts-of-knowing in the "specificity of place", using Giroux words (2011). As Timothy Choi would put it, these instituting acts-of-knowing represent "oscillations between [localized] detail and

broader claim that ultimately blur the distinction between example and abstraction." (2011, p. 15).

And yet, I have shown that instituted imaginaries in EIA include assumptions about what the communities know and do not know and the implications of this. Among these implications are: first, the problem of an instituted social amnesia, using Russell Jacoby´s term, which suggests by it the "memory driven out of mind by the social and economic dynamic of [society]" (1975, p. 4). I have shown that the EIA overlooks local stories that address, for example, the problem of the geological fault in the nineties. Communities respond to this attempt to eliminate their histories by articulating the past in the present, what Giroux refers to as "critical historical consciousness" (2011). This is a way to challenge the rule of the past in the present. As Jacoby warns us, if "the past is forgotten, it rules unchallenged." (1975, p. 5)

Second, there is an instituted "deproblematization of the future [of the relations between the communities and their environment] and [the] mechanization of science/world relations" (Freire, 2000, p. 53). This process occurs through rigid mechanisms of participation, which, based on a linear one-way model of communication, limit the public engagement with the instituted decision-making process. Such deproblematization involves the end of political debate through the use of technical parameters articulated in the EIS.

Communities are aware of this limitation placed on them regarding their capabilities to remember the past and to know about their surroundings. As a farmer once said in a local environmental radio show in 2014, "Just because we are farmers does not mean that we are ignorant, instead we have generated enough technical knowledge to counteract lies of dam developers" [Que seamos campesinos, no quiere decir que seamos ignorantes, hemos reunido conocimientos técnicos para contrarrestar el traperío de los desarrolladores].

Associated to these instituted imaginaries is the model known as deficit model, an old notion in science studies. Usually, it has been related to what scientists think about the knowledge of their potential publics. However, deficit models are not reducible to the scientific community, but rather it is present in spaces where acts-of-knowing are articulated, like in the

case of the communities challenging the EIA. I have shown that despite the multiple ways that communities challenge the authority of science, science is still seen by their own communities as a special kind of knowledge, which requires special consideration. This can be seen, for example, when communities witness the presence of otters, which had previously been ignored in the EIS document. Despite that their knowledge of otters is more accurate than the assessment made by the developers, the community's neighbors think that their knowledge must be corroborated by some kind of scientific authority in order to have an impact on decision making.

However, unlike the assumptions of knowledge deficits found in EIS, the communities overcome this deficit of knowledge by articulating relations among people which goes across scientific and non-scientific knowledge.

All in all, this is not a dispute between science and local knowledge, or between scientific facts and a sum of anecdotes provided by the community. Of course, there was a perceived failure of the EIA to give an account of their communities, but this is not the most important outcome here. People indeed demand collaboration with scientists, but, importantly, not in the terms that are presupposed in the EIA.

### 4.8 Last thoughts

This chapter shows imaginaries related to instituted and instituting acts-of-knowing present in the controversy about run-of-the-river dams on rivers of southern Costa Rica. The chapter has given an account of the origin and development of EIA as a model of governance across the world, including Costa Rica, under the umbrella of transnational development organizations. Then, I have aimed to examine the manufacture of instituted social individuals in their relation to acts-of-knowing. In this case, I suggest that the EIS document of the San Rafael River makes assumptions about what social individuals know or do not know according to pervasive imaginaries of science, which reproduce a division of knowledge labour where closure of meanings prevail. In parallel to this analysis, using a postphenomenological multi-sited ethnography, the chapter has sought to identify instituting variations in the way that communities articulate acts-of-knowing. Such acts-of-knowing, in this case, include

historicised perspectives, embodied experiences and relations, which are broader than expectations held by the EIS document about the way people engage with acts-of-knowing. This suggests a need to reflect on the boundary work of practices associated with implementation of the EIA and reconfigure the governance tool of EIA in the communities where it is conducted. Other practical and theoretical consequences of this chapter will be discussed in Chapter 7.

# Chapter V: Contested Water Worlds

## 5.1 Water Worlds

I took my time to decide what the unit of analysis of this chapter would be in relation to water or rivers. And indeed, there is no such a unit. During my fieldwork, I realized that some of my interlocutors refer to rivers as water and others refer to water as rivers, or even as *pozas* [natural pools in rivers], as I will show later. The difference between these terms seems, in part, convention. For example, a river is like water except that it is flowing to somewhere, but more than that, rivers have many histories apart from and including human beings.

Rivers shape and are shaped by geomorphological, biological and climate conditions, at the intersection of "cultural landscape[s] of social, political and infrastructural systems" (Klaver, 2011, p. 4). This makes each of them unique in terms of the water worlds in which they are embedded (see Barnes & Alatout, 2012). As I mentioned in the Introduction chapter, in this dissertation, water worlds refer to the unique confluence of knowledge claims and practices (acts-of-knowing) that, in their relation to human, non-human living beings and material entities, co-create and maintain particular territories where the rivers are located.

The point in this chapter is that the ways in which cultures have created meaning about water worlds is not self-evident, but, rather, water worlds are subject to cultural interpretation in many different ways (see e.g. Ferreira, 2006), including, among other elements, the mediation of the embodied experience of the senses. Among the senses used to perceive water, sight plays a large role. As Fantini argues "seeing plays a crucial role in influencing how people know water and generate meanings about it" (2017, p. 1). Strang (2004) underlines that the fact that water and rivers continuously take infinite visual forms is one of the reasons why they attract more visual attention than other forms of materiality. And yet despite this, water and rivers exhibit monotonous regularities, enough to make sense as a whole, as creators of a proper world.

In line with Haraway, who affirms, “beings do not preexist their relatings” (2003, p. 6), this chapter aims to elucidate river imaginaries in relation to visual articulations of water worlds. As I mentioned in the theoretical chapter, I take imaginaries as central in articulating a variety of acts-of-knowing in different settings, and therefore, they may be studied using several sources of knowledge. However, past researchers have mainly relied on texts and oral testimonials to study imaginaries without much consideration of, for example, visual and aural experiences. The excessive centrality of text and the lack of other sensory categories is a gap in the literature on imaginaries that this chapter partially aims to address through the study of visual artifacts. In light of a growing body of research highlighting imagery as a key dimension of collective meaning (Rose, 2001), most of the visual artifacts in this chapter are not just an attachment or an illustration to enrich the visual appearance of these pages, but rather a source of inquiry as valuable as any of the others here considered.

And yet beyond this theoretical preoccupation with imageries and imaginaries, my motivation to explore their relation originates from personal experiences, in which the presence of pictures, drawings, banners, collages, and other forms of visual artifacts about water was felt in the course of the fieldwork upon which this dissertation is based. In the communities where I conducted fieldwork, the presence of visual artifacts served a variety of purposes from decorating a town hall for a meeting of communities and environmental groups to use them as protest symbols in demonstrations. In any case, what many of such ways of seeing have in common is that they articulate particular visions of water, rivers and their surrounding ecologies, including humans and other beings, that are crucial, I argue, in the controversy around run-of-the-river dams in southern Costa Rica.

### 5.2 Contested Water Worlds: the Opposition against the Magical Formula

One day I was with Gabriel in San Isidro. Gabriel is a peasant from Quizarrá and supports the *Ríos Vivos* movement. As we were walking on the streets on our way to a meeting and talking about the origins of the conflict of the dams, he told me:

> At first, [the developers] came and said: `The rivers are not going to be affected by the dams. The species downstream will enjoy 10 per cent of the flow of the river, and this will allow them to live´.

This was a promise that developers made to all the communities. However, according to Gabriel, most members of the community did not receive very well the idea that developers use 90 per cent of the river, and give 10 per cent of the water flow back to the river. Gabriel commented to me that, shortly after this announcement, an underlying skeptical attitude emerged in the communities towards the idea that 10 per cent of the river could be suitable for maintaining life in the river. This idea refers to the notion of "environmental flow", which represents a reference point, of which alternative variations of meaning about rivers were articulated by the communities. Indeed, during discussions about dams references to "environmental flow" were frequent. For Gabriel, "environmental flow" represents a magical formula:

> Imagine the river where you like to go swimming with your kids, and then remove 90% of the water from the river. The water left is what developers and the MINAE [(Ministerio de Ambiente y Energía in Costa Rica)] call an "environmental flow". Where is the logic behind this formula? We do not understand the magical formula of the so-called "environmental flow" yet.

Here, the meaning of "magical" is to be understood as something secret or cryptic. And indeed, it was. The technical conceptualization of "environmental flow", and the arbitrary formula of the 10%, appear to community members as immutable mobiles (Latour, 1987), which circulate without proper translation into the local context of application. In that sense, "environmental flow", as applied in particular contexts of Costa Rica, may be referred to as a black box. Latour defines blackboxing as the way scientific and technical work is made invisible by its own success.

Once a black box is opened, however, disengagement prevails within the communities; in the case of Quizarrá, the immutability of the notion of "environmental flow" was questioned by some inhabitants. As one neighbor told me about the implications of "environmental flow":

> At first, I was curious about knowing that a hydroelectricity project was underway in Quizarrá, but when I realized the technical details and that they would steal 90% of the flow from the river, I thought that this would mean that the river got dried up due to the diversion

of water. With only 10% of the flow, the level of the river would be too low and it would disappear. Only a stone path would remain instead of a river.

Given the importance and level of contestation of this way looking at the river by the communities, very quickly, I associated this notion of "environmental flow" with a term I was familiar with during my graduate studies. I am referring to the term "environmental orthodoxies" by Tim Forsyth. Forsyth refers to "environmental orthodoxies" as "institutionalized, but highly criticized conceptualizations of environmental degradation despite the growing evidence of the inadequacy of such concepts" (2003, p. 34). This term is similar to "mother [or father] statement", which Calder defines it as "myths [which are] often promulgated by both the media and, perhaps more seriously, by national and international environmental and water-related organizations, that they have permeated and affected land use and water resource planning at the very highest levels." (1999, p. 21).

In order to adapt it to the circumstances of this dissertation, I translate the term "environmental orthodoxy" by Forsyth into "technical orthodoxy" or "technical arbitrarity" to specifically refer to scientific or technical conceptualizations that are taken for granted despite the vague assumptions that were needed to produce it. By "vague", I do not mean to say that such assumptions are totally false or groundless. Rather, I mean to say that they are co-created for a particular context, and then, as "immutable mobiles", they are applied in other contexts through "chains of reference" without a critical interrogation of their local whys and hows (Latour, 2013).

During my participation in activities like radio shows or workshops (see Appendix C), I introduced the notion of *arbitrariedad técnica* [technical arbitrarity] to contextualize the nature of "environmental flow". At first, I had used the term „technical orthodoxy", but soon, I noticed that using the term *arbitrariedad técnica* was more easily understood among the neighbors of the communities. My goal was to show that scientific terms may also have political implications.

Unsurprisingly, the negative effects of "environmental flow" are something that intuitively everybody knew in the communities, as I have shown earlier when people criticized

the arbitrary formula of "environmental flow". In the same line, other members of the communities even connected this formula to colonial ways of exploitation. For example, in one of these radio shows, Raquel not only criticized the effects of the "environmental flow", but she also connected it to historical episodes of colonialism:

> The companies are not asking for little, they want to take over 90% of the river's flows, and the communities are supposed to survive with only the remaining 10% of the river. These companies take advantage of people's needs, and offer unreal solutions such as employment, roads, money for community projects but none of these offers is written on paper, nor could they in any way repair the damage caused to agricultural activities, recreation, tourism, ecology and drinking water supply. It is something like giving gold in exchange for mirrors once again.

My contribution in these radio shows was, then, not to show how negative the formula of "environmental flow" was, but rather to provide a framework to demonstrate that the application of this formula is contingent and something that has precedents and is common in other contexts. In doing so, I also provided a historical background to the rise and development of "environmental flow". This is the focus of the next section of this chapter.

### 5.3 Global Flows of the "Environmental Flow" Concept[8]

The notion of "environmental flow" is related to the World Bank's machinery of knowledge production, which, according to Goldman, represents the global "main producer of concepts, data, analytic frameworks, and policies on the environment" (2005, p. 180). The World Bank´s tentacles stretch around the world within Environmental Impact Assessment assumptions, reaching the southern Pacific side of Costa Rica. Indeed, almost all studies on the environmental impact of the run-of-the-river dams in southern Costa Rica, the notion of "environmental flow" is considered with respect to a study published by the World Bank: Davis, R (1999). *Environmental Flows: Concepts and Methods. Water Resources and Environment Technical Notes.* The World Bank, Series Editors. According to the edition of this study published in 2003, environmental flows "are the water that is left in a river ecosystem, or

[8] The content of this section was published in Spanish as an article for the social media platforms of the *Ríos Vivos* movement (see Appendix C).

released into it, for the specific purpose of managing the condition of that ecosystem" (Davis & Hirjin, p. 11).[9]

The idea of "environmental flow" has a longer history emerging in 40s in the United States, and since then different definitions and methods exist to assess the quantity and quality of a flow downstream from a removal of water from a watercourse (Moore, 2004). In the literature there are four main approaches to "environmental flow" (see Linnansaari et al., 2012): hydrological, hydraulic, habitat simulation, and holistic approach. The hydraulic approach to environmental flows takes into account the information provided through the hydrological approach, and in addition, it uses characteristics like speed and depth of river segments. The habitat simulation approach represents a modeling approach on the biota found in the river, which is added to the information provided by the hydrological and hydraulic approach. Lastly, the holistic approach takes into account other characteristics of rivers like their river basins and their social aspects (see Jowett, 1997).

In Costa Rica, while it is not mandatory to calculate "environmental flow" following one of these particular approaches, the one most used is based on the hydrological approach (Huguenin, 2016). The *Ley de Aguas*, the Water Law of Costa Rica, dates from 1942 (Asamblea Legislativa, 1942), and for obvious reasons, it is not explicit in establishing a formula for "environmental flow". A new bill, which includes the definition of "environmental flow" as "the minimum quantity of water needed, both in quantity and quality, to maintain the health of the ecosystem, ensuring basic goods and services necessary for life" (Expediente Legislativo 17742: p. 4), is in process to be converted into law. In this bill, not approved at the time of writing, the procedure for the calculation of "environmental flow" is not determined but left open to the "particularities of the ecosystem, the biological organisms, existing uses of the river and the location" (Article 84, p. 45).

[9] I did not find the version of this study published in 1999, but I found a study with the same name published in 2003: Davis, R. & Hirji, R. (2003). Environmental Flows: Concepts and Methods. Water Resources and Environment Technical Note C1. The World Bank, Series Editors.

The adoption of the hydrological approach in Costa Rica is not a self-evident decision. Arguably, compared to the other three main approaches, this is the simplest approach in terms of its procedure and the considered elements. The hydrological approach consists in measuring the average annual flow of a stream to calculate the "environmental flow" based on the assumption that a percentage of such average annual flow can maintain the course of the river for different purposes. This hydrological approach is so simple that it takes into account neither biological nor geomorphological aspects of the river in detail, let alone social nor other ecological aspects. In addition, the hydrological approach, and its mathematical formula, does not take the characteristics of a particular territory into consideration.

The question about the percentage of the flow is open. As many people asked, "Why is 10% the "environmental flow"? Why not 50% or 80%?" The hydrological approach usually comes with an arbitrary formula that determines that only 10% of the water is the "caudal ambiental" or "environmental flow", leaving the rest, 90%, for the infrastructure of the project developers. It is not clear why the "environmental flow" is usually established at the 10% of the river flow. In Costa Rica, this is just a recommendation, and the final decision depends on developers. Such developers, usually, are influenced by the most influential method within the hydrological approach, the Tennant Method.

Conducted by Tennant (1975), the Montana Method is the most popular study within the hydrological approach (see Gropal, 2013). Based on a percentage of the mean annual flow, Tennant studied the effects of removing water from rivers on fish on streams in three states of the USA (Wyoming, Nebraska, and Montana), and concluded that, in wet season, 10% of flow would be the minimum to maintain a healthy habitat for the fish., and in dry season, 10% would be a "poor or minimum" quantity.

Despite the locality of the study by Tennant, different countries use it, in most of the cases with minor or no revisions (Jowett, 1997). Several researchers have expressed doubts about the transferability of the Tennant Method on the grounds that it was based on research conducted on areas where the streams are similar, and thus, cannot easily be transferable to

other contexts of practice (see e.g. Gopal, 2013, p. 135), like a river in a rural community of Costa Rica. These authors warn us about untested extrapolations.

### 5.4 Implications of the "Environmental Flow"

In southern Costa Rica, developers use the 10 per cent and the notion of "environmental flow" to co-produce the notion that there is continuity of life through the run-of-the-river dam, despite the diversion of 90 per cent water from the river. It is not by chance, I argue, that the images represented by developers are consistent with this idea. I analyzed the EIS documents for the Peñas Blancas River and the San Rafael River, but this kind of engineering imageries is representative in others EIS documents of other dam development projects in the area. The images (Figure 12 and Figure 13) share a common style that undermines the view of contrasting landscapes due to the construction of infrastructures. I am not suggesting, nevertheless, that these images are mere propagandistic tools. I am suggesting that the rivers, which these images articulate, co-create an ordered arrangement of elements consistent with the assumption that the dam does not obstruct life (this can also be seen in Figure 14). The similarities between the upstream and the downstream of the point of water diversion is well visible. For example, the blue lines flow across the run-of-the-river dam, suggesting that the river is not interrupted. In this process, these blue lines become "technologies of representation" (Law & Whitaker, 1987, p.160). These authors argue that, when communicated by scientists to the public, scientific models often involve "processes by which… technologies suppress what they purport to represent and replace it with novel and more docile elements which are often visual" (1987, p. 161).

The two EIS documents include other images of the Peñas Blancas and San Rafael rivers. However, the Figures 12 and 13 are basically the only images in which both the river and the (future) dam appear together.

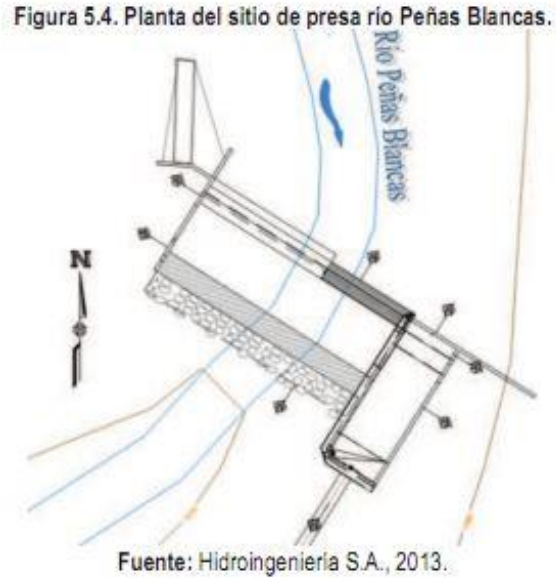



**Figure 12: Run-of-the-river dam in the EIS document of the Peñas Blancas River.**

The water worlds co-produced by the developers highlight rivers as quantified and reduced to numbers through the application of the "environmental flow", under the reductive assumption that a part of the river that is dried up can maintain the same properties as the whole. As Castoriadis (1986) puts it:

> [Western thought encapsulates] the idea that everything that exists is determinable, in the sense that it possesses an immanent potential for being defined and distinguished. (p. 210)

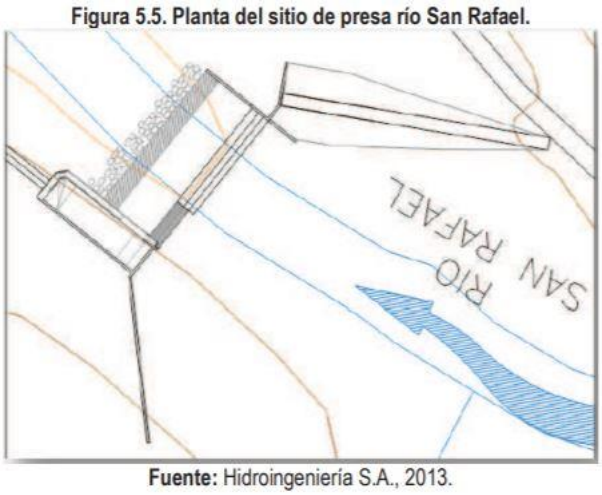



**Figure 13: Run-of-the-river dam in the EIS document of the San Rafael River.**

In these "purified" water worlds, there is no significant alteration between upstream and downstream of the rivers. The infrastructure of the dam is camouflaged by a particular technology of representation and therefore its consequences are made invisible through a process of co-production. An imaginary of water and rivers as divisible, determinable by humans and not affected by the dams emerge in this confluence of significations, and the relations that rivers create are overlooked.

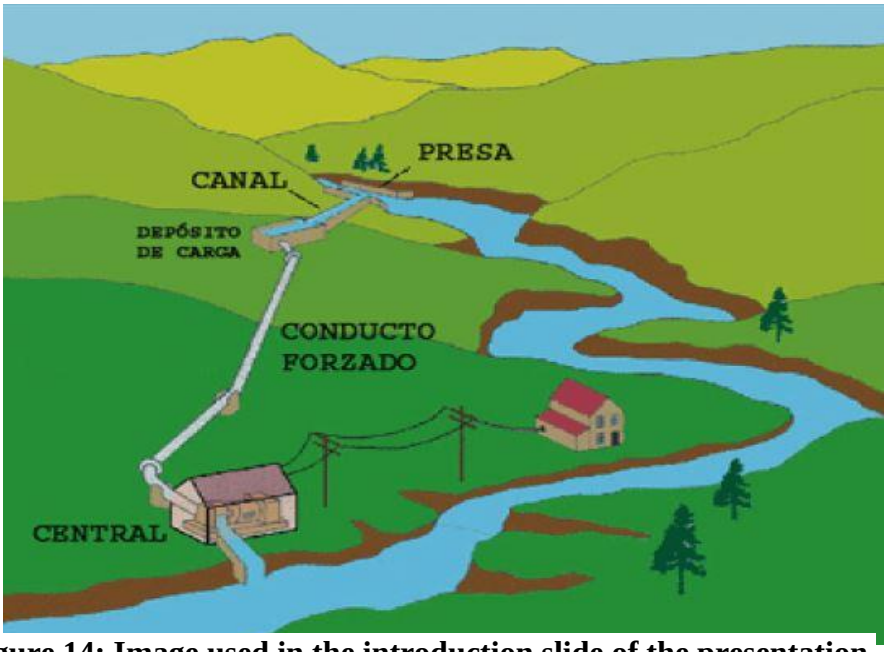



**Figure 14: Image used in the introduction slide of the presentation titled "Descripción del Proyecto" [Project Description] conducted by representatives of Grupo H. Solis (developers of the dam in the San Rafael River) in November of 2013.**

This type of landscape purification can be seen in the image used as a reference in a presentation of the hydroelectric project in the community of San Pedro (Figure 14). The image shows a blue river, surrounded by green land, whose waters are diverted to produce electricity. However, the main flow of the river does not seem to be affected by the water intake and does not even appear dry. The "environmental flow" is invisible in this image. Similar to the images above (Figures 12 and 13), there is a continuity of lines and colors across the river without any alteration caused by the water dam and the diversion of water.

With these thoughts in mind, the next sections of this chapter focus on the water worlds that are embedded in the communities, and that, as I will show, articulate imaginaries that emanate from different assumptions about water and rivers.

### 5.5 Rivers as the Sustainers of Life through Imageries

There are experiences during fieldwork that can change us. In my case, two of these key moments are two gatherings in which I participated in March and August of 2014, where water worlds emerged through visual artifacts sustained by discourses, practices and relations as mutually reinforcing. It was in these gatherings where I noted to myself that visuals artifacts are not just isolated representations, but rather are a powerful way to articulate imaginaries embedded in the water worlds where this dissertation had been carried out. In particular, I started to visualize imaginaries, which articulate rivers as an integral and vivid part of the communities of southern Costa Rica.

**Figure 15: Gathering at Los Cusingos Bird Refugee, March 2014.**

The first gathering with approximately 30 people took place at los Cusingos Bird Sanctuary located within the Alexander Skutch Biological Corridor on March the 27th of 2014. The gathering was an opportunity to discuss ways to resist the development of dams in the area. The character of the meeting was mainly informative, where the most informed neighbors shared their information about the situation of plans to build dams and the joint actions to take in the community. In 2014, this community was organizing against the development of the

projects Peñas Blanquitas I and Peñas Blanquitas II in the Peñas Blancas and Peñas Blanquitas rivers respectively.

During the meeting, I took notes on everything I considered interesting at that time. This includes, for example, the situation of the development of dams in the area at that time and the importance of coordinating the efforts of the communities affected by the dams, among other topics. Francisco, a member of *Ríos Vivos* who lives in the same community, led the meeting but several other neighbors had their say and there were dialogues between the participants.

The first thing that caught my attention was the presence of drawings, which were put on the walls of the porch where the gathering took place. Children made the posters and they, together with their families, brought them to the meeting. When I asked their parents about the purpose of it, they told me that the school had prepared an activity for the children to do in class. The activity consisted in drawing a river with a dam, and in using the drawing to be displayed in the gathering. In total, kids brought seven drawings, but, according to their parents, more than one kid made some of them. So, the number of kids involved with these drawings is unknown. I took a picture of each drawing and thought that I would use them later.

The six drawings are similar in layout (they can be seen in Appendix D), showing landscapes crossed by rivers from a third-person perspective. The predominant colors are green and blue. In all drawings, the elements of the landscape are still, except for the rivers in the distance, which provide a sense of movement, on the one hand, through the arrangement of fish in the surrounding water, and on the other hand by drawing the flow of water in a unique direction. The presence of flying butterflies in one of the drawings also provides a dynamic sense to the landscape.

All drawings include text in their composition. The text includes imperative and declarative sentences. To begin with, the most common statement consists of the act of saying things as kids wish them to be, that is, for example, the imperative claim *no a la represa* [no to dams] or *cuidemos nuestros ríos* [we should take care of our rivers]. An example of a declarative

sentence is el *agua es vida* [water is life], but as just said, declarative sentences are much less frequent than imperative ones.

While a half of the drawings include a dammed river, the other half do not (see Appendix D). Among the ones with dams, I focus my attention to analyzing the one, which is more explicit in depicting the consequences of infrastructures, namely the drawing in figure 9. This drawing belongs to the group of drawings, which makes a sharp distinction between the upstream and downstream of the dam in terms of the effects on the environment of the river. Below there is an interpretation of the chosen drawing.


**Figure 16: The drawing chosen for analysis.**

Compared to the other drawings, this one is rich in dimension and details. First, the image has been drawn from third-person point of view. However, there is a tree on the left of the image, which adds a more sophisticated dimension to the image. Second, despite that it does not have people, it shows a wide variety of figures and sketches of trees, flowers, water, stones, infrastructures, and fish. I interpret the arrangement of such figures as not random and following

a specific order dictated by the conditions of the river upstream and downstream the dam. The river, then, has two differentiated parts. Upstream of the dam, the river is wide and contains fish and a diversity of vegetation, such as green trees, flowers, and grass. Downstream of the dam, the flow changes as a result of the water being diverted through a yellow pipeline. Under the run-of-the-river dam, there are cut trees, accompanied by stones and fish out of water.

The drawing contains text. The first line is the main message and says *no destruyan el ambiente* [do not destroy the environment]. The second and third sentences say respectively *no queremos que destruyan nuestros ríos* [do not destroy our rivers] and *no queremos que destruyan nuestra flora y fauna* [do not destroy our flora and fauna]. In Spanish, unlike the first sentence, the second and third sentences are written in first person plural "We". In addition, on the bottom right, the drawing includes the signature of the author and the name of her school.

The river is the main character in the drawing, flowing from top to bottom of the image. However, it is difficult to use river in singular because there is a sharp distinction between what the river represents upstream and downstream the dam. While upstream, the sketches of thick vegetation and fish represent life in harmony with the river, under the dam, there is an awareness of death through the representation of dead fish out of water and chopped trees. Downstream the dam, as the flow of water decreases, the amount of water is too low to sustain organic life, and instead, stones become visible.

The dam does not store water, but rather uses the downward flow of the river to divert water into a pipeline for the generation of electricity. The pipeline includes the acronym ICE (*Instituto Costarricense de Electricidad*), which is the public body that manages the production of electricity in Costa Rica.

The meaning of the text and images complement each other, and both give the impression that dams have far-reaching consequences, although of different kinds. While the images highlight the material effects of diverting the water, the text indicates the significance of such effects in terms of the daily lives of the communities. For example, in the use of the pronoun "our", like in "our rivers" and "our flora and fauna", the represented material effects

over trees and fish are connected with those who live in the adjacent community. There is, thus, a construction of a sense of belonging with the aim to connect the community with the rivers and other non-human beings. The idea is that if the free-flowing river is destroyed, the trees are chopped down, and the fish cannot get enough oxygen, then their daily lives would be altered as well. This notion highlights the role of rivers in co-creating a world of possibilities and relations and the dam as a harbinger of cultural and ecological decline.

**Figure 17: Chopped trees, stones, and fish out of water make a landscape that characterizes the downstream of the dam in this drawing.**

Some months later, on August the 18th, I noted the presence of the same visual pattern in a different gathering, namely an environmental youth camp at Montaña Verde, an ecological lodging, run by an environmental association with the same name in Rivas. *Ríos Vivos* organized this event gathering 20 people, including me. This event is much more than *Ríos Vivos* propaganda or an activity in which people represent what the organizer wants. In sharp contrast, the visual artifacts co-created in this event emerged from experiences and contributions of all the participants.

The two days Camp consisted of talks about different aspects of rivers and the communities, among other subjects related to what is usually understood as environmental education. One of the activities on offer during the Camp was a workshop consisting of a session of collage creation in an informal environment. Those present, including myself, were divided into two groups. The goal was to create a collage out of pictures found in dozens of newspapers

and magazines that one of the organizers brought to the room. Each group had to answer the same two questions, “What do rivers offer to the community?” and “What do the communities offer to the rivers?” Once the two groups completed the collages, a representative of each group was given an opportunity to present for 10 minutes the intended meaning of the collage. In addition, the workshop included 15 minutes for discussion among all those present.

The two collages created in the workshop are similar in their layout. The organizers provided the backing for the collage, consisting in a white surface onto which the participants applied pieces of paper. The number of pieces of paper used in each collage is similar, approximately 20, but whereas in Collage 1 (this collage can be seen in Appendix E) the images are bigger in size like two opposing walls, in image 2 they form a landscape scenography representing an area affected by dam. In addition, the participants drew with pens and pencils in both collages, and in one of them, they added a branch with leaves to represent trees. The use of text is marginal in both collages, except for indicating the goals of the activity in the workshop.


**Figure 18: One of the collages (Collage 2) made during the environmental youth camp, August 2014.**

There are, nevertheless, differences in the way that the rivers are portrayed in the collage. While in one image, the river runs roughly from top left to bottom right in a third-person perspective with a top-down view, in another, the river is represented from a much closer perspective near the river edge. Both visuals, nevertheless, follow indications of the organizers and divide the collage into two sections: what rivers offer to us, and what we give to rivers. It is important to highlight the use of the pronoun "we" in the two cases.

The collage 2 (Figure 18) includes a more explicit representation of the river once it is dammed. In this way, this collage has a similar style than the prototype explored in the other gathering (Figure 16), that is, a river flowing from top to bottom of a landscape frame.

The collage is made of a mix of pieces of papers, sketches, finished paintings, and branches with leaves. In the middle there is the river divided into two parts corresponding to the upstream and downstream of the dam. An abundance of fish are found immediately upstream of the dam, where water is painted in blue. On the other hand, downstream there is no water in the river, but just stones and mud. In the riverbank downstream from the dam, fish skeletons appear along the contaminated part of the river near a dump. The dump contains, in addition, bottles, TVs, fridges, cans, tires, and washing machines, among other unidentified waste. A digger and an operator remain close to this polluted area.

A piece of paper represents a city. However, given the comments of participants, it was clear that the meaning attached to it was related to human settlements, without necessarily involving cities. The human settlement is surrounded by trees on the top, and by the mentioned dump on the downside. An agricultural area is reachable through a bridge over the river. The agricultural area contains trees, fruit and vegetables. Near the agricultural area, there is a rainforest and horse-riders on grassland. Irrigation channels from the river transport water to the farms.

There is a stark contrast between the different areas of the collage. The farm surrounded by the rainforest and the human settlement are places where life can grow. In contrast, the dam and the dump are places where the stream becomes dry and the waste accumulates. As a result, this area becomes a sacrifice zone, except for the digger operator, who seems to work normally at a waste-disposal site. As in the case of the previous image (Figure 16), the state of the upstream and downstream of the dam is strikingly different from each other. The dam not only becomes the border between life and death, but also means the stop of contributions of the river to the community, except for the generation of electricity through the dam and a factory with three chimneys situated there.

**Figure 19: A sacrifice zone in the collage.**

As shown in the collage, the river offers the possibility of life in many forms. Life in the urban settlements and life in the farm is compatible with masses of rainforest. The farm, nevertheless, does not aim at representing industrial-scale farm practices. As one of the creators of the collage said, “the farm represents a way of subsistence to live in the community”. This seems a way of articulating sustainability. The river offers the necessary conditions to the development of urban areas. However, the creators of the collage warn that human settlements produce a larger amount of waste that may end up in the septic system and the river.

Taken together, the two events articulate rivers in different contrasting stages due to the effects of the diversion of the flow by a run-of-the-river dam. This variation insists in drawing a stark distinction between the upstream, which sustains life, and downstream of the dam, which negates life, highlighting the consequences of infrastructure development in terms of material and relational transformations. The dam is a barrier not only to water, but also to the connectivity of life. The lack of flow downstream of the dam breach zone represents a discontinuity, which draws a boundary between life and death. This contrasting spatial arrangement emphasizes the issue of the emergence of sacrifice zones, which are reminders of the *espacios basura* (Mantilla, 2012) that are spreading across Latin America in light of extractive industries. This does not mean that all drawings in these events are the same and represent the same features (see Appendix D and E). Nevertheless, there is a pattern that transcends drawings, practices and discourses, and thus I call it, an imaginary of water worlds in the area.

This mention of extractive projects reminds me what, Jorge, a member of the Boruca[10] indigenous community told me in February of 2015. The Boruca indigenous community is one among other indigenous communities in Costa Rica such as the Bribri, Cabécar, Chorotega Huetar, Maleku/Guatuso and Ngobe/Guaymí, or Térraba/Teribe. Jorge participated in a cultural workshop to celebrate water. The event was called *Fluye* [Flow] and was organized by Verónica, a then student at York University. The event consisted in a "series of cultural workshops in a decolonizing spirit" (see Diaz, 2015). During the event, Jorge shared a saying from his indigenous community that I quickly linked to the development of dams and the extractive approaches. In his words, the legend says "that if you desperately look for gold and find it, the gold is cursed. Only if you find gold by chance or by a sign, is it legitimate gold". When I learned about this saying, I very quickly linked dams with this notion of a desperate quest for gold, which become cursed gold that probably causes death to those who own it or make benefit from it.

[10] More information about the Boruca people in Costa Rica can be found here: http://www.boruca.org/en/about-boruca/

Such visions of rivers as alive or dead do not emerge in a vacuum, but rather, are revealing of larger webs of signification, which were present at other sites that I visited during fieldwork. In what represents an intertextual relation, these imaginaries of rivers include but go beyond imageries, and reflect particular ontological and relational water worlds in rural communities of southern Costa Rica. The dependencies between rivers and human areas of the drawings remind me that to live in rural communities is deeply entwined with the river. Thus, I observed that rivers are not only a resource for the communities, but also to be infused with rural consciousness, which simultaneously infuses the river. The river running free, in part, marks what it means to be human and allows the establishment of links, which are essential for life in these communities. In some way, a river is one more member of the community. As one participant in the workshop said:

> I live very happy near the river because I love it very much. The river is my best neighbor. For me, the river is a way of de-stressing. When I see the water coming down, I feel tranquility and inner peace.

These visual artifacts have come to form the imaginary of animated rivers, which may die like a living being, as the flow of the river diminishes. Under this imaginary, rivers emerge in relation to contrasting areas of the watercourse, which may either create or eliminate in their communities, according whether there is water enough for sustaining interconnectedness and interdependencies. Such disruptions of connections are various, but the majority, in a non-mutually exclusive way, involve relations among humans and between human and non-human worlds.

### 5.6 Rivers as a Base for Relations among Humans

As an example of how human relations are mediated by rivers, I focus on the meaning of *pozas* for the communities in two different sites of my fieldwork. Very often the Costa Ricans in my study refer to *pozas* instead of rivers, especially, when they indicate a place in the river of leisure and recreation for families. As the statements below suggest, the notion of *pozas* alters the essence of rivers, including affective bonds with others; others in the present and others in the future through an intergenerational lens. Given this interpretation, it could be argued that *pozas* are a socialized part of the rivers, and the water worlds in which they are immersed. Below, I will illustrate this through two examples.

**Figure 20: Contrasting pictures of a river in the north of the country before and after a dam. During the Environmental Youth Camp at Montaña Verde in 2014, Pamela used these contrasting pictures to emphasize the consequences of "environmental flow".**

The first example is from events organized against the dams in which *Ríos Vivos* is addressing the problematic of the technical orthodoxy of the "environmental flow". In one meeting in 2014, the topic of the "environmental flow" came up during Pamela´s talk, an artist and environmental activist. Pamela said to the audience during her PowerPoint talk, "the EIAs minimize the importance of *pozas* as meeting points in the communities and places of relaxation". Just afterwards, Pamela showed the audience two images of a river taken in the

same place but in different times (Figure 20). Despite the differences before and after the run-of-the-river dam, the backgrounds are exactly the same. The two pictures are contiguous in space, even though the left picture is more zoomed in. Pamela´s goal was to make the audience aware of how a dam (and the related notion of "environmental flow") may have negative impact over human activities and the places where the members of a family create bounds among each other. Whereas to the right of the image the water flows and the family enjoys the waters of the *poza*, the right side shows an "environmental flow" after the diversion of the river due to a construction of a dam in the north of the country. The juxtaposition of these images by environmental movements in their talks makes apparent two contrasting landscapes. One is swimmable and welcoming of people, that is a *poza*, and the other, is a stone path that emerges from the "environmental flow" and the subsequent scarcity of water and relations among people in the community. The latter represents infrastructures as example of disruptive elements of the social life of the communities.

These images have travelled from the north to the south of Costa Rica. Otto took these pictures in the north and then passed the pictures to members of *Ríos Vivos* in the south to show their own experience with dams that were built years before. Otto took the picture of the dried river (an "environmental flow") purposely to put it together in a certain way so that the contrast between a dammed and a non-dammed river can be highlighted. He used these pictures to make people aware of the consequences of dams, and especially those consequences related to the "environmental flow" and the 10% of water that is left downstream from a run-of-the-river dam.

When these pictures were shown in the Environmental Youth Camp at Montaña Verde in 2014, one of the participants, Jorge, said:

> The *pozas* are places of natural recreation; places of communion with friends and nature; and places of encounter with real fun (not virtual). In a few decades, I will no longer be here physically, but I hope that, at least, the *pozas* continue to be those free spaces, open to everyone for recreation, regardless of age and economic condition, in which the children can say, on a hot summer afternoon: let's go to the *pozas*!

Jorge connected the existence of the *pozas* for future generations with the present struggle against run-of-the-river dams. In that sense, he referred to notions of intergenerational

justice in order to legitimate opposition to the development of infrastructures in the rivers. In doing so, he created links with future generations of Costa Ricans, who may enjoy the *pozas* as others do now. He also mentions notions of distributive justice, as he thinks that the access to *pozas* should not be restricted by the socioeconomic status of people. He is also wary about the future of virtual forms of recreation, like the internet, which he contrasts to forms of physical and embodied recreation, which, again, creates social bounds and contributes to developing interpersonal relations.

Later on, other activists in other meetings used these pictures of "contrasting landscapes" in a similar way. Pamela told me that using this visual communication was helpful because it shows to people, especially those who did not have the opportunity to visit a dammed river in the north, the consequences of an "environmental flow".

The second example throws us to the water of a *poza*. For so many days, I went swimming in the many *pozas* of the cantons of Pérez Zeledón and Buenos Aires. The *pozas* of Los Gemelos and "de Pepe" in the Chirripó River, the *poza* Azul in the Caliente River, the *poza* La Unión in the San Rafael River, and the *poza* La Perica in the Volcán Ricar are just but a few *pozas* in which I swam. Sometimes I swam alone, but more often *zopilotes negros* [American black vulture] and other animals were paying attention to me. In addition, especially during the dry season, in many instances, I had the opportunity to interact with people who enjoy taking a bath in *pozas*. This was an excellent opportunity to see in situ the significance of rivers in the way people connect with others. Depending on the day and the *poza* that I visited, I found different people taking a bath or just walking around the river. But among the many encounters that I had in *pozas* with other people, there was an encounter that deeply impacted me in a *poza* of the river Peñas Blancas in 2014.

I am referring to Sofía and his son, Diego, who live between Rivas and Quizarrá. A degenerative illness left Diego´s body paralyzed and unable to walk. Especially since then, his mother has been concerned with finding places where Diego can safely swim. Sometimes, she can afford the access to the pool in a gym in San Isidro del General. However, that is not always the case, and they have to go swimming in a nearby *poza*. For Sofía:

> These *pozas* are important because is part of our life, of our culture, and of our identity. Here we grow up with rivers. I cannot imagine the idea of our family growing up without rivers. When I was a child, on Sundays, this was a way to have fun and eat our own food without spending much money. The river is something beautiful and we have to treat it right.

I heard this statement about the important relation between rivers and communities many times while I was doing fieldwork. However, water has an additional role to play in Sofía and Diego´s lives. Indeed, being on the deep water is the only place where Diego can move around without external help. Despite his physical paralysis, he manages to slowly swim around the water while his mother is looking at him next to his wheelchair from the shore of the river. "Water is his life and his world, and this world has strengthened our relation. The farther he is from me, doing his things alone, the happier I am", she said to me, while Diego was in the water. In that sense, water mediates relations and makes other worlds, like the world of Diego, to flourish. The *poza*, in this case, becomes infrastructure for Diego, a kind of socioenvironmental space, without the need of human intervention in the river.

As I hope I have shown, *pozas* are key meeting places for the communities. Indeed, developers have recognized this as a chance to win the favor of the communities adjacent to the rivers. For example, the company Hernán Solís offered to build an artificial *poza* in case they were able to develop the San Rafael Hydroelectric Project. However, some members of the community not only rejected this proposal, but also believed that this was an affront to them. The pozas are not just stored water, whose depth allows for swimming. They are also part of the river connected to a larger non-human community, as I show in Chapter 6.

### 5.7 Last Thoughts

There is an imaginary, which articulates water worlds as much more than a quantifiable river isolated from the people in the communities. This imaginary seems central to why the proposed partition of the river represented, for example, in EIS documents is rejected in my communities of study. The communities reject this "scientific orthodoxy" or "technical arbitrarity" using visual examples of run-of-the-river dams and "environmental flows" in other contexts in which they have been applied. They do not accept the authority of EIS documents

to determine that ontologically 10% of a river is still a river. As Code (2006) would put it, this imaginary articulated by the communities is an "ecological situation", which means:

> An epistemological position whose starting point is in the ecological situations and interconnections of knowers and knowings—be they benign, malign, or merely equivocal—depart radically from inquiry directed toward analyzing discrete, disparate beings, events, and items in the world, only subsequently to propose connections among them or to insert them into "contexts" conceived as separately given. (p. 7)

As I have shown in this chapter, there is an underlying imaginary of water worlds that emerges in the communities where the particular controversy of this study unfolds. Such an imaginary flows in a variety of visual and non-visual situations that evoke emotions and arise as a consequence of the interrelations between water worlds and human beings. All together, they form the imaginary of animated rivers, which have the capacity to live under certain conditions, and in doing so, they facilitate multiple connections between human inhabitants of water worlds. These instituting articulations of water worlds are not in a vacuum, but rather, they emerge in the context of a response against institutionalized articulations of rivers, such as the case of the scientific notion of "environmental flow".

As we will see in the next chapter, these water worlds not only allow for the creation of relations among humans, but also enact multispecies relations with various consequences for acts-of-knowing.

# Chapter VI: Encountering Imaginations and Imaginaries

## 6.1 A First Transgressive Moment with Non-human Animals

From the beginning of my stay in Costa Rica, I noted the pervasive presence of animals. Just as I had experienced earlier in my life, I encountered animals in routine situations. Exotic (at least for me) animals appear on the animal field guides of Costa Rica. Animals are also on the covers of the Costa Rica travel guides. Animals are printed on the surface of Costa Rican banknotes. And they were also disturbing my sleep during the first nights in the country. Such encounters with animals have their significance, but I am accustomed to it, and thus, I did not pay special attention to such encounters.

However, after doing fieldwork for the first couple of weeks and facing what St.Pierre refers to as "transgressive data" (1997), my views about animals changed. I soon realized that animals, far from routinized and invisible, would become protagonists in my dissertation, just like humans. This is because, during conducting fieldwork in different sites, I found myself in situations where I observed that the way that human and non-human beings responded to each other permeated what in this dissertation I understand as acts-of-knowing.

As mentioned earlier, in light of a postphenomenological and relational approach to imaginaries, it is important to be sensitive to the world horizons of human beings. This means to focus my perspective on the mutual constitution of non-human and human beings in shared environments within the water worlds of this dissertation. In such shared environments, unusual relations between human and non-human beings may contribute to the transformation of taken-for-granted perceptions of the world. This fits with my above appreciation of what St. Pierre understands as "transgressive data", that is, data that challenges our prepositions, or in other words, what we think when we think about any topic of research. St.Pierre sees "transgressive data" as "emotional data, dream data, and sensual data" (p. 179). For Gullion, this involves "data that [is] not visible and that [disrupts] linearity" (2015, p. 13). In my particular case, although I was aware that I would visit a biological corridor and I must admit I was familiar

with some literature on animal studies, transgressive data challenged my (human-centered) assumptions about the controversy under study as I will show in what follows.

In this chapter, I follow the notion of non-human beings as argued by Cornelius Castoriadis. According to Castoriadis, “le vivant” [the living] exhibit characteristics of representations, affects, and intentions (Castoriadis, 1997). These are not discrete categories, but rather messy and shifting conditions. For Castoriadis, representation, affect, and intention are inherent characteristics of animals in their continuous process of giving meaning to their self-created world.

In what represents an active capacity, representation means that non-human living beings are able to “to put into image” a world under their own frames of reference (Adams, 2008, p. 396). For Castoriadis, a given environment influences the forms of representation of living beings, but such a given environment does not determine the way that such living beings create their own world. So, living beings, in their creation of representations, neither act based on random choices nor they are determined by an environment.

Affect involves the pleasure and displeasure that living beings take from the world. In this sense, Castoriadis claims, “the affect [of living beings] is, to begin with, a decisive 'signal' of its relationship with the environment” (1997, p. 356). Positive and negative affect lies between attraction and repulsion. In accordance with Castoriadis, I chose the notion of affect over emotion because while emotion is more focused on a social and cultural, and thus, cognitive direction, affect, on the other hand, has the capacity to be more generalizable to encounters not mediated by language, as McCormack (2006) would point out. In an absence of a symbolic system like language, representation is accomplished through bodily interactions, gestures, sounds, and postures, among other ways of positioning in the world.

Intention, for Castoriadis, means either the search for pleasure or avoidance and danger based on the circumstances that living beings face in light of the worlds that they create. This necessarily involves translating intention into “action towards self-conservation” (Adams, 2008, p. 396).

This view of non-human animals allows us to recognize them, not only in general terms as part of a species, but in their individuality as capable of performing representations, generating affective ties, and having intentions, as I will show below with the example of birds and a monkey called *Carasucia*.

The first time I experienced such "transgressive moment" was in February of 2014, when I attended a gathering with more than a dozen of people from different local groups and environmental associations in the *salón comunal* [town hall] of the *Asociación de Desarrollo Integral de Quizarrá* [Association for the Integral Development of Quizarrá]. During the gathering the song of a bird was loud enough to attract the attention of most of the people present, including myself. The sound was so powerful that even the speaker stopped talking to hear it. Some seconds of silence later, Ramón, a farmer who was present at the event, stated that this species of bird was common in the area, but difficult to see due to its mainly nocturnal habits. I suppose that, given my condition of outsider, Ramón addressed me, and said that the bird call unmistakably belonged to a *pájaro estaca* [common potoo or grey potoo]. At the same time, others, who also knew about this bird, nodded in agreement with Ramón.


**Figure 21: Gathering in Quizarrá, February 2014.**

I would describe that moment as one full of excitement in the hall, especially as two other people publicly shared their experience of having seen and heard a *pájaro estaca* near the Peñas Blancas and Peñas Blanquitas rivers. They told me that the *pájaro estaca* resembles a branch of a tree, or even an owl. According to these neighbors, a *pájaro estaca* has a particular unmistakable sound. I learned about the sound after hearing the bird´s call for the first time in my life. At that moment, it seemed to me that nobody can forget an encounter with a *pájaro estaca*. Jesús, a neighbor of the community, used the occasion to show me a picture of a *pájaro estaca* on her mobile phone. Other participants and I did not leave the meeting in order to spot the bird because we wanted to show respect towards the organizers. However, the spontaneous interruption of the meeting was seen as perfectly fine for all the participants, including the interrupted speaker who also was fascinated by the song of the bird. In reference to the encounter and its outcomes, the speaker said "learning is always something good", and then continued with the agenda of the meeting.

Although the meeting was about informing different neighbor associations about environmental activities in the corridor, it also included the topic of the dams in the area. Indeed, this topic of dams was of great concern in early 2014 because developers had planned to build two run-of-the-river dams in the Peñas Blancas and Peñas Blanquitas rivers, both adjacent to the place where the meeting was held. After the encounter with the *pájaro estaca*, when the topic of the dams was raised, it became apparent to me that the opposition to dams was not only justified on personal grounds or humanistic grounds, but also on the grounds of the solidarity with other species of animals, like the ones just mentioned. Indeed, it did not escape my attention at that time that, after having discussed about the habits of the *pájaro estaca*, the atmosphere of the meeting changed. I noted that the references to these and other birds and animals present in the area increased from that precise moment onward. For example, Emiliano had this to say by the end of the meeting:

> We are not doing this [opposition to dams] only for ourselves, but for the protection of animals, who also depend on the river. A river is not an isolated pipeline, and I am sure that its connections to the environment exist and are multiple and difficult to trace. If the rivers are dammed, important connections will be broken in a large part of its course.

An understanding emerged that developers of dams can cause harm in animals of the mentioned rivers. It is interesting to note that, in this meeting, the spontaneous encounter with the world of a *pájaro estaca* triggered a shift in the conversation´s focus to include other species in the discourse. Of course, this melodic encounter should not be used to argue that the bird call determined the way that the meeting was held or the topics that were raised. However, the bird, while creating its own melodic world, caused an affective response that contributed to reconfigure the atmosphere of the meeting to discursively include *pájaros estaca* and other animals as "co-agent[s] in the performativity of relationships" (Birke 2014, p. 75). In Nyman and Schuurman's words, an affective response entails the "experience of being affected by the other [human or not] both bodily and emotionally" (Nyman & Schuurman, 2016, p. 2).

In a way, this encounter changed the focus of my participant observation as well. Up until the encounter with the *pájaro estaca*, my fieldwork notes at the meeting, focused on environmental activities and issues related to the management of a biological corridor in the community. This approximately reflected the formal agenda of the meeting. But, then, suddenly after the encounter, animals had a larger presence in the conversations during the meeting and also in my mind. This scene of encountering worlds had transgressive effects, which affected my view of the kind of scenario in which we, humans and non-humans, found ourselves at that time. It could be argued, following Birke (2014), that since that time I took animals more seriously, "taking animals seriously must, I believe, include finding ways to observe just how they themselves produce human-animal encounters" (p. 75).

Using Castoriadis terms, whatever its intention was, the *pájaro estaca* was able to sing loud and melodic enough to affect positively a group of curious human beings, and attract their attention. In doing this representation, unintentionally or not, the bird expanded the frontiers of its world and produced an alteration in a social situation like a meeting. This ended up changing the focus of the conversation, and creating a less human-oriented environment. These processes are, of course, contingent and situated practices, and not generalizable.

Certainly, I am not the first to show an unexpected encounter with an animal, which spontaneously changes the research agenda or circumstances (see e.g. Michael, 2004). Yet, the

presence of the *pájaro estaca* near the location of the meeting was, I would say, the first time, but not the last, that such an encounter enriched my fieldwork experiences with the imagination of non-human animals in Costa Rica. Imagination, understood by Castoriadis as the capacity of (non-human) living beings to be active in creating their own world, as I will discuss later.

### 6.2 What is a Non-human Animal?

The definition of what constitutes an animal is varied and far from obvious. Indeed, the category of animal, as well as the category of human, are contested since their boundary is historically contingent and moving (Fuller, 2011). But especially in the Western tradition, the term animal has been mainly a way to demarcate hierarchies among species, where humans are the privileged ones. As seen from our vantage point, it could be argued that the use of the term animal has been predominantly pejorative in the western tradition.

Aristotle and René Descartes represent two good examples of this "cultural marginalisation of animals" in the Western tradition (Berger 1980, p. 15).

For Aristotle, animals, as part of a teleological cosmos, were subordinated to man's dominion (see Palwau, 2013, p. 148). In his famous manuscript Politics, Aristotle states, "nature makes nothing pointlessly, as we say, and no animal has speech except a human being" (1998, p. 4). Interestingly, despite that Aristotle includes human and some non-human beings, like bees, in the category of "political animals", only humans, albeit not all equally, have the capacity for speech and live in a city-state, what makes them privileged. This serves as a legitimate basis, so that animals, then, potentially including also other homo sapiens, remain at the free disposal of humans.

The French philosopher René Descartes left what is commonly conceived as "legacy of dualism" (Alsop, 2005, p. 6), which involves the ontological separation of rational mind and body. This has enormous influence in modern thought, including contemporary considerations of animals up until the present time. Cartesian animals are bodies, that is, soulless machines with no mind and no capacity for suffering. For John Berger, the Cartesian approach to animals supposes a "decisive theoretical break" (1980, p. 11) in the way humans consider non-human

beings. In that sense, ethicist Mary Midgley goes as far to argue that Descartes provides the basic framework for a "deadly doctrine" in which animals are "genuinely unconscious automata" (2008, p. 23).

In a more contemporary context, Kari Weil (2012) draws our attention to the significance of these other non-human worlds for humans. However, she warns that the human understanding of non-human animals will always be necessarily partial and incomplete. Weil argues that, given that our representations of non-human animals are based on language, our study of non-animals may result in distancing ourselves further from non-human animals because not everything is intelligible through language. In what seems to be a paradoxical situation, Weil implies that the more sophisticated our knowledge (based on language) about non-human animals is, the more effort we will have to make in order not to distance ourselves from them. This poses limits to our ability to understand non-human animals.

Thus, our limitations to comprehend such non-human worlds makes me modest in formulating the goals in this chapter. In this chapter, I do not mean to grasp all possible meanings about human and animals' encounters, nor do I claim to have resolved the ontological question of the animal, but rather, I mean to elucidate possible implications arising from the encountering worlds between humans and non-humans to acts-of-knowing. In this sense, this chapter complements Chapter 5, which shows rivers as mediating the connections between and among human communities. In this chapter, the relations between human and non-human beings, will be discussed in more detail.

But before we enter into the affective worlds shared by human and non-human living beings, I focus on the socio-historical conditions that have surrounded the emergence of a particular imaginary about (non-human) animals in Costa Rica. The role of non-human animals (at least those who do not fail into the category of pets or farm animals) in Costa Rican society, and the predominant role of the natural sciences in defining such role, is the focus of the next section of this chapter.

### 6.3 Non-human Animals in Costa Rica

For me, one of the most outstanding aspects of the *Museo del Jade* in San José are the numerous animal-shaped figures that fill its showcases. Some of these figures seem to hybridize animals with humans and gods, trespassing ontological frontiers. The numerous myths and legends by the Bribrí and Boruca people involving animals support this notion of non-human animals as capable of crossing different material and spiritual worlds and having an active role in the life of the communities. It is not casual that when the Borucas fought the Spanish conquistadores, they wore masks of wild animals in order to intimidate them. There is indication that these European conquistadores were astonished at the density and diversity of animals they found in Central America, when they arrived for the first time (Hughes, 2001, p. 114). Borucas, in using these masks, aimed to show that the guardians of the territory involve human and non-human entities, or something in between. Even today those masks are popular and the fight against the Spanish is still remembered through dances and exhibition of those masks. The Boruca festivity, which hybridizes humans, animals and gods, in southern Costa Rica is known as Danza de los Diablitos, The Dance of the Little Devils.

The relation between human and non-human animals through the history of the indigenous communities of Costa Rica is more complex and sophisticated than the brief account that I have just given. But I wanted to show that there are fascinating dimensions about entanglements of human and non-human worlds that go back to these communities and deserve further theoretical and empirical investigation.

As fascinating as these relations between indigenous peoples and non-human animals are, in this section I focus my attention now on the emergence of non-human animals in contemporary Costa Rica. This means the articulation of imaginaries about non-human animals in Costa Rica, which co-produce them as one of the main symbolic landmarks of the country. I am referring to the notion of Costa Rica as a leader in biodiversity and conservation in the world, and the role of non-human animals in that endeavor.

In the last decades, work on biodiversity research has told us a great deal about the quantity of non-human species in Costa Rica. Indeed, Costa Rica is recognized as having the densest levels of biodiversity of any country in the world (Kohlmann 2011, p. 204). Costa Ricans are proud of the number and density of animal and vegetal species. For example, according to the Estado de la Nación report (2017), most Costa Ricans think that protecting the environment and biodiversity should be as important as improving education, health, security, and employment, and the elimination of corruption. In addition, 66% of Costa Ricans agree that the Government should undertake more efforts to protect biodiversity in the country.

One aspect of biodiversity involves the quantification of animals as a means to co-create a particular imaginary of Costa Rica. This stems from efforts to classify non-human nature that go back, I argue, to the neocolonial character of the country in the 19th century, and of the neoliberal vision introduced in Costa Rica, together with the sustainable development approach, since the end of the 20th century. Through this quantification, animals emerge as valuable scientific objects for the natural sciences, which have to be protected and isolated from humans in "fortress conservation" areas (Brockington, 2002). This is the topic of the next section.

### 6.4 Neocolonial and Neoliberal Notions of Animals as Scientific Objects

Animals have been the focus of numerous investigations in Costa Rica. Animals emerged as scientific objects in parallel to the development of the Costa Rican liberal state model at the end of the 19th century. As Kenton Kroker writes: "[Implied in scientific objects is that they] are not accessible by everyone one but are usually handled by experts who have gone through an extensive or more or less homogenized forms of training" (2007, p. 4).

The liberal state model was based on a neocolonial logic which converted small farms into large export-driven coffee plantations especially for the, at that time, dominant British capital market (De la Cruz, 1980). Although the concept of neocolonialism emerged in the context of the Cold War era, the period in the 19th century after the diminishing of the Spanish

power in Latin America is often known as neocolonial as the direct Spanish rule shifted to an indirect commercial rule by other powers, especially Great Britain (see Arboleya, 2008)

Driven by the increasing benefits of the coffee export sector, the then ruling Liberal government co-created the first Costa Rican scientific institutions linked to the conventions of European movements like Comtean positivism and Herbert Spencer's theories on social evolution. As a consequence, institutions like the pioneering Instituto Físico-Geográfico Nacional of 1889 [National Physical-Geographical Institute] were dedicated to do research of explicit practical benefit for the country, which is to say, to foster progress in the image of European countries and the ideals of the Enlightenment (see Burns, 2004 [1980]). There are of course previous studies on the fauna and flora of Costa Rica than the ones conducted at the end of the 19th century, however, as Eaking (1999) notes, they were mainly conducted by amateurs without a clear national institutional mandate.

A key figure in the process of modernizing the country was Henri Pittier, a versatile Swiss scientist who became doctor at the University of Jena, Germany, working with his well-known professor, Ernst Haeckel (see Eakin, 1999). Pittier was one more among the many European scientists who, in the middle and end of the 19$^{th}$ century, crossed the Atlantic Ocean in order to contribute to modernize Costa Rica (and other Latin American countries). Initially they did it mostly as teachers, on behalf of local elites. Later some of these, like Pitter, changed their role and status in the country becoming scientists with increasing responsibility in national affairs (see, e.g. introduction of Gilson and Levinson, 2013). This is not to say, however, that Costa Ricans were passive recipients and totally excluded from these early institutionalized research ventures. For example, Eakin (1999) states that Pittier worked with Costa Rican volunteers for developing secondary research stations in Puntarenas and Puerto Limón. In any case, the influence of international scientists on early scientific infrastructures in Costa Rica is manifest.

Among the many research activities led by Pittier one of the most prominent was the mapping of the country, especially the less inhabited parts in the south Pacific side. The mapping of Costa Rica involved the use of classification schemes from a variety of disciplines,

like cartography, botany, agriculture, geology, anthropology, and zoology (Eakin, 1999). These research endeavors contributed to put Costa Rica on the path of progress, as understood in that period, through both the ordering of plants, minerals, indigenous people,[11] and animals, and the stabilization of its fragile border with Colombia. Colombia was the former border country of Costa Rica, before Panama became independent from Colombia in 1903 after the Thousand Days' War (1899–1902).

Whereas predominantly European scientists took a relevant role in the institutionalization of science in Costa Rica in the 19th century, North American scientists gained increasing prominence in the turn of the 20th century during the emergence of the first conservation areas in the country. In 1913, the Government selected the Poás Volcano as the first protected area in the country. This was followed by a number of other public and private conservation initiatives. These include the declaration of buffer conservation zones of 2 kilometers around the Poás and Irazu volcanoes in 1939 (Law Number 13), and along the Pan-American Highway in 1945 (Law Number 197). In 1961, the Government created a buffer conservation zone around all the volcanoes of the country (Law Number 2825). However, all these initiatives were never put into formal effect due to, among other causes, the lack of formal accountability (see Gámez and Obando, 2004). As a result, broadly speaking, these measures had little effective impact on these areas (see Campbell, 2002).

In parallel to these early efforts to develop conservation areas, it is important to highlight some other initiatives by foreign naturalists, which have been instrumental in the development of conservation areas. For example, of ornithologist Alexander Skutch, who settled in Costa Rica in the 1940s and was key for developing Los Cusingos Bird Sanctuary and, years later, the Alexander Skutch Biological Corridor; North American Quakers who settled in the 1950s in what later became the Monteverde Cloud Forest Reserve; the designation of the first national park by the Instituto Costarricense de Turismo [Costa Rica Tourism Institute] in 1955 known as Poás Volcano National Park (Law Number 1917); and a Swedish

[11] See Blancos perfectos obsesión y delirio de la Costa Rica del siglo XIX [Perfect Whites: Obsession and Delirium of Costa Rica in 19th century*]* by Alonso Rodríguez (2016) for an account of the racist imaginaries among part of the liberal political class and its influence over the Costa Rica of the 19th century.

and Danish partner, Olof Wessberg and Karen Mogensen, who settled down in the sixties in Costa Rica and struggled to establish a reserve in what is now known as Cabo Blanco Absolute Natural Reserve.

However, in the decades before the 1970s, control over these and other protected areas was basically haphazard. Apart from the private initiatives, there were only some "five guards, a vehicle, and no experience" to control the relatively few conservation initiatives in a few diverse areas of the country (Boza, 1993, p. 240). These initiatives were basically disconnected from one another and not coordinated through a strategy that formally establishes shared conservation principles and guidelines. Indeed, the lack of criteria to define the quality requirements of national parks made their effective implementation even remotely possible until the seventies (see Campbell, 2002).

This inconsistency lasted at least until the Costa Rican government, especially on the advice of Álvaro Ugalde and Mario Boza, with the substantial help of international (especially North American private) donors, expanded and professionalized the system of national parks. In general, the development of conservation areas in Costa Rica followed the North American model based on the creation of national parks as silos and the subsequent forced isolation of people from these areas (see Cronon for an account of the emergence of national parks in the United States in the 19$^{th}$ century, 1996). In some cases, then, the creation of national parks in Costa Rica generated conflicts with local communities. For instance, the establishment of the Palo Verde National Park in 1978 resulted in a controversy, three years later, over the legality of the processes of expropriation.

In any case, Ugalde and Boza achieved the establishment of national parks using a variety of strategies to ensure that the Costa Rican Government protects conservation areas. Foremost among these strategies was the co-production of national parks in alignment with significant sites of Costa Rica´s history. The idea at that time was to create national parks, says Boza (1993), especially in "areas of stunning scenic beauty, on historic sites commemorating heroic exploits of the past, and in areas of demonstrated importance of conservation." (p. 240).

This involves the convergence of material and symbolic forces to co-create a conservation imaginary aligned with tourism, sociohistorical interests, and the (mainly international) scientific community, dedicated, especially, to conservation research. It is this latter point which is of concern for the purposes of this chapter. In this line, Costa Rican 38th President Rodrigo Carazo once described national parks as "splendid natural laboratories which we offer to the international scientific community, and also to children, young people and adults who should not be denied the joy of direct contact with nature in its pristine state. All of this represents the contribution of the Costa Rican people to peace among men and goodwill among nations" (cited in Evans, 1999, p. 129). Despite the citation, I have not found the date of Rodrigo Carazo´s speech, but it was made during its presidency between 1978 and 1982.

The first sentence of this part of his speech alludes to national parks as massive laboratories of nature offered to the international scientific community. President Carazo here begins to co-create a national imaginary featuring ways of knowing the fauna (and flora) in Costa Rica. Under this imaginary, animals, especially those confined in national parks, emerge as scientific objects through the co-production of national and international interests, and the natural sciences under the umbrella of sustainable development.

Ugalde and Boza were awarded the J. Paul Getty Wildlife Conservation Prize in 1983. In his speech at the award ceremony at the White House, Ronald Reagan, the 40th President of the United States, said, "They [Álvaro Ugalde, the Director of the National Park Service of Costa Rica and Mario Boza, Costa Rica's first Park Service Director] have a genuine treasure to protect. Someone has told me that Costa Rica's wildlife includes more than 850 bird species, 205 mammals, 150 amphibians, 210 reptiles, and 700 species of butterflies." (Reagan, 1983).

If there is an institution that has embedded such imaginaries in Costa Rica, this institution is the Instituto Nacional de Biodiversidad (INBio, the National Biodiversity Institute of Costa Rica). INBio was formed in 1989, under the first presidency of Óscar Arias (1986-1990, his second presidency was from 2006 to 2010), with aims to "preserve, scientifically classify, and integrate Costa Rica´s biodiversity into an overall strategy for sustainable development" (Zebich-Knos, 1997 p. 181). That means to expand and manage the biological

inventory of the country for economical purposes through the practice of bioprospecting. This term, coined by Thomas Eisner, originally stems from biochemical prospecting, and Park defines it as "the exploration of biodiversity for commercially valuable genetic and biochemical resources" (Park, 1995, cited in Zebich-Knos, 1997, p. 180).

Not surprisingly, the pharmaceutical industry, Merck & Company, Inc., became one of the major partners of INBio through an agreement, which now is considered to be pioneering, as it became the first of its type in 1991 (see Joyce, 1994). In the agreement, the drug firm agreed to pay more than a million dollars to INBio (amounting to roughly a fifth of its first budget), and donate equipment, in exchange for "10,000 samples of plants, animals, and soil" (Coughlin, 1993). According to the agreement, Merck had the exclusive rights of these samples for two years after the identification of specific biological specimens and samples. If any of these samples had had commercial value, Merck would retain the patent and would share royalties (from 1% to 10%) with the Government of Costa Rica mainly to protect national parks. During the years the funding sources became more diversified. For example, in 2001, they included North American NGOs, universities, and other private companies and international organizations (see Isla, 2015, p. 64).

INBio was controversial from the very beginning, as many feared the loss of national sovereignty in light of international trade obligations, and negative social and environmental consequences (see e.g. COECOCEIBA, 2008; Isla, 2015). This scholarship is aligned with the term "biopiracy", made popular in Vandana Shiva´s book *Biopiracy: the plunder of nature and knowledge* (1999). For example, in her study about bioprospecting discourses in the Costa Rica of the nineties, Nygren shows that bioprospectors treat local environmental knowledge as "culturally and socially free `human capital` to be exploited in the service of biobusiness" (1998, p. 208). Evans holds, in his book *The Green Republic: A Conservation History of Costa Rica* (1999), that INBio officials had a "condescending or paternalistic" attitude towards people who wanted to collaborate with INBio (p. 242).

In any case, since its inception, INBio has been productive, at least in scientific terms. For example, according to Pablo Fonseca (in the magazine Scientific America, 2015), INBio

has produced around 2500 articles on biodiversity with the participation of 600 scientists from 42 countries. INBio also has recruited dozens of Costa Ricans for the so-called “small army” to collect biological samples around the country (see Campbell, 2002, p. 47). This is what is now called “citizen scientists” (or local “parataxonomists” using Campbell´s more technical term, 2002). This work resulted in the creation of the second largest inventory of Latin America's biodiversity including 3,400,000 types of animals and plants, among other specimens (ELCIRA, n.d.).

However, the original goals of seeking fortune through the exploitation of “green gold” in Costa Rica were never fully achieved and the budget was dramatically reduced due to the withdrawal of foreign donors, especially since 2005. In 2015, the project collapsed and was definitively shelved, leaving only a smaller version in hands of the Costa Rican Government.

While, in this section, I was not intending to provide a detailed historical overview of the development of research institutions and national parks in Costa Rica, I certainly wanted to highlight the implications of these practices on the kind of research conducted on animals. The case is that there has been an absolute predominance of life sciences disciplines in approaching and categorizing animals and other forms of life. This perspective, I argue, overlooks the deep connections between human and non-human beings in multitude of spaces beyond narratives about Costa Rican national parks and protected areas. While I do not deny the importance of national parks and natural reserves in Costa Rica, I propose that it is also important to highlight the significance of non-human animals in other spaces shared with humans, like the water worlds enacted in this dissertation. As Birke puts it in a more general discussion about the relation of animals to science, “animals have been long studied within [life and behavioral] science… but often without significant reference to [the human context]” (2014, p. 74). In contrast, this chapter deals with animals in Costa Rica, but in a different manner, namely, it adopts an approach to animals in Costa Rica based on an intimate and affective dimension in their relation to human animals, which is inspired by Castoriadis notion of living beings.

## 6.5 A Second Transgressive Moment with Animals

Apart from my work, there are other examples of localized and intimate approaches to the study of animals in Costa Rica. For instance, the book *Monkeys Are Made of Chocolate: Exotic and Unseen Costa Rica* (Ewing, 2005) contains a series of short essays featuring humans, plants and animals, when they cross paths in Costa Rica. To cite another example, some works by the ornithologist Alexander Skutch on birds give some clues on the interactions between humans and birds. In doing so, he uses a first-person narrative and does not hide his feelings when telling stories about birds (see e.g. Skutch, 1997). Curiously, this has been a reason to criticize his informal writing style in biology journals (see Schoech, 1998). Notwithstanding these contributions to the topic of animals with implications to humans in Costa Rica, they are isolated examples. Literature on encountering species is scarce not only in this country, but also, even in a more general context.

**Figure 22: Gathering near the Quizarrá church, February 2014.**

Just one day after the encounter with a *pájaro estaca*, which opened this chapter, I went to another meeting with other neighbors in the same area within the COBAS. This other meeting took place in a town hall near the Quizarrá church (see Figure 22). The agenda of the

gathering was similar to that discussed in the meeting the day before, consisting in informing the audience of environmental activities in the area, and then raising the topic of the dams due to its importance at that time.

During a pause in the meeting, a bird, perched on a cable, attracted the attention of Laura, one of the participants. That particular bird is rare to spot, according to the pleasantly surprised neighbor. This neighbor, Laura, told us that she had not seen the bird for years. I was not able to see the bird, because it flew very quickly. But again, that was an encountering situation, a "transgressive moment", which made me rethink the role of animals in their encountering with human worlds, as it was the case with the *pájaro estaca* on the day before. Almost instinctively, I thought that animals for Costa Rica are more than mere numbers and taxonomies for biodiversity, and that there is a qualitative aspect about multispecies relations that has to be considered. In that moment, I also thought of other meetings I have had in other countries, such as Spain or Canada, and I barely remembered that unexpected encounters with animals become a central element in the discussion, as was the case in Costa Rica during those days.

Although the encounter the day before with the *pájaro estaca* created more reactions among the participants of the meeting, this second encounter also had consequences in the venue of the meeting. For example, in this meeting there was also references to animals, when the topic of dams came up. As Berta, another neighbor in the meeting, said:

> It could be said, it is by chance [that we spotted the bird], like now, but when we, humans, encounter animals, they prevent us from retreating more and more into our own human world, and instead they make us feel that we are a species among many other species that inhabit the planet. Thus, they should have the same right as us to reclaim that water of the rivers.

An act-of-knowing emerges in which neighbors position animals both as part of the community and a valuable political constituency. This serves to "destabilize reductive assumptions about their object status [and] their lack of social importance" (Hamilton and Taylor, 2017, p. 176). The meeting became a place where there was public recognition that non-human worlds not only matter in the fight against dams, but also are constitutive of political

life. This does not mean that all animals that visited the meetings had a transgressive effect upon the participants. The *pájaro estaca* at the beginning of this chapter and the bird I just mentioned caught the attention of the participants to the point of having an effect on the meeting. However, given the half-walls and the open structure of the hall, in most cases different kinds of birds and lizards came and went, and did not attract attention.

In any case, the participants of the meeting, with the contribution of a small bird, co-created the imaginary of "we are standing against the dams", and that "we" is multispecies in terms of humans and non-humans. This act-of-knowing serves for the local residents as a self-reflective review of their involvement with the protest against the dam, and to include them in the protest demands. It is not surprising, then, that the symbolic presence of non-human animals is recurrent, for example, in actions and protests against the dams, as I show in the next section.

### 6.7 We, Humans and Non-humans, against the Dams

During fieldwork, I noted that the relevance of non-human animals for the communities transcended the two examples that I just mentioned. The presence of animals during my fieldwork takes many forms. In this section, I focus on the presence of non-human animals in spaces of resistance against dams, including the water worlds, which were the topic of Chapter 5.

I noted that dams were a cause of concern, among other reasons, because some residents see the diversion of water for extractive purposes as the end of (non-human) worlds, which are connected to the people who live near the rivers and the potential construction sites. For example, in the eyes of an affected resident in Quizarrá, the diversion of water would end interspecies relations:

> Developers do not want to produce energy from rivers, instead, they want to take away its life energy. This, [the dam], affects me because my home and kitchen garden are located after the diversion of water, which represents a part of the river, which would die, together with fish and other aquatic animals, if water were diverted.

This eloquent statement points to the importance of rivers as enablers of life dynamics, which are meaningful and relevant for humans. That is a life where humans do their activities

in a sustainable way together with other non-human species. The river, then, is considered a hub with connectivity for other species other than humans. For example, in a similar line, Alejandro told me:

> The *pozas* (he refers to the ones located in the Peñas Blancas River) are very important because families go to the river to have a good time, indeed, it is the ideal place to spend time with your family on Sundays. You can relax near the river while listening to the sound of birds and having access to fresh air.

Alejandro articulates the river not only as a meeting point for families but also as a meeting point, or a water world, between families and birds. Birds, and their melodic singing, take part in the recreational activities of persons near the riverbanks.

Another resident, Emiliano, pointed to the danger of damming the river for "other species that live in that stretch of the river". This person wondered "how deer, jaguars, lowland pacas, and cows would be able to drink" from the part of the river affected by the diversion of water. This statement is in line with what a kid said in one of the meeting which I attended in Quizarrá: "It is important to keep alive fish and other animals that drink water from the river".

Similarly, one farmer in the area near the San Rafael River once told me:

> In summer the water flow is much lower, and if they build the dam, we would run out of water in this part of the river, and the remaining animals would die. Our life is water, and if there is no water here and there are no animals, our life is threatened.

In March 2014, I attended a demonstration against the dams in San José, Costa Rica. In total, 19 organizations of different types staged the demonstration with the motto "*en defensa de los ríos, sus ecosistemas y comunidades*" [in defense of rivers, their ecosystems and communities]. The demonstration went on from the SETENA to the Legistative Assembly in a festive atmosphere, attracting about 250 people, based on my own observations.


**Figure 23: A banner in the demonstration of March 2014 in San José, Costa Rica.**

During the demonstration, a banner (Figure 23) which reads "*ríos libres para el futuro, todas las especies estamos de acuerdo*" [Free rivers for the future: We all agree on this] caught my eyes many times. This banner was also present in a workshop held in August 2014 near the San Rafael River. The banner is divided into two parts: on the left there is a picture of a river, and on the right, it appears the footprints of 10 different species, including humans, in a non-hierarchical way.

The creator of the banner is Gabriel, a member of *Ríos Vivos*. He told me:

> This banner means that we are all together to stand up for the rivers. Obviously, there are things about the dams that is only about human issues, but this should not mean that humans have sole competence to determine the fate of the rivers. While humans cannot ask otters or

> religious mantis about their thinking on the issues about dams, humans have to recognize that they [otters, religious mantis and other animals] have important things to say about this. Despite that they use other ways of using language, animals have things to say, for example, about how to use water and how to use rivers.

Accounts like these recognize animals not only as a legitimate political force, but also as a model of action to follow. This is against the humanistic-centered inclination to see animals as non-political figures (Birke, 2014). Of course, as Birke also suggests, there are increasing examples of the contrary, but still the humanistic legacy is a substantial one in the Western tradition. In any case, this non-humanistic approach shows "how the natural environment shapes the attitudes, discourses, and practices of the people who dwell there" (Cidell, 2010). Nevertheless, that animals are seen as political agents by some people does not mean that they are free of controversy. For example, the presence of this banner in a workshop that took place in August 2014 in San Rafael sparked criticism by some of the present who are in favor of the dams, and who argued that humans are more important than non-human animals.

After the demonstration in San José that I mentioned earlier, several environmental activists, representatives of the communities, and Costa Rican politicians such as José María Villalta, Marcela Guerrero, Juan Carlos Mendoza, and Carmen Muñoz held speeches in support of the demonstrators in front of the Legislative Assembly. At the end of the speeches, Valero invited the demonstrators to get closer to the stage and asked us to firmly lock the left arm with the right arm to symbolize the "disruptions that affect rivers, communities and ecosystems when developers build run-of-the-river dams" (Figure 24).

As we stood still for a minute raising our arms, the silence made us think about the connections that are broken when there are obstructions in the "flows of life, which are like the flow of blood in our veins and arteries", as one female demonstrator literally said. This action of the "blocked veins in arms" offers an embodied challenge to the idea that there is continuity of life through infrastructures after the diversion of 90% of water. And importantly for this chapter, the demonstrators related this action not only to the defense of "people" in the communities, but rather to the defense of human and non-human worlds, which are inextricable for the communities of southern Costa Rica.


**Figure 24: Blocked veins in arms after the demonstration in San José, March 2014.**

### 6.8 Learning with Animals

The first time I met the Solano family was in Los Cusingos Bird Sanctuary on March of 2014. Los Cusingos is located within the Alexander Skutch Biological Corridor, just 30 minutes by bus from San Isidro de El General, the capital of the canton of Pérez Zeledón in Costa Rica. Community members had organized an informative meeting about the development of dams in the rivers near their homes. For me, as a newcomer to Costa Rica, the meeting was also a way to meet people and socialize with the people of the communities in the Alexander Skutch Biological Corridor. During the meeting, two members of *Ríos Vivos*, Luís and Wendy, discussed the widespread expansion of dams in the area (Luís also appears in Chapter 1, p. 1). By that time, there were 13 hydroelectric run-of-the-river projects planned in nearby rivers, and the number seemed to increase quickly. Indeed, there was the feeling that the list of new hydroelectric projects in the area increased on a weekly basis.

When the meeting was over, people gathered around to talk about and view the drawings depicting the effects of dams that kids had brought (the ones of Chapter 4 and Appendix D). While I was taking pictures to the drawings, an elderly couple from Quizarrá came up to me. It was at this point that I met Adam and Valeria, the Solano family. They asked me what attracted me to Costa Rica. When I told them that I was doing an academic work about the dams, they expressed indignation at the idea that the rivers of their community could be, literally, "destroyed" by dams. Adam and Valeria attended the gathering to understand what was going on with the dams in their community:

> The dams are a trap for the community. The developers, with their blathering, want to make us think that their projects are beautiful, but they aren´t. Today we are here to show our rejection to the development of dams in our community.

In an act of hospitality, they invited me to their house. Some days later, I visited them, and spent several days at their place, situated in the middle of a mosaic of rainforest and farmlands. Among the many things I learnt, as a guest in their house, was the importance of multispecies encounters in generating social life, as I show below.

The Solano family has bird feeders in their backyard. Twice each day Valeria leaves food on the feeders so that animals can come, eat and go as they please. On the day I was at their place, nevertheless, a *mono carablanca* [white-headed capuchin] used the feeder. "We call him *Carasucia* [Dirtyface], and he is a lonely rider", Valeria told me while she was looking at *Carasucia*, who was hidden in the tree branches about 15 meters away from the backyard and looking back at us. Then, she suggested me to get into the house not to scare *Carasucia* away. Once we were hidden in the house, *Carasucia* slowly started to approach the feeders already loaded with bananas and other fruits. At that moment, Valeria told me in a slow voice:

> *Carasucia* was a member of a troop of monkeys, but after a fight with other members of the troop, he was injured, and I think he was rejected. Since then he is alone, but not isolated at all. He comes here every day to get some bananas to eat, but apart from that, we have developed like a relationship of trust. He spends time looking at me.

Effectively, while we were observing the backyard from a window of the house, *Carasucia* came, saw, ate and left. Certainly, *Carasucia* acted according to his instinct of self-

preservation, but in doing so, he has formed bonds with Valeria. Five minutes after *Carasucia* had left, Valeria described the encounter as an experience of positive affectivity:

> I like to see *Carasucia* feeding because it is astonishing to think that he is free to visit us as he wishes at any time. I fell in love with this practice because each encounter with *Carasucia* or any other animal is different and unpredictable.

After seeing *Carasucia´*s performance in the backyard, I had a similar feeling as Valeria. I was amazed not only at seeing *Carasucia* creating its own world, but also at the way that Valeria challenges the mechanistic view of non-human animals. At the time, this reminded me of what I had read earlier precisely about encounters between white-headed capuchins and humans in Costa Rica, "there is little similarity between wild and caged primates. It´s like comparing prison inmates with free people working and playing together" (Ewing, 2011, p. 1).

**Figure 25: *Carasucia* in a tree staring at the house.**

I saw *Carasucia* two more times repeating the same ritual of coming and going while I lived at the Solano´s house, but probably *Carasucia* saw me even more times than I did. For

example, when I was sitting on the porch of the house, sometimes I spotted him looking (perhaps) at me, or maybe at the feeders.

**Figure 26: Bird feeders in the backyard.**

As originally planned, Valeria built the feeders with the intention not to feed a white-headed capuchin, but to feed birds. Valeria told me she loves birds because her paternal grandfather also enjoyed the observation of birds, when she was a child. As Valeria reloaded the feeders, she told me a story about birds. Valeria observes birds every day, and distinguish them according to different aspects like color, shape, or habits. For example, by feeding birds on a daily basis, she was able to detect that some birds are fruit-eaters and others prefer seeds. After years of observation and other bird watchers, Valeria got to know that among the fruit-eaters, there are birds that feed essentially on pineapples. But one day, such fruit-eating birds stopped coming. She detected a decline in population of the kind of bird that particularly eats pineapples. “Some years ago, such birds stopped coming, and the pineapple that I used to leave on the feeders became leftovers that remained there for days”, said Valeria.

Valeria connected the decline of birds to the expansion of a large-scale pineapple farming not far from her place. “This phenomenon coincided with the emergence of a massive

plantation in San Francisco [situated about one kilometer from her place] to export pineapples to other countries", she said with resignation. To corroborate her observations, Valeria shared the information with her nearest neighbor, Luisa, who lives in a house approximately 100 meters from her. Luisa also has a bird feeder attached to trees near her house, and she also feared that the birds had died from the pesticides of the pineapple farm. Their knowledge, nevertheless, is not only based on their observations and their sharing information about the presences and absences of birds in their backyard. Sometimes, Valeria and Luisa, visit together Los Cusingos Bird Sanctuary, located in the lower parts of the Alexander Skutch Biological Corridor. There they have learnt about basic behavioral characteristics of birds in some of the activities that have taken place since Alexander Skutch settled there when the property was a ranch, and after his death in 2004, when the ranch became a Sanctuary.

Once Valeria established the relation between the disappearance of birds and the pineapple farms, she started to follow news of the pineapple industry in Costa Rica. Although Valeria is not an internet user, she became increasingly interested in news about pineapple farming on TV and newspapers since the beginning of the mentioned decline of birds. Valeria learnt from reports in the press about several issues in the pineapple industry. Using her testimony, later on, I identified such issues to be related to the health of farmworkers contaminated with pesticides; the several demonstrations in San José against the consequences and expansion of pineapple (and banana) farming; and the impact of pesticides on the surroundings of farming facilities. This latter issue includes the contamination of the subsurface aquifers adjacent to pineapple farming areas, as was the case especially in the canton of Siquirres, a case that particularly attracted media attention in Costa Rica due to the adverse affectation in local communities (see Maglianesi (2013) for a focused analysis of the impact of pineapple farming in Costa Rica).

As we were still spotting birds at the backyard feeder, Valeria said to me:

> The government has promised several times to address the expansion of pineapples, but I think that pineapples farming continues to grow in this country. Some years ago, the local ASADAS had problems with these pineapple growers because they wanted the supply of water for their pineapple fields. I remember that among some members of the community there was mistrust and resistance to sharing water to the pineapple fields. I do not know how

> the issue was resolved but obviously, the pineapple farms are still there and taking water from our rivers at a great cost.

She was right. The rise in hectares of pineapple farming is evident between 2000 and 2015: from 11000 hectares to 40000 hectares (Montiel, 2015). Pineapple is economically the fastest growing and the second most exported crop in Costa Rica, comprising 31 percent of agricultural export from January to September of 2016 (Mora 2016, p. 9). This has contributed to make Costa Rica one of the most intensive countries in the use of pesticides in the world (see Willis, 2016), although problems with pesticides are not new in the country and are also related, decades ago, to other crops like banana (see e.g. Thrupp, 1991).

As any reader familiar with environmental history would recognize, this story is similar to that of Rachel Carson´s struggles to prevent the poisoning of birds in North America some decades ago. Notwithstanding the differences in context, I found the similarities between the testimonies of Rachel Carson and Valeria to be rather deep. In a self-reflexive move, I questioned myself: Am I being fair to Valeria by comparing her to the way other people in the Global North acted decades ago? Regardless of this, Valeria showed me how her interactions not only with species in generic level as birds, but also with *Carasucia*, as individual, represent a significant part of her affective life. Valeria´s life is partially based on relations with non-human beings, which now are threatened by global dynamics of exploitation of natural resources, like dam development or increasing use of pesticide that could make it worse than it needs to be.

Valeria is aware of this danger, but as a woman of many responsibilities, now she has little time to settling the issue in the pineapple industry, despite her interest in the way it affects her surroundings. In the short term, for her, the impact of the run-of-the-river dam seems more straightforward than anything else, but she is conscious that there are an amalgam of issues that always need to be addressed in the community. As other people in the community, Valeria draws attention to the waste of time that could be better spent in other ecological issues:

> It would be important to change the law so that we do not have to worry about the construction of dams anymore. [Instead of opposing dams], I have more important things to

> do like figure out about the issues about the pineapple farms, reforest this area, and know more about [the habits and characteristics of] animals that come here.

### 6.9 Last thoughts

This chapter has a limited aim and does not claim to cover all the possible encounterings between human and non-human living beings in the context of my fieldwork in Costa Rica. My aim has been simply to draw attention to detailed multispecies encounterings, which are being missed under the current focus on biodiversity and sustainable research based on the natural sciences way of knowledge. It is my hope that I have shown that human and non-human animals not only share spaces, but also affective states, which form relations that influence acts-of-knowing. While sometimes unexpected encounters, like the one with birds in meetings, contribute to create these spaces, other times it is the daily routinized construction of bonds, which generate spaces of interspecies affectivity. Taken together, these different encountering worlds would seem to suggest that non-human beings are more than a passive background. Non-human beings play and important role in the controversy over run-of-the-river dams by providing a reflexive examination of the human worlds and anticipating, as in the case of Valeria´s birds, the consequences of human intervention in the environment.

As I mentioned earlier, in contrast to a determinable view of non-human animals, I understand animals as able to have imagination. Under Castoriadis' approach, this means to recognize the capacity of an animal for being for it-self and, thus, to create an own world. As Castoriadis (1997, p. 356) recounts:

> Imagination is the capacity to make be what is not in the simply physical world and, first and foremost, to represent to oneself and in one's own way.

Under this view, living beings represent "a rupture of inorganic nature, and as such a rupture of and within being itself" (Adams, 2011, p. 185). They are able, thus, to translate their external environment into meaning within a frame of reference.

When animals are around deploying all their creative imagination, they influence actions of people and collectives. They encourage learning and empathy, although, of course, differently for different people. In doing so, non-human living beings co-create imaginaries that

challenge the traditional account of animals as mechanical automatons. In Costa Rica, animals are not only vast in number as many inventories of biodiversity reveal, but also qualitatively relevant enough to count as co-creators of multiple environments, which include linkages between human and non-human beings of the water worlds of southern Costa Rica.

# Chapter VII: Conclusion

## 7.1 Answered Research Questions

Every day, in communities, towns, forests, rivers and other settings, Costa Ricans are engaging with acts-of-knowing, which as shown in this dissertation, co-create and are co-created by imaginaries that reflect visions and assumptions about who knows what, when, where, within whom, and how. Such acts-of-knowing are not open windows to an outside reality. As this dissertation shows, the articulation of acts-of-knowing and their associated imaginaries both depends on and has specific implications for the relationships between human and non-human beings in the water worlds of the southern Pacific side of Costa Rica.

Below I present my conclusions as responses to research questions that I posed at the start of this dissertation. These questions are as follows:

### *7.1.1 What are the imaginaries associated with acts-of-knowing during controversy over run-of-the-river dams in southern Costa Rica?*

As I hope to have shown in the chapters included in this dissertation, there are various imaginaries, which may refer to different acts-of-knowing. In Chapter 4, I show differences between the acts-of-knowing assumed in the EIS document, and the acts-of-knowing of local communities. The acts-of-knowing underpinning the EIS document co-create an imaginary of the local communities, which draws boundaries around their potential epistemological contributions to create knowledge. As a result of these assumptions about the communities as knowers, the EIS document tends to ignore their experiences in daily living, and does not fully take into account knowledge about biophysical dynamics that members of the communities are able to co-create using various means. Among these means, there is coalition formation, in which diverse groups of people, which vary in their support, co-create acts-of-knowing. This is the case, for example, when, after mobilizing fishers and farmers working near the rivers, otters are identified by the communities. Yet despite this, the EIS study remains silent about it. The imaginaries that are dominant in the EIS document reflect a vision of local residents as being disconnected from the biophysical environment in which they live, and as consequence, such

local residents are ignored, when it comes to creating a list of endangered animals, like otters. In essence, the EIS document tacitly enacts an imaginary of absent communities. Under this logic, the acts-of-knowing and imaginaries of the communities are lost. However, while the EIS document reflects imaginaries about the knowledge capacities of the communities in reductive ways, such communities have different visions about what acts-of-knowing should be considered, based on an embodied and relational way of co-creating acts-of-knowing beyond individual reason. Communities are not only opposed to dams, but also to the way that they are imagined and unimagined by others through the EIS reports.

In addition, such communities link present phenomena with past experiences in other sites in what represents a historicized perspective that provides a context and frame of reference for the communities. As Giroux (2005) notes, "the critical function of historical consciousness" (p. 29) plays a fundamental role in the imaginaries of many human communities. Missed in the EIA process, this historicized perspective is key to understand how communities initially co-created meaning about the damming of rivers and about the risk around landslides.

Another example is the difference that exists between seeing rivers either as a living being connected to the community, as some members of the communities articulate through drawings and other practices, or just as a quantifiably and divisible category, as articulated in the EIS document with the universal notion of "environmental flow" of Chapter 5. Here two contrasting imaginaries about water worlds emerge. On the one hand, the river emerges as a living member of the community, which contributes to establish social and ecological relations. If the run-of-the-river dam is built, then the river would die, and such relations would be broken. This, in addition, would generate waste and other by-products. On the other hand, the developers articulate an imaginary of the river as a divisible flow of water that, when diverted from its natural course, supposedly, does neither generate waste nor any other problem to the communities. This latter imaginary about water worlds carries imaginaries of nature, which are reminiscent of mechanical and divisible entities, without seeing the multiple connections that exist between rivers and human and non-human beings. The EIS report says something about

how people have to live and how they have to relate to their environment through the articulation of imaginaries that legitimates the building of the run-of-the-river dams.

*7.1.2 When, where and how are these imaginaries evident? What are their agencies?*

I hope to have made clear that imaginaries transcend mere individual and rational acts. As Adams (2015) writes, the importance of imaginaries consists that they "highlight the [collective] element of the human condition instead of imagination as a [rational and individual] faculty of the singular human being" (p. 15). Such imaginaries are articulated through a variety of documents (e.g. EIS document of San Rafael River), practices (protest demonstrations, meetings, etc.), visual artefacts (e.g. images in Chapter 5), and situated practices in relation to acts-of-knowing, (Chapters 4 and 5). Imaginaries enact and are enacted in relation to these multiple instances, which I explored through a situated multi-sited methodology.

There is also a notion of imaginaries associated not only with documents, social artefacts and practices, but also with non-anthropic ways of being. Chapter 6 shows that the human protagonists in this dissertation, in their engagement with acts-of-knowing, are not in a socially isolated vacuum, but bound up with non-human beings in a "world that constrains and enables human practices" (Code, 2006, p.5). In other words, acts-of-knowing are subject to worlds of social meaning, the "social-historical" as Castoriadis would put it, but nevertheless, these worlds have also an external referent, which, in unpredictable ways, is beyond anthropic forms of being, and shapes the human agenda. Despite the fact that this dissertation does not provide an ultimate answer to the demarcation problem between anthropic and non-anthropic spheres, it shows that interspecies encounters can have implications for the way that imaginaries and acts-of-knowing are articulated in the communities. Imaginaries are not encapsulated in human worlds, but rather there is a co-creation of acts-of-knowing that transcend human experiences. In their (transgressive) encounters with people, non-human animals are able to trigger learning and motivate a curiosity and interest in the ecologies of areas where people live their life. I showed this, for example, when Valeria became intrigued by the expansion of new pineapple farms near her house after she had noted the decrease of birds in her backyard.

*7.1.3 Third, what are their associated politics of knowing, legitimisations and authorities?*

This question has to do with the normative implications of this study.

I hope to have shown that another of the implications of this study is the unequal articulation of imaginaries at the institutional level during the unfolding of the socioenvironmental conflict over dam development. While some of imaginaries (rivers as divisible, commodified and detached from the communities), supported for example by EIS documents, are instituted and, thus, they are dominant and well-represented institutionally, other imaginaries (rivers as living beings which can live or die, rivers as intertwined with humans in relational water worlds) are instituting being articulated in informal settings, out of the reach of instituted power. These instituting imaginaries remain at the periphery of instituted decision-making mechanisms, and thus they have an institutional lower position. The mechanisms of participation of the EIA process are insufficient to articulate these alternative imaginaries enacted by the communities. So, communities are displaced through imaginaries, which undermine their status in decision-making. This inequity gives "excessive attributions of credibility" (see Medina, 2010) to the instituted knowledge, represented by EIA, at the expense of ignoring other ways of knowing based on alternative radical instituting imaginaries. This asymmetry requires a normative reflection based on Cornelius Castoriadis' framework, which I propose in the following lines.

As Castoriadis warns (1997), an instituted society which does not put into question its own foundations may result in the development of heteronomous societies. Heteronomous societies are those societies that recursively reach closure of meaning according to a given imaginary without mechanisms of self-reflection. The endorsement of particular imaginaries based on the rational mastery of the environment is a way to reach social closure by silencing the relational water worlds of the communities, which are institutionally silenced. For example, I have shown in Chapter 5 that through the concept of "environmental flow", there is an ontological occupation of the way that communities collectively imagine water and rivers. Even before the run-of-the-river dams are built, there is an attempt of imposition on their understanding of rivers to legitimate the diversion of 90% of water from the river.

Such institutionally dominant imaginaries fall into the category of modern imaginaries. Modernism comes in various versions. As Timmons claims (2003), "modernizationists… believed that cultures and economies changed from traditional, backward, and primitive to more modern, industrial, urban, and dynamic" (p. 21). Modernism comes with strict demarcations that separate the world, including their rivers, into categories that are not necessarily separable, but that rationally justify the ontological occupation of water worlds. It is this implicit imaginary of the rational mastery which secretly remains embedded with the technoscientific acts-of-knowing that, in this dissertation, I have contributed to elucidate. The expression of modern imaginaries is at odds, for example, with the place-based and relational imaginaries that people enact in their (human and non-human) interactions. Modern imaginaries of science bring disaggregation between science and other forms of knowing, despite participatory mechanisms, which, as I have shown, do not challenge instituted imaginaries, given their reductionist view of what counts as participation (see Chapter 4).

A way to avoid the modern heteronomous tendency of an instituted society, and the closure of meanings at a given time, is to instead "[recognize and recover] its instituting character explicitly, and [question] itself and its own activities" (Castoriadis, 1991, p. 20). In this dissertation, significant among these activities are ways of establishing "truth", which Castoriadis call "procedures of validation" in modern instituted societies (1991, p. 160). Under the sustainable development model in Costa Rica, I have shown that the tendency is to develop these modern heteronomous systems of knowledge, which contribute to the "unlimited expansion of rational mastery" (Castoriadis, 1980). This rational mastery of modernity clashes with other practices and mobilizations of members of the communities and would remain institutionally unchallenged if it was not for the instituting efforts by activists and members of the communities to avoid the dispossession not only of their rivers but of their acts-of-knowing.

There are different approaches to think about what is to count as dispossession. Dispossession has a mutant nature and takes different forms. Indeed, the notion of dispossession is dynamic and works at different levels, affecting "material and cultural forms of everyday life" (Kasmir & Carbonella, 2008, p. 14). Dispossession, as in its original Marxian formulation,

involves not only the privatization of lands and the pronunciation of their occupants by the state as morally wrong, but also a "cultural discontinuity" in communities (Kirmayer & Kahentonni, 2011, p. 89). This dispossession, I argue, includes but transcends the material world, and involves the establishment of imaginaries that categorise the world in particular ways, favouring extractive agendas in Latin America. This is what some call "total extractivism" (Dunlap & Jacobsen, 2020, p. 6) to accurately reflect the seriousness of the increasing depletion of human and non-human communities around the world.

In that sense, through acts of resistance and protests, communities are not only challenging the constructed evidence that is obtained through EIA, but also showing alternative worlds to which modern assumptions, as expressed in the EIA, are not met. Such instituting worlds are epistemologically and ontologically different from the reductive way of imagining acts-of-knowing through a positivist lens. The instituting practices, actions and relations of the communities contribute to make more autonomous socionatural worlds because they show the limits and boundaries of the logic behind the unlimited expansion of the economy through modern and reductionist acts-of-knowing and their imaginaries. Under the conditions of autonomy, the "constantly at work" instituting society challenges the instituted society, in a self-reflective move that involves more self-limitation in our relation to the environment. As Castoriadis puts it, "the project of collective autonomy means that the collectivity… recognizes and recovers its instituting character explicitly, and questions itself and its own activities" (1991, p. 20). Instituting, then, is necessarily in tension with the instituted society, as in the case of the controversy under study. As noted by Castoriadis, "once [the instituted society] is set in place, the social as instituting slips away, puts itself at a distance, is already somewhere else" (2005, p. 112). Instituting is "history in the making", instead of "history made", as in the case of the instituted society (p. 108). The instituting side of a society is, thus, "what makes a society always contain more than what it presents" (p. 114). This is what neighbors in the communities, environmental movements, rivers, otters and other non-human animals achieve, namely they provide the necessary self-reflective awareness for reaching a society, which sets its own limits about the ecological relations in specific water worlds. It is only in that case that it becomes possible to refer to ecoautonomous water worlds.

## 7.2 Gaps Addressed and Contributions

This dissertation has contributed to the literature critical on the sustainable development model in Costa Rica by showing that imaginaries associated with acts-of-knowing not only matter in the way that sustainable development is being pursued in Costa Rica, but they also play an important role in suppressing ways of knowing that are reflective of the local communities featured in this dissertation. There is no meaningful sustainable development without the acknowledgement of the context which enables some acts-of-knowing to flourish, and not others, according to well-established imaginaries (of modernity). These modern imaginaries are present and have consequences, but at the same time, they remain apparently invisible and outside of scrutiny. This is, at least, problematic, and thus, this dissertation serves to highlight that imaginaries in relation to science in Costa Rica, and in Latin America in general, should be a fruitful area of science studies.

In a more general theoretical context, I identified some theoretical gaps, which I have also sought to address. First, I have shown that a focus on the co-production of science and society fails to capture the nuances of socionatural environments, like the ones in rural areas, where acts-of-knowing are articulated in a co-creative way. Through a postphenomenological acknowledgement of non-anthropic entities, I have shown that imaginaries are not articulated in a social vacuum, but rather in reference to non-human living beings, which have an imagination and a way to act that, in some cases, orients the practices of humans as well. There is science beyond the large institutions and laboratories of the Global North.

Only a few years ago, I used to think that STS was a field that interrogates the knowledge practices of science in whatever the context is. Now however, after engaging with other intellectual experiences in the South, I have come to see the situated character of STS and the need to rethink its position in the different spaces in which science plays a role in the formation (or suppression) of particular ontologies. That is not to say that STS is a monolithic field. On the contrary, STS is changing, and I hope this dissertation humbly contributes to an ecological rethinking of the subfield dedicated to study sociotechnical imaginaries. My impression is that a rethinking of sociotechnical imaginaries in this field from a

postphenomenological perspective can be a fruitful way of linking acts of knowing to particular more-than-human communities in situated rural environments that constitute particular water worlds.

As I have shown, instituted co-production between science, as articulated in the EIA process may also involve co-destruction of biophysical phenomena and symbolic elements of the communities. Thus, co-production is worth exploring as much as co-destruction or dispossession, for example. This should have ontological consequences in the way that STS is formulated. For example, why is the field related to the notion of co-production of science and society and not the notion, for example, of co-destruction of science and ecologies? My point is that the notion of co-production of knowledge is neither neutral nor free, but rather it may be expensive in terms of damaged ecologies, or the appropriation of meaning-making processes that communities articulate in very different ways through alternative imaginaries.

In addition, in this dissertation I have distinguished between co-production and co-creation of acts-of-knowing. While the former refers to instituted acts-of-knowing produced in relation to taken for granted assumptions embedded in (modern) imaginaries of science, the latter involves informal, contingent and instituting acts-of-knowing that communities articulate using a variety of grounded practices and activities, challenging the deep assumptions of the mentioned imaginaries.

At the same time, this dissertation should contribute to rethinking political ecology, and in doing so, to contribute as well to "postconstructivist political" ecologies, where the goal is "to envision relations between the biophysical and the cultural, including knowledge" (Escobar, 2010, p. 97). This means both not to take for granted the assumptions behind the acts-of-knowing articulated in socioenvironmental conflicts, and to extend the notion of "environmental imaginaries" to the ways that (scientific and non-scientific) acts-of-knowing are articulated, according, in many cases, to colliding imaginaries, which carry different institutional weight.

Castoriadis´ approach has allowed me not only to grasp these sensibilities, but also to create boundary-spanning across human and non-human regions that constitute the water worlds, which are rich in patterns and nuances, but not necessarily well defined or demarcated.

### 7.3 Reflection

As I argue in the introduction, this dissertation aimed to be at the intersection of discussions about postpositivist agendas in science; postexceptional approaches to the social science; postcolonialism; and postchurched**.** Below I reflect on each one of these in turn, based on the experience I gained during the completion of this dissertation.

(I) This work contributes to reflections on the importance of the social sciences in addressing and framing environmental challenges of today's Costa Rica. This is in line with the view of Jasanoff, who claims that the interpretative social sciences have "a very particular role to play in relation to climate change [and any other environmental issues, in order to] restore the public view" (Jasanoff 2010, p. 249). This dissertation follows this direction and challenges the evident underrepresentation of the social sciences in the framing of environmental issues in Costa Rica and elsewhere. While it is my hope that this dissertation contributes to articulate the imaginaries of communities in southern Costa Rica through postpositivist methods, I am left reflecting whether I was able to fully explain the role of the social sciences while I was doing fieldwork. In some meetings with farmers, local neighbors, and researchers working in the communities, where there were the cultural traditions of a "1-minute introduction" by each participant, I attempted to describe my role as social researcher, but, although this was congruent with the participatory stance that I aspired to, it left things unsaid. Intriguingly, I felt that other researchers from other fields such as biology had an easier time explaining their work and contribution to the communities through their research.

(II) This work also attempted to highlight the exclusions of environmental issues from social inquiries, which is becoming increasingly

anachronistic and reductionist given the emergence and broad recognition and acceptance of socioenvironmental problems with blurred boundaries between the social and the natural. In the words of Baerlocher and Burger, "[excluding biophysical elements... makes it difficult to understand how social sciences may be able to contribute with explanations of, or reflective approaches towards, the societal process for sustainable development" (2010, p. 81). In this dissertation an attempt was made to include the agency of the non-human world at the level of acts-of-knowing and imaginaries, and, in doing so, it promoted this increasing but still relatively underdeveloped alternative to the "human-exceptionalism" tradition, which Catton and Dunlap identified and reported in the 70s. Following White (et al., 2015), this dissertation attempted to contribute to the turn from the "sociological imagination", brilliantly shown by Mills in his classical book of 1959, to the "socio-ecological imagination", in the global context of the increasing influence of the Anthropocene (Steffen et al., 2007) or Capitalocene (Moore, 2015; Haraway, 2015). However, despite my attempt at decentering the still dominant human view of the world through a postphenomenological perspective (especially in Chapter 6), I am aware that this work still remains based on anthropocentric assumptions. This means that the human content of this dissertation is likely to have higher weight than the non-human content.

(III) At first, I sought to develop a postcolonial approach. My aim to pursue a postcolonial research agenda in this dissertation clashed with my own western background. Although I have had extraordinary professors and mentors that have taught me about postcolonialism, my education mainly stems from a western perspective, including western philosophers like Cornelius Castoriadis. Thus, I have to admit that the theoretical perspective of this dissertation can be considered within western theoretical traditions, which, to some extent, compromises the postcolonial aims that I have indicated before. I did try to incorporate voices from the Global South, but I found it difficult, not because of language barrier, but because this also requires

unlearning assumptions drawn from other milieus. I admit my own academic biases, drawn from my own western positionality. As Todd reminds us in her critique of the misappropriation of indigenous terms by western scholars, "Decolonising the academy, both in Europe and North America, means that we must consider our own prejudices, our own biases." (2016, p.19). This dissertation contains citations from Latin America authors, and in doing so, I bring their scholarship to STS, a scholarly field with particular origins in the Global North. In that sense, while, at least, I hope I have made more visible a socioenvironmental controversy in Costa Rica and its broader ramifications, I continue to aspire to "pluricentric global dialogues" (Harding, 2008). However, in my defense I would say that Castoriadis' work, which represents the main theoretical background of this dissertation, is original in the reflexive sense that it interrogates the own foundations of western culture and its own taken for granted assumptions. As David Ames Curtis (see foreword in Castoriadis, 1991) puts it, "the priority [Castoriadis] assigns to ancient Greece as the birthplace of philosophy, politics, and the project of autonomy appears not as a "romantic" glance backward or a pious "defense" of "Western values"" (p. ix). Indeed, the project of autonomy and radical imaginaries by Castoriadis aims at contributing to self-reflection and awareness for avoiding heteronomy and the closure of meanings.

(IV) As indicated in the introduction, this dissertation seeks to forward a "postchurched" mode of STS, that is, a way in which scholarship might takes into account both big theoretical debates in the field (High Church) and transformative activist agendas (Low Church), which until recently Hess states, have remained separated in the academy. Political ecology has a larger tradition in engaging with local communities. The commitments between political ecology and local movements are deep (see e.g. Bebbington, 2012), at least deeper than in STS. In Chapter 3, I presented a way to conduct advocacy research, which is of course, set within the contexts of this dissertation research project. Sadly, this has served me to realize that the social expectations, in the form of guidelines for example, about how to conduct advocacy research are not the norm. Whereas there are many academic guidelines in graduate programs on how to do a dissertation in terms of layout,

epistemological rules, and even ethical considerations, the social aspects and impact are, usually, not considered.

### 7.4 Limitations

Of course, all research projects have a series of pragmatic and context specific limitations and challenges. In total, I conducted fieldwork for one year in the country, but in four different periods of time during 2013, 2014 and 2015. Inevitably, some events occurred outside of these periods. So, I focus my analysis on events in which I participated. I am convinced that I was able to attend enough events and activities to understand the issues at stake and grasp the imaginaries about acts-of-knowing that shape the controversy at least during the time of fieldwork.

Another difficulty was that it was not possible to talk with developers and producers of EIA because they were not easy to reach. For example, in summer 2014, I visited an event in which farmers and developers had been invited, but the developers did not appear at the event (see Figure 27 in Appendix B). I turned then to documents as a way to elucidate instituted imaginaries related to the developers and professionals in charge of EIA. My focus was placed on scientific and policy documents, which has a number of advantages, but it leaves their voice and their embodiment engagement with materials and non-human living beings silent in this dissertation.

### 7.5 Recommendations

Disappointed with the reports from international organizations, the Costa Rican President Mario Boza once said in 1992, “We [Costa Ricans] do not need to be told over and over again what we must do”. During my fieldwork, given the many things that I have learned from a variety of Costa Rican communities, environmental movements, and institutions, my aim is far more modest than to give lessons back, following what might be conceived as a deficit or banking model of knowledge dissemination. However, in line with recent criticism from within Costa Rica over the work of the National Technical Secretariat of the Environment

(SETENA),[12] my aim in what follows is to suggest some recommendations which can be added to existing voices that shape and support reform of existing structures in the implementation of a sustainable development agenda in the country:

- Water and rivers should neither be taken for granted nor conceived as neutral phenomenon, which can be quantified and isolated separately from the more-than-human communities in which they are embedded and submersed. Rather, water and rivers (or *pozas* as some say) are immersed in water worlds whose socioenvironmental configurations fluidly differ from each other. The complexity of water worlds, in which the communities are embedded and reciprocally sustained, suggests that water and rivers may be an important platform mediating the interactions between amalgams of living beings, and thus, their relevance has to be considered beyond an imaginary based on the quantification of rivers as a moving mass of water, a hydroelectric force, which can be diverted without consequences. Water and rivers are not a simple resource, neutral, inert, and life-less categories but rather they are immersed in imaginaries that challenge this ontological construction. It would be important, thus, to recognize the ontological value of water worlds as a whole instead of treating rivers as mechanized, isolated and determinable masses of water. In other words, it is important to rethink our ontologies of the world.

- There is a priori confusion manifested in the EIS about what local communities know and do not know. This notion promulgates a particular "deficit model" of knowledge (Wynne, 2010), based on specific assumptions about the knowledge capacities of the members of the communities, which position them both as

[12] Various environmental organizations and local non-governmental groups signed the manifesto called "*Urge reformar la SETENA*" (There is urgent need for reform of SETENA, n.d.). Approximately this document was published in 2015 and was signed by Alianza de Redes Ambientales (ARA), Alianza Nacional por el Agua (ANDA), ARCA, Asoc. Preservacionista Flora y Fauna Silvestre, Asociación de Ecología Social (AESO), Bloque Verde , Coecoceiba Amigos de la Tierra, Comité Bandera Azul Ecológica de San Miguel de Santo Domingo de Heredia, Comité de Protección de los Recursos Naturales de Guacimal, Instituto de Oceanología de Costa Rica, Federación Ecologista (FECON), Finca Amalur , Fundación Arqueológica Los Sitios de Moravia, Oilwatch Mesoamérica, PROAL Amigos del Pacuere, Red de Coordinación en Biodiversidad, Sociedad Científica Latinoamericana de Agroecología (SOCLA), and Unión Norte por la Vida.

passive object and as ignorant about their biophysical surroundings. The often assumed claim that lack of acceptance of the infrastructural project is due to lack of technical information by the communities does not hold in the context of my fieldwork in southern Costa Rica (see Chapter 4). I hope to have shown in this dissertation that the more information that the communities had about the project, the more critical they became about it, and the more they looked for alternative sources of information. Surprisingly though, activist groups also have similar expectations about the relation between knowledge and acceptance or rejection of ideas. For example, I found cases in which, some people, who oppose the dams, assumed that the more information about the projects would be advertised through flyers in bakeries to the rest of the community, the more people of the communities would join their fight against dams. Based both on the number of signatures collected and submitted to SETENA to stop hydroelectric projects and on my own observations on the public events where these projects have been discussed, it may be assumed that a majority of the people in the communities oppose the dams. However, as I showed in Chapter 4, it is not necessarily the case that receiving information concerning the dams leads to a shift in attitudes toward the dams. Such change of attitudes depends on acts-of-knowing, which often depend on situated experiences and meanings attributed to information that is received.

- The division between natural and social sciences in EIA is normative, and therefore depends on criteria that can be challenged on social (and even ecological) grounds. Thus, encouraging participation of local communities in the social aspects of the EIA by answering surveys, while preventing them to participate in the disciplines of the natural sciences, undermines particular ways of knowing. The testimonies of farmers and local communities about the natural world are a valuable source of environmental knowledge, which should be considered. As I showed in Chapter 4, the presence of otters creates a different ontological world than the one of EIA in which otters are not even identified or considered. Given that otters are an endangered species in Costa Rica, and that the existence of endangered species may stop a project from being approved, it

was important for the people of the local communities to identify and list them in order to have a new argument against the EIA. They achieved this identification (for example in the San Rafael River) through articulating embodied and collective acts-of-knowing. Unlike the researchers of several EIS studies, local communities identified endangered species in the rivers, and this raises doubts about who are the real experts when it comes to know about the local fauna in the sites of this controversy.

- The recommendations from this study are also significant for those institutions engaged with mechanisms of public participation across the country in nature and energy decision-making. While I do not argue against the merits of the mechanisms of public participation, I do not think that this dissertation should be understood only as a means to expand public participation in an unequivocal way. Indeed, it is my understanding that a call for more participation without defining a path to achieving one can be misleading, but in addition, I have two more reasons to believe that participatory mechanisms per se is not the panacea for solving issues: (I) as I hope to have shown, mechanisms of participation may impose constraints in the form that people want to participate in decision-making. Some community members, thus, engage with science using alternative sources. For example, some inhabitants use the Internet to look for alternative information than that of the EIA (II) it is necessary, thus, to recognize the limitations of participatory mechanisms. As shown, despite the attempts of the Costa Rican government to establish mechanisms of public participation in environmental and energy decision-making, there is still an asymmetrical gap between the assumptions that underlie the instituted imaginaries linked with sustainable development and the imaginaries that communities articulate in relation to acts-of-knowing. Thus, it is not clear who should participate with whom and why and in what occasions. It would be convenient thus to rethink such participatory mechanisms in order to interrogate their ontological assumptions about the communities and their water worlds. As this dissertation makes clear, participatory mechanisms of EIA do not have

neither the flexibility nor the social environment to incorporate some of the most significant imaginaries of the communities.

- This dissertation discovers instances where people of the communities, in addition to their daily knowledge practices, demanded to corroborate their statements and wider their knowledge about their local environment using scientific methods, but not as used in the EIA. In some cases, they relayed on relatives who are doing science or on international researchers who have the trust of the communities for whatever reason. This means that members of the local communities are not anti-science, but rather they want to use science without endorsing many of the (modern) imaginaries that science carries as articulated, for example, in the EIS document of the San Rafael River. This initiative of local communities to engage with science on their own is an important aspect that public institutions based on a reductive and unidirectional notion of science communication tend to overlook. Thus, promoting science on behalf of the local communities is a way to counteract the science on behalf of private interests, which is associated with the run-of-the-river dam developers and the EIA processes in the country.

## 7.6 Future Research

Stories of conflict and hope situated in light of human-induced socioenvironmental pressures are not new to Latin America. Following a situated and postphenomenological scholarly tradition, I believe it is always worthwhile to show localized cases where these stories are newly enacted, like in this case in the Pacific side of southern Costa Rica. This is important because, as Roberts and Thanos claim, there is no such thing as a general "environment in Latin America", but rather, there is a broad range of environments in the region that include different combinations of characteristics (2003, p. 195). Following my own terminology in this dissertation, I would say that these different environments, constitute in many cases, rich water worlds, in which various (sometimes contradictory) imaginaries are articulated through diverse practices, interactions, discourses, and encounters between and among humans and non-human

beings. While this diversity (of water worlds) may sound obvious, this reminds myself and others to both reclaim the relevance of exploring situated sites where socioenvironmental conflicts unfold in relation to water, and, and at the same time, to avoid universal claims about stories and encounters, like the ones I described in this dissertation. A dissertation whose topics are dynamic and always changing, as I write these words.[13]

This raises future research opportunities. For example, it is necessary to document socioenvironmental conflicts in specific contexts. In doing so, it is important that we try to understand that acts-of-knowing are not isolated, but rather are embodied in socioenvironmental water worlds, which when viewed as a whole, challenge taken-for-granted social arrangements that are sometimes implicit in environmental policies. Such acts-of-knowing and the worlds that they maintain are mutually constitutive, and sometimes, as we saw, mutually co-destructive. Therefore, boundary-spanning approaches based on imaginaries are needed to support, on the one hand, a more socioenvironmental STS and, on the other hand, a political ecology more sensitive to issues of knowledge co-production and co-creation between and among a variety of living beings, including humans.

Future work should also consider differences and similarities between the different socioenvironmental conflicts that today confront the Costa Rican society, including indigenous peoples. As I mentioned earlier, I conducted fieldwork during 2013 and 2015, and despite that I got to know other socioenvironmental conflicts in the area, due to time restrictions, I was not able to find parallelisms, affinities and perhaps differences between such conflicts. Future work should focus on the study of imaginaries across such socioenvironmental conflicts in Costa Rica and all Latin America, which are becoming more frequent, as I showed earlier.

In addition, given the increasing global pressure over resources, it is necessary to be sensitive to the needs of the (more-than-human) communities, who are at the forefront of responding to the depletion of the world and the dispossession of forms of human and non-

[13] Before this dissertation was completed in 2020, I came to know that the San Rafael project would be cancelled because it has not achieved the status of "*conveniencia nacional*" [national convinience]. This news was received with great joy by the communities, which saw that their struggles had had impact over the decision. I was informed about this decision via a message by a member of *Ríos Vivos* movement.

human life. This can be achieved through research agendas that not only take them into consideration for research, but also collaborate with them in solving whatever socioenvironmental problems and related conflicts exist. In short, any research study in the region should fulfil the demands of the (more-than-human) communities. I attempted to achieve this through an advocacy research approach with postphenomenological sensitivities, as explained in the methodological section.

The above considerations are vital to reveal the dilemmas and also the promises that are necessary to consider when facing present and future socioenvironmental challenges, especially in water worlds where "*el agua es más valiosa que el oro*" [water is more valuable than gold], as many voices loudly claim today in all of Costa Rica and Latin America.

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# Appendix A: Study Participants

I have changed the names of the participants to protect their privacy. For the same purposes, I asked the participants to select their age from a range. The order of this list is basically random.

| (Fictional) Name | Age range | Month and year of interview |
|---|---|---|
| **Jimena** | 50-55 | August, 2014 |
| **Pamela** | 35-40 | August, 2014 |
| **David** | 20-25 | September 2014 |
| **Gabriel** | 45-50 | September 2014 |
| **Rafael** | 50-55 | October 2014 |
| **Samuel** | 55-60 | August 2014 |
| **Roberto** | 30-35 | August 2014 |
| **Isabel** | 50-55 | March 2015 |
| **Francisco** | 50-55 | November 2014 |
| **Jorge** | 20-25 | March 2015 |
| **Mariana** | 35-40 | March 2015 |
| **Alejandro** | 25-30 | March 2015 |
| **Emiliano** | 35-40 | April 2015 |
| **Valeria** | 60-65 | March 2014 |

# Appendix B: Fieldwork Sites

I attended 34 fieldwork sites of various kinds in Costa Rica. These fieldwork sites do not include the informal interviews that I conducted in Costa Rica. Each item on the list includes the place, the date (month and year), characteristics of the meeting and the participants. This list is not in strict chronological order.

| Location | Date | Characteristics | Participants[14] |
|---|---|---|---|
| **Universidad Nacional de Costa Rica** | February 2014 | Informal meeting | Faculty members of the University and international researchers |
| **Private house near Quizarrá** | February 2014 | Formal meeting | COCOFOREST members and international researchers |
| **Community Center in Quizarra** | February 2014 | Public meeting | Neighbors, Environmental movements (*Ríos Vivos*) and international researchers |
| **Community Center near the Church in Quizarrá** | February 2014 | Public meeting | Neighbors and international researchers |
| **Cultural Center in San Isidro de El General** | February 2014 | Public event called Un Río de Palabras (A River of Words) | Neighbors from several communities, environmental movement members, artists, poets, etc. |
| **Office of Ministry of Agriculture and Livestock in San Isidro de El General** | February 2014 | Formal meeting | Costa Rican civil servants and international researchers |
| **Los Cusingos Bird Sanctuary** | February 2014 | Formal meeting | AMACOBAS members and international researchers |
| **Los Cusingos Bird Sanctuary** | February 2014 | Public meeting | Environmental movements (*Ríos Vivos*) and neighbors |
| **Private house in Quizarrá** | February 2014 | Informal meeting | COCOFOREST members and neighbors |
| **Private house in Quizarrá** | March 2014 | Informal meeting | Neighbors and environmental movements (*Ríos Vivos*) |

[14] These categories are not exclusive because they many times overlap. For example, some neighbors are members of environmental movements.

| | | | |
|---|---|---|---|
| **Diocese, Casa Sinaí in San Isidro de El General** | March 2014 | Formal meeting | *Ríos Vivos* and neighbors |
| **Diocese, Casa Sinaí in San Isidro de El General** | March 2014 | Formal meeting | *Ríos Vivos* and neighbors |
| **Trincheras Bookstore in San Isidro de El General** | March 2014 | Public meeting (workshop with artistic performances called Tarde de Ríos, "An Evening with Rivers") | Neighbors from several communities |
| **Chirripo River** | March 2014 | Public meeting | Public hike along the river. Environmental movements, students of public universities and neighbors |
| **Fudebiol (Pérez Zeledón)** | March 2014 | Public meeting (World Water Day) | Neighbors from several communities |
| **San José** | March 2014 | Demonstration | Hundreds of neighbors mostly from the southern Pacific side of Costa Rica and some parliament members |
| **Buenos Aires** | August 2014 | Public meeting | Civil servants, Water and Sewage Institute representatives and neighbors |
| **San Vito** | August 2014 | Public meeting (energy and water conference) | Representatives of ICE, formal experts (sociologist, biologist…), and neighbors |
| **Community Center in San Rafael** | August 2014 | Public meeting (workshop by Kioscos Ambientales) | Students and staff members of University of Costa Rica, neighbors, and *Ríos Vivos* members |
| **Longo Mai community hall** | August 2014 | Public meeting (Environmental workshop) | Neighbors from several communities |
| **Legislative Assembly of Costa Rica (San José)** | August 2014 | Formal meeting | Ministry of Environment, Energy and Telecommunications, neighbors, and environmental movements |
| **Montaña Verde (Rivas, Pérez Zeledón)** | August 2014 | Environmental Youth Camp by *Ríos Vivos* | Environmental movements and neighbors (most of them in their 20s). |

| | | | |
|---|---|---|---|
| **San Isidro de El General** | January 2015 | Protest gathering against the killing of Jairo Mora | Environmental movements |
| **Community Center near the Church in Quizarrá** | February 2015 | Public meeting (artistic workshop called Fluye "Flow") | Neighbors, national and international students, and Boruca indigenous people. |
| **A restaurant in San Isidro de El General** | February 2015 | Informal meeting | Environmental movements and neighbors |
| **Cultural Center in San Isidro de El General** (Figure 27) | March 2015 | Public meeting (a local farmers forum with a focus on dams) | Farmers, neighbors, environmental movements, and civil servants (dam developers were invited but did not attend the event) |
| **Fudebiol (Pérez Zeledón)** | March 2015 | Public meeting (World Water Day) | Neighbors from several communities |
| **San Rafael** | April 2015 | Public meeting | Environmental movements and neighbors |

* In addition, I participated in six Radio Shows (see Appendix C), which I consider to be fieldwork sites as well.

Con respecto a las características específicas de los Bonos de Vivienda para familias campesinas, el representante del Gobierno dijo que si una persona que vive en el campo cuenta con lote y tiene un bono, según la nueva Ley puede pedir un segundo bono.

"Para las familias campesinas, la mejor solución es un bono individual

*Cuatrocientos quince familias en el cantón bonaerense, recibieron soluciones de vivienda, durante los 13 meses de gestión del Gobierno.*

Preocupación entre fuerzas vivas

**Desarrolladores de hidroeléctricos ausentes en Foro**

Alexandra Ivanova

*Para dar a conocer los diferentes aspectos de los proyectos hidroeléctricos privados, la Unión de Productores Independientes en conjunto con el Movimiento Ríos Vivos realizó un Foro que se llevó a cabo en el Complejo Cultural, sin embargo, la actividad no contó con la participación de representantes de proyectos hidroeléctricos.*

*Durante el foro, se esperaba dar a conocer más a fondo las dos versiones, no obstante, solo se realizaron exposiciones de integrantes del Movimiento Ríos Vivos.*

*De acuerdo con el secretario general de la UPIAV, Román Chacón, los desarrolladores cancelaron su participación en el último momento, por lo que algunas personas que asistieron al Foro dijeron que no recibieron la información necesaria del tema.*

"Nos dijeron que no podían estar presentes a la actividad, ya que tienen miedo que las personas empiecen a gritar y no les dejen hablar. También, se refirieron a una falla administrativa, por lo que no conformaron una comisión que estuviera presente en el Foro. Contamos con la participación de representantes de Movimiento Ríos Vivos, pero los pobladores necesitan conocer la versión de las dos partes," dijo Chacón.

Según el vecino del cantón, Carlos Fernández, la población de las comunidades donde se pretende desarrollar los proyectos hidroeléctricos privados, tiene que recibir la información completa del proyecto que le permita emitir ucriterio al respecto.

"Siempre recibimos información de los medios de comunicación, sin embargo, necesitamos escuchar la versión oficial," destacó Fernández.

También, varias personas coincidieron en que la información que dieron a conocer los expositores del Movimiento Ríos Vivos, les hacer pensar en la necesidad de proteger más los ríos en la zona.

Para terminar, la representante del Movimiento, Raquel Bolaños, fue muy clara en afirmar que la agrupación continuará las acciones para defender los recursos hídricos en la zona Sur.

*Román Chacón, secretario general de la UPIAV, Mauricio Rodríguez de CoopeAgri y la representante del Movimiento Ríos Vivos, Raquel Bolaños, conformaron la principal durante el Foro.*

**Figure 27: Newspaper article of the event, which reads "hydroelectric developers were absent in the forum". Periódico Estrella del Sur. March 2015.**

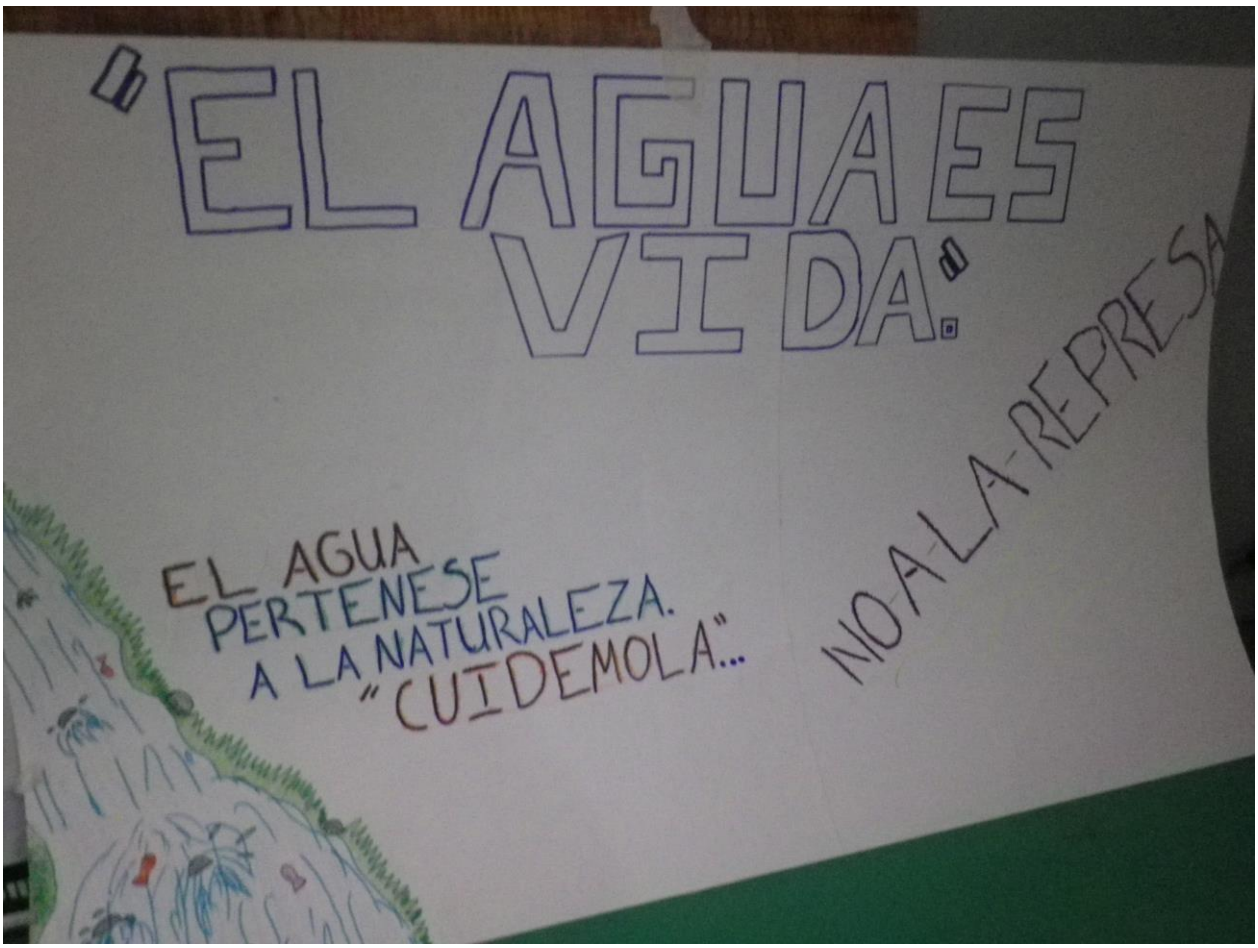
# Appendix C: Advocacy Research

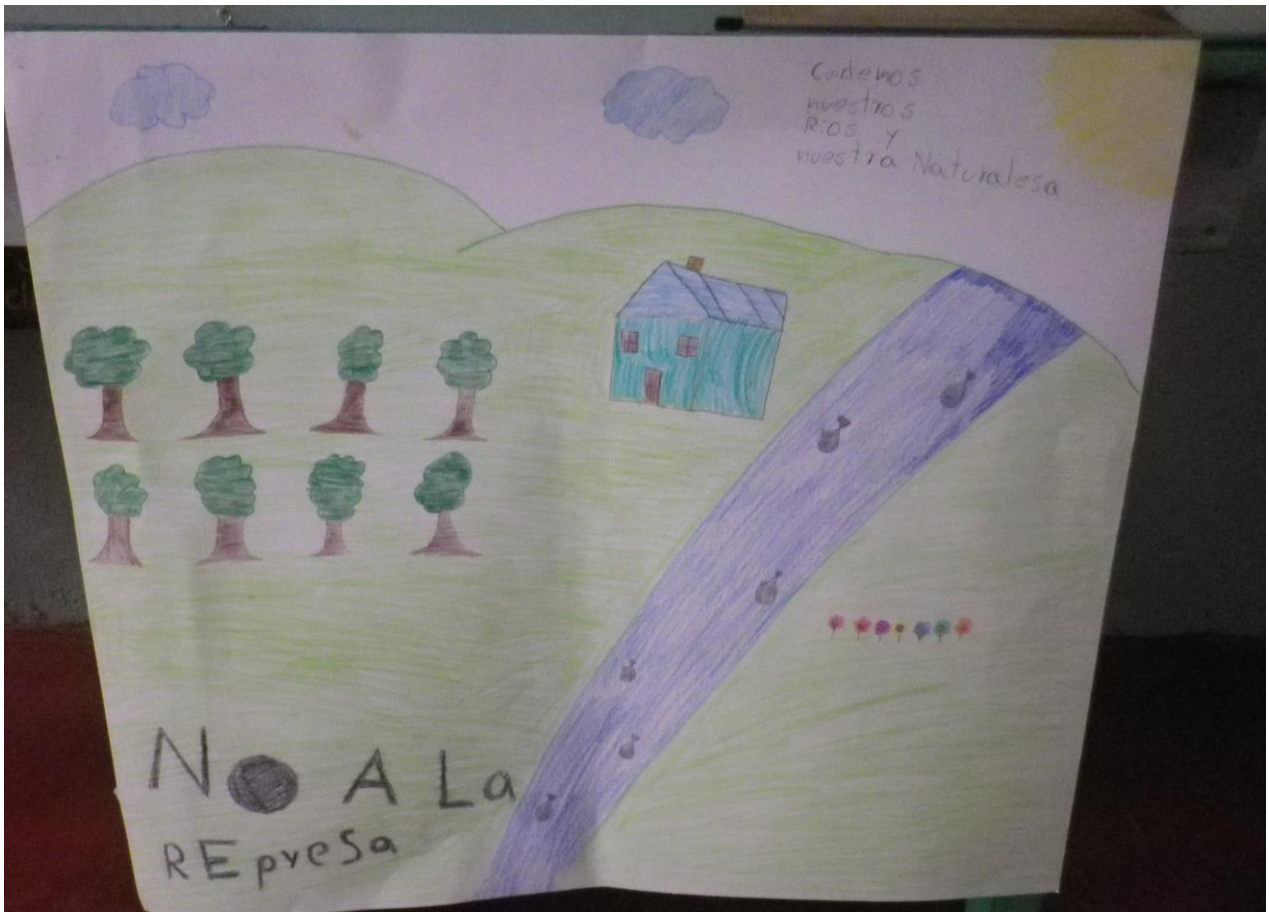
| Event/Platform | Advocacy Research Activity* | Date |
|---|---|---|
| **Radio Chirripó** | Participation in Environmental Radio Show (see Figure 20) | April 2014 |
| **Radio Cultural** | Participation in Radio Show | April 2014 |
| **Radio Chirripó** | Participation in Environmental Radio Show | August 2014 |
| **Radio Chirripó** | Participation in Environmental Radio Show | September 2014 |
| **Radio Chirripó** | Participation in Environmental Radio Show | February 2015 |
| **Radio Chirripó** | Participation in Environmental Radio Show | March 2015 |
| **Tarde de Ríos event, World Water Day** | 15 minutes talk about water and climate change | March 2014 |
| **Poster of *Ríos Vivos* Campamento de Jóvenes** | I took and provided the pictures to design the poster announcement of the event. | August 2014 |
| **La Caravana de la Ciencia Workshop at The Ministry of Science, Technology and Telecommunications of Costa Rica (MICITT) in San José** | I organised a workshop, which was part of the Caravana de la Ciencia, a series of workshops on Responsible Resarch and Innovation, supported by the UNESCO Office in Montevideo, Uruguay and funded by the European Commission. In this event, both members of the communities and environmental movements, and researchers of SETENA were invited. | September 2018 |
| ***Ríos Vivos* Facebook page** | Article in Spanish language about origins and development of the notion of "environmental flow" (this article was requested by members of the communities) | December 2018 |

* I participated in other activities and events, workshops, and demonstrations organised by the environmental movements and neighboring communities that oppose dams (see Appendix B). The above list only includes those activities in which my contribution served a specific purpose in a particular context of activism.

**Figure 28: One of the environmental radio shows of Radio Chirripó in which I participated in San Isidro de El General. Pérez Zeledón. Usually the radio program was attended by between 3 and 5 people who gave their opinion on various aspects of the environment in the region. A focus of the Radio Show was the issue of rivers and the run-of-the-river dams in the area.**

## Appendix D: Drawings in March 2014


Cuidemos
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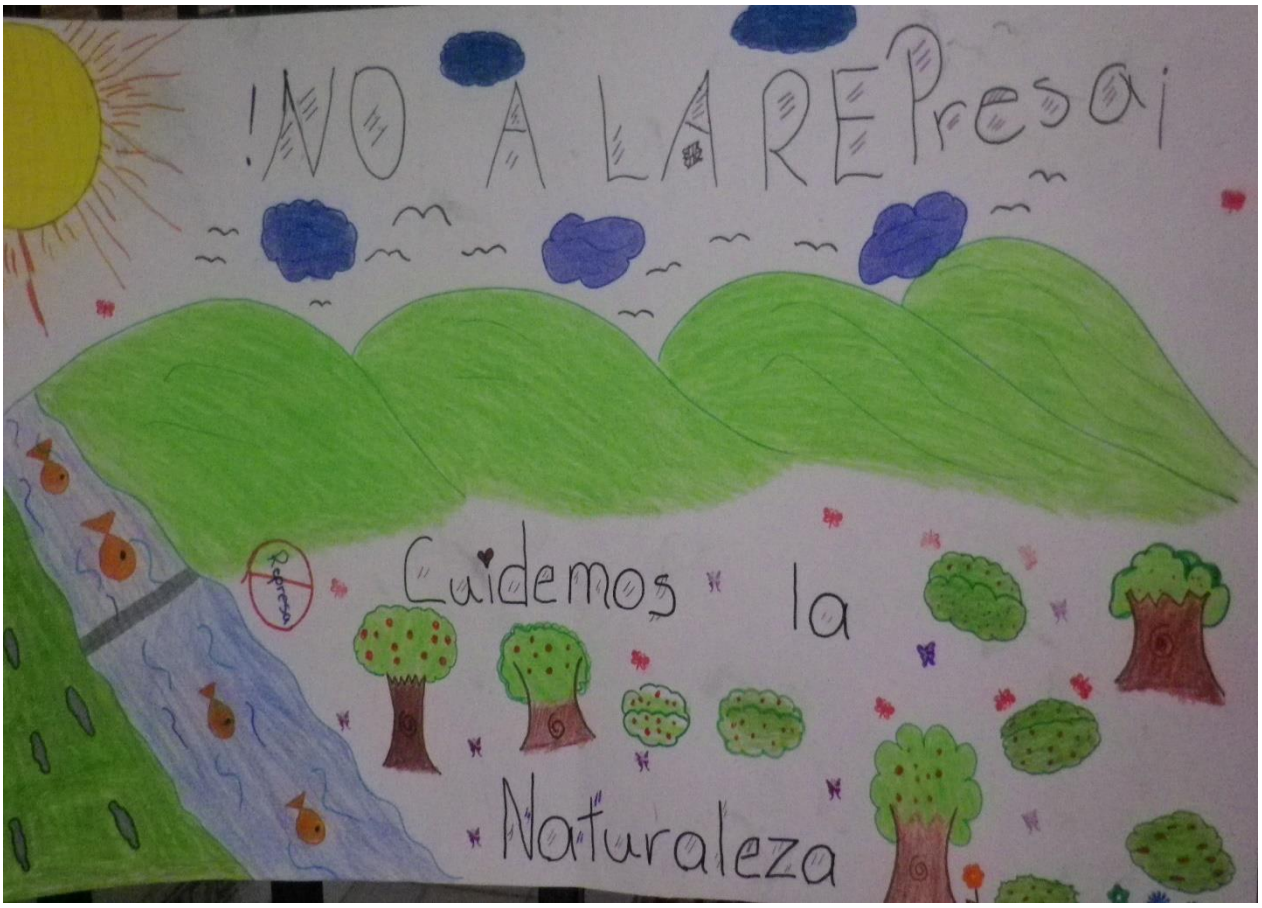
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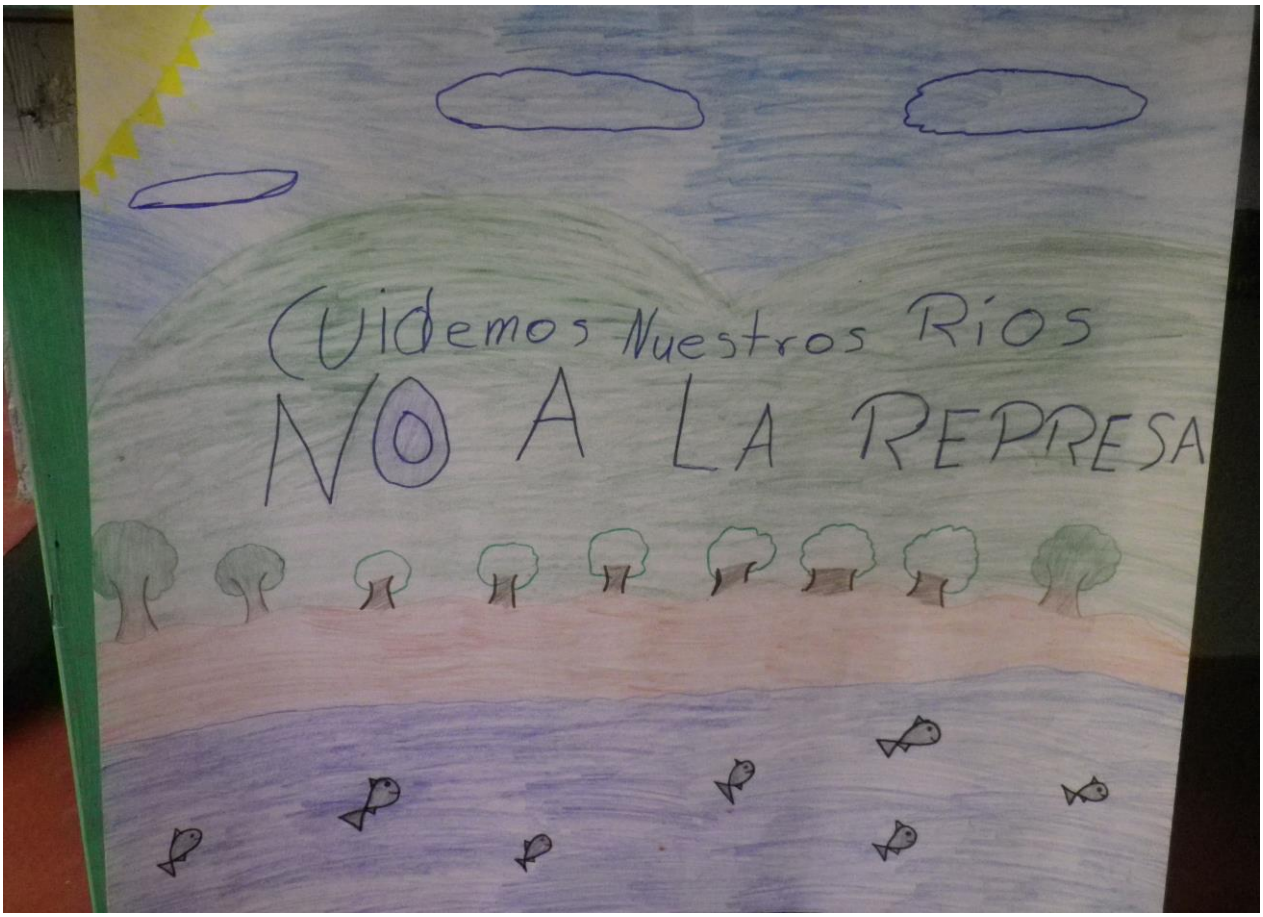
Cuidemos la
Naturaleza


Cuidemos Nuestros Ríos
NO A LA REPRESA

## Appendix E: Collage 1 in August 2014


# Appendix F: Informed Consent

York University

Informed Consent (in Spanish)

Nombre del estudio: Reimaginando los imaginarios sociales en el contexto de riesgos ambientales en el Sur de Costa Rica.

Nombre del Investigador: Francesc Rodríguez, Candidato a doctorado. Programa de Posgrado en Estudios sobre la Ciencia y Tecnología en la Universidad de York.

Dirección de correo electrónico y teléfono: frodrig@yorku.ca 416-736-2100

Propósito de la investigación:

- En esta tesis se analiza la polémica que ha surgido con respecto a la propuesta de construir varias represas hidroeléctricas en el Pacífico-Sur de Costa Rica. Estas represas afectan a seis ríos y varias comunidades rurales cercanas. Mi objetivo es explorar los mecanismos de toma de decisiones y analizar cómo estos mecanismos sociales se articulan entorno a distintos imaginarios según diferentes grupos sociales, incluyendo científicos, políticos y miembros de las comunidades locales y movimientos ambientales.

Lo que se le pide que haga en la investigación:

- Entrevistas: usted tendrá una conversación conmigo de una duración de entre 30 y 60 minutos. El debate abarcará los temas investigados y será grabada.

- Grupos de discusión: usted participará en una discusión con otras personas (entre cuatro y seis participantes) por unos 60 minutos. Voy a ofrecer a usted y al resto de los participantes el entorno más seguro posible para llevar a cabo la discusión.

Riesgos y posibles molestias:

- Hay un riesgo de pérdida de anonimato si proporciono en mi trabajo información de identificación personal, pero tomaré medidas para evitar esto. Sin embargo, el anonimato puede, en algunos casos, comprometerse involuntariamente, pero insisto en que lo evitaré al máximo.

Beneficios de la investigación y beneficios para usted:

- La investigación contribuirá a arrojar luz sobre los procesos de toma de decisiones ambientales y la forma en que se organizan en torno a distintos imaginarios en el contexto del panorama institucional de Costa Rica. Después de la finalización de la investigación, voy a obtener un título de doctorado en la Universidad de York.

La participación voluntaria:

- Su participación en el estudio es completamente voluntaria y usted puede elegir dejar de participar en cualquier momento. Su decisión de no ser voluntario no influirá en la relación que pueda tener con los investigadores o personal del estudio o la naturaleza de su relación con la Universidad de York, ya sea ahora o en el futuro.

Retirada del estudio:

- Usted puede dejar de participar en el estudio en cualquier momento, por cualquier razón, si así lo decide. Su decisión de dejar de participar, o de negarse a responder a preguntas concretas, no afectará su relación con los investigadores, la Universidad de York, o cualquier otro grupo asociado con este proyecto. En el caso de que usted retira del estudio, todos los datos asociados recolectada será destruida de inmediato siempre que sea posible.

Confidencialidad:

- Voy a ocultar la identidad de los participantes en todos los datos y los textos resultantes de la investigación utilizando seudónimos y códigos para almacenar los datos. Los documentos serán confidenciales en mi ordenador que está asegurado por una contraseña. Después de la realización de la tesis, voy a borrar todos los registros de datos. La confidencialidad será proporcionada en la mayor medida posible por la ley.

¿Preguntas acerca de la investigación?

- Si usted tiene alguna otra pregunta puede ponerse en contacto con mi supervisor Steve Alsop.

- Esta investigación ha sido revisada y aprobada por los participantes Human Participants Review Sub-Committee, York University's Ethics Review Board y se ajusta a los estándares de las normas de ética de investigación Tri-Council de Canadá. Si usted tiene alguna pregunta acerca de este proceso, o sobre sus derechos como participante en el estudio, su puede ponerse en contacto con el Gerente Senior y Asesor Principal de Políticas de la Oficina de Ética de la Investigación, York University.

Derechos Legales y Firmas:

Yo, doy mi consentimiento para participar en la tesis “Reimaginando los imaginarios sociales en el contexto de riesgos ambientales en el Sur de Costa Rica” realizado por Francesc Rodríguez (Universidad de York). He comprendido la naturaleza de este proyecto y deseo participar. Yo no renuncio a ninguno de mis derechos legales al firmar este formulario. Mi firma abajo indica mi consentimiento.

Firma Fecha

PARTICIPANTE

Firma Fecha

INVESTIGADOR PRINCIPAL

# Appendix R

**You will need an Ontario map to follow these suggestions**

**Itinerary #1**
**Toronto to Sudbury and return (shorter version) – about 920 km**

-Highway 400 to Highway 89
-Highway 89 west to Shelburne
-Highway 10 to Owen Sound

> *more scenic alternate route: on Highway 10, at Flesherton, turn right onto Grey County Road #4 and go 3 km to Grey County #13 (turn left) through village of Eugenia. Stop and see Eugenia Falls. Then continue on #13 down through the Beaver Valley which slowly widens until you reach Georgian Bay at Thornbury. Then drive west on Highway 26 to Owen Sound. Beautiful drive along the Bay. You hit Highway 6 in the east end of Owen Sound

-Highway 6 from Owen Sound to Tobermory take the car ferry to Manitoulin Island and continue on 6 cross to the mainland and join Highway 17 north of Espanola (there is a Spanish connection: see Wikipedia)
Drive east on Highway 17 to Sudbury
Back to Toronto on Highways 69 and 400 (Highway 69 becomes 400 just north of Parry Sound)

> *alternate route: to get a taste of Muskoka, the heart of cottage country, leave highway 400 about 17 km east of Parry Sound at exit #213 (Lake Joseph Road at the village of Horseshoe Lake). Follow Lake Joseph Road for 21 km to Foot's Bay. Take Highway 169 which will take you through Bala on to Gravenhurst (birthplace of Norman Bethune!). 169 ends at Highway 11. Continue south to Toronto.

**Notes:**

This first part of the trip, to Tobermory, gives you a good sense of the farming communities of western Ontario. Lovely country.
Bruce peninsula: begins in picturesque Wiarton. The west side of the peninsula is flat and has sandy beaches on Lake Huron. The east side is the rugged Niagara Escarpment with sheer cliffs and caves. A quick side trip to Lion's Head (turn off highway 6 at Ferndale) is worth the view - it's breathtaking.

Tobermory is the terminus. A pretty small harbour town. Here you board the MS Chi-Cheemaun - reservations needed (2 sailings a day)

Manitoulin Island: off the ferry at South Baymouth. This island is the largest in the world in a freshwater lake. Several first nations reserves.

Typical bush in the trip to Sudbury. Science North the key stop in Sudbury. For the mining story, Science North operates another centre, Dynamic Earth. Sudbury area about 40% francophone.

**Itinerary #2**
**Same as # 1 but proceed east from Sudbury to North Bay – about 1000 km**
Back to Toronto on Highways 11/400

**Note:**
North Bay: a pleasant small city on Lake Nipissing (which is very large)

**Itinerary #3**
**Sudbury and Northeastern Ontario - about 1245 km**

North to Sudbury on Highways 400 and 69
East on Highway 17 to North Bay
North on Highway 11 to 11B
Through Cobalt to Haileybury and New Liskeard
Highway 65 east to Notre-Dame-du-Nord, QC
Quebec highway 101 south along Lake Timiskaming
In village of Temiscaming, cross river back into Ontario
Highway 63 to North Bay
Highways 11 and 400 to Toronto

**Notes:**

From North Bay to Cobalt area, typical Canadian shield and boreal forest with many lakes. At New Liskeard, suddenly you meet a flat region of farmland (the Little Clay Belt) notable for dairying (there is a fantastic cheese shop on the highway in Thornloe).

Lake Timiskaming is very large and attractive. Decent accommodations in New Liskeard and Haileybury, both on the lake. [This is my family's country: my mother was born in North Cobalt and my great grandmother died in the great fire of 1922 in Haileybury] The drive back on the Quebec side is very nice as farmland turns back into bush.

**Other possibilities:**

Sault Ste-Marie is interesting because of the locks for ships moving between Lake Superior and Lake Huron. There is a train trip to the Agawa Canyon that leaves SSM. Just west of the Sault you can visit the shore of Superior. This is quite a bit further and you would have to back-track unless you returned via Michigan. Toronto-Sault (one way): 687 km. You can drive this in one long day.

The true north trip would be up Highway 11 through North Bay. It swings much further north then west by Lake Nipigon and joins Highway 17. The trip east on 17 is along the north shore of Superior and some of it quite spectacular. Round trip: about 2600 km (further than driving from Barcelona to Warsaw!)

If you look at a map, you will see there is a lot more of the province north of these roads.