FLOWERS, POWERS, AND WATER FLOWS

Conflicts over Irrigation Water and Rose Farming in the Ecuadorian Andes



Patricio Mena-Vásconez

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Patricio Mena-Vásconez

Thesis

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Abbreviations

AVSF	French acronym for "Agronomists and Veterinarians without Frontiers"
CODEMIA-CPM	Spanish acronym for "Consortium for the Development and Integrated Water and Environmental Management of Cayambe-Pedro Moncayo-CPM" (usually abbreviated as "CODEMIA")
COINOA	Spanish acronym for "Corporation of Indigenous Organisations of Olmedo"
COOTAD	Spanish acronym for "Organic Code of Territorial Organisation, Autonomy, and Decentralisation"
CPR	Common Pool Resource
CSR	Corporate Social Responsibility
EFTA	European Fair-Trade Association
ERA	Echelons of Rights Analysis
FLP	Flower Label Programme
GADIP	Spanish acronym for "Autonomous Decentralised Intercultural and Pluri-national Government" (of Cayambe)
GADPP	Spanish acronym for "Autonomous Decentralised Government of the Province of Pichincha"
GDP	Gross Domestic Product
GIS	Geographical Information Systems
GMOs	Genetically Modified Organisms
IWRM	Integrated Water Resources Management
NGO	Non-Governmental Organisation
RA	Rainforest Alliance
RAS	RA Sustainable Agriculture Standard
SAN	Sustainable Agriculture Network
SENAGUA	Spanish acronym for "National Water Secretariat"
STOs	Second-Tier Organisations
TURUJTA	Kichwa acronym for "Council of Indigenous Organisations of Tupigachi"
UCCOPEM	Spanish acronym for "Union of Peasant Indigenous Organisations of Cochasquí - Pedro Moncayo"
UNOPAC	Spanish acronym for "Federation of Popular Organisations of Ayora, Cayambe"
USDA	United States Department of Agriculture
WFTO	World Fair Trade Organisation
WOTRO	WOTRO Science for Global Development, Netherlands Organisation for Scientific Research (NWO)
WRM	Water Resources Management group (WUR)
WUA	Water Users' Association
WUR	Wageningen University and Research

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Starting a thesis process a bit late in life (I was born in 1959) is quite an experience. I certainly do not believe that there is an absolute right or wrong age to pursue a PhD, but not doing it when you are, say, 27, does entail a set of circumstances I am still not completely sure I was prepared to face some years ago. Somehow, it is like climbing a mountain: anyone *could* do it, but it is better to do it in your greener years, yet the difficulties imply also a special pleasure of accomplishing it, many times with the help of amazing folks. I always wanted to do a PhD, and after my two master's degrees in botany and journalism, I almost had the chance to continue towards a doctorate in NYC and Cardiff; for one reason or another, it never crystallised. This doctorate is of course a distinct personal triumph of which I am genuinely proud and thankful.

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Gloria passed away some years ago and left a deep void in many souls. I had the opportunity to work with her after that initial association on an institutional gender-audit at EcoCiencia, an environmental NGO I had co-founded in 1989. In more recent years, and within the context of this thesis, I visited the dry valleys of Ica in Perú with her and some other wonderful Water Justice people. Gloria is a beacon that will never stop making us smile, and she will forever guide and inspire all of those who had the privilege of sharing at least some time with her.

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times of different length along these last six years. I was able to visit the lady of the couple that hosted us during that first visit. Dear Nell and Riks, thank you for your wonderful friendship, which has lasted so long and across so many miles, and which we cherish in a very special way. I cannot forget to mention Sonia Somovilla and Lester Hüner, the best landlords-cum-friends one could wish for; Juana Vera, whose generosity is beyond words, and Silvia Serrato and Andy Farrow, whose home close to the Uiterwaarden was the best place to turn 50. You and your lovely families were such a highpoint of our experience.

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CHAPTER 1
INTRODUCTION



The giant Cayambe volcano, where Pisque irrigation water comes down from

1.1 Problem statement: Floricultural agribusinesses, encroachment and struggles over water in the Pisque watershed

This thesis focuses on Andean water-related conflicts, specifically in relation to the quite recent expansion of export-oriented flower agribusinesses in a mountainous inter-Andean valley in northern Ecuador, the Pisque River watershed. During the last thirty-five years this phenomenon has deeply changed the life of a region inhabited for centuries by indigenous communities who have been the victims in a history of encroachment by, and the protagonists of struggles against, powerful external actors. Floricultural agribusinesses, especially farms that produce roses for export, constitute the latest chapter in this chronicle.

This text is primarily an amalgamation of five papers that have been published or presented for publication, adapted to configure a thesis as part of the PhD process. Being stand-alone documents, these papers do derive from a common political ecological approach and together address – from diverse conceptual and methodological perspectives – the intricate and dynamic issue of contemporary irrigation in the Pisque watershed as a product of a centuries-old history.

As such, after this common introduction, each of the four chapters based on the five papers (one chapter is based on two papers) presents its own background, methods, results, and inferences, and a final chapter discusses the connections between the chapters and wraps up the conclusions of the whole work. While the five papers refer to the same region – the Pisque River watershed in the province of Pichincha, Ecuador –the maps of the thesis chapters show some variation since, for example, a historical outlook asks for a slightly different scale and specific limits than one more centred on contemporary discursive struggles or global market-oriented concerns related to the emergence of floriculture in the region.

A distinct event is the conductive thread of the whole thesis: quite recently, some local inhabitants started to develop their own version of export floriculture. As will be seen, against many adversities local families decided to build small, low-tech greenhouses and start their own floricultural businesses after having worked for years at large flower farms, mainly as non-specialised workers, and to try to compete against powerful, globally connected companies. Before my field work started nobody had addressed this phenomenon beyond a passing comment. In 2012 I started my field work walking and inquiring around the localities of this inter-Andean valley

dominated by the colossal snow-capped Cayambe volcano. The main idea was to interview as many flower producers and other related actors as possible. It was a revelation to find a new actor: amidst the large earlier floricultural companies that during the last decades had transformed the variegated agricultural landscape into a growing plastic-covered uniformity, hundreds of minuscule, similarly whitish, structures had sprouted mushroom-like. This discovery led me to modify the original purpose of the research.

This work is part of the larger, WOTRO-funded, WUR-WRM programme "The trans-nationalisation of local water battles: Water accumulation by agribusinesses in Peru and Ecuador and the politics of corporate social responsibility". This programme investigated transnational processes of water resource accumulation and contamination by agribusiness companies in (semi)arid areas in both countries and explored the societal responses to such processes. In the Pisque region there has been a historical accumulation of water by external actors, more recently by flower companies, to the detriment of local communities. Moreover, this water is being used to produce non-edible goods in this semi-arid Andean region, and the flowers are mainly exported to countries such as the Netherlands, where water is abundant. Water itself is thus exported as virtual water (see e.g. Hoekstra and Hung 2002).

While the research of this dissertation does fit well with the original objectives of the programme, it is also true that during the field work and later analyses it became clear that, even if there certainly had been and is a struggle between local communities and external actors that were concentrating irrigation water, this struggle was mainly covert and that a new set of relationships had been establishing in the region; at least partially, this new situation included an adoption of new technologies and global connections by local families and communities.

As will be discussed, the seemingly clearly dualistic interaction between two local discourses – that of local food sovereignty and self-determination versus that of agribusinesses´ modernity and productive efficiency – proved to be more complex and dynamic, entailing new conflicts, uncertainties, and promises.

1.2 Research design

1.2.1 Research objective and research questions

This thesis aims at gaining comprehension about what has happened, is happening and could happen with irrigation development; in particular the competition and conflicts regarding access to water, rights of water control, and forms of water governance in the Pisque watershed. It is done both through contemporary and historical analyses, the latter laying the grounds to grasp the current situation in which the arrival of flower agribusinesses and its recent uptake by local inhabitants has added complexity to a longstanding conflictive and dynamic set-up.

Through a series of focuses linked by a politico-ecological thread (see below), several salient topics related to Pisque irrigation are addressed to answer the following main research question:

> *What is the current situation and what are the perspectives of irrigation in the Pisque watershed, as part of a history of local inhabitants historically facing encroachment by and struggling against powerful external actors, the latest of which are flower agribusinesses?*

This broad research question can be divided into more specific ones that are addressed in detail in the four paper-related chapters. These questions respond to an 'adapted grounded theory approach' (Charmaz 2008). Grounded theory´s premise is that a theory should stem from insights gained from the field research. A grounded theory of a studied topic starts with concrete data and ends with rendering them in an explanatory theory (Glaser and Strauss 1967). Even if this methodology was not followed from the start of my research, the basic premise is relevant. Wallis et al. (2015) used their own adaptation of grounded theory in an Australian irrigation system to generate emergent themes within their main question on irrigation renewal and governance.

Here I went to the field to request as many answers as possible relating irrigation water governance and from that, inductively, the following related sub-questions emerged:

1. How have socio-environmental conflicts related to irrigation water developed throughout Pisque basin´s history and shaped the contemporary flower-dominated hydrosocial territory?
2. How have the discursive framings used by two main current irrigation stakeholders – i.e. flower agribusinesses and local peasant-indigenous inhabitants – to defend and foster their values and practices on water allocation, developed in the Pisque watershed?
3. How can the recent appearance of small local floriculturists be explained and how does it fit into the food/water security-self-determination vs modernity-efficiency controversy in discursive, legal, and factual terms?
4. How have agricultural certification schemes influenced the socio-environmental conditions in Pisque floricultural practices, and how do small local floriculturists perceive the changes triggered by certification schemes?

1.2.2 Political ecology as the backbone of this dissertation

To address the realities and conflicts summarised above, political ecology has proven a germane analytical framework, considering that political ecological studies aim at improving our understanding of nature and society relations through the lenses of power and politics (Zimmerer and Bassett 2003). According to Perreault et al. (2015: 7-8):

> *"Political ecology is best characterized not by research topic … or scalar or socio-spatial focus … Rather, the field's coherence derives from a set of commitments that are held in common … in all political ecological work. These are, first, a theoretical commitment to critical social theory and a post-positivist understanding of nature and the production of knowledge about it, which views these as inseparable from social relations of power. … Second, political ecology retains a methodological commitment to in-depth, direct observation involving qualitative research of some sort, often in combination with quantitative methods and/or document analysis. … Third, political ecology is characterized by a normative political commitment to social justice and structural political change. … To paraphrase Marx, the point of political ecology is not merely to understand the world; the point is to change it."*

This multidisciplinary and integrative field has had its own development, not devoid of clashes, along its relatively short existence (see e.g. Bryant 1998; Watts 2000; Forsyth 2001; Escobar 2010; Robins 2012; Büscher and Fletcher 2018). The very name could lead to thinking that it is exclusively, or at least principally, linked to ecological issues, i.e. concepts related to natural ecosystems and communities, and derived concepts such as biodiversity, extinction, conservation, protected areas, and the like. While it is true that in the beginning this was mainly the case, the ecological part of the equation started to be widened towards agroecosystems and urban ecosystems, and, in general, 'the environment'. This tendency prompted some authors to question the too-broad scope that political ecology was reaching. On the other hand, some authors also questioned the fact that it was more politics than ecology, and thus it should be labelled 'environmental politics' (Walker 2005).

Starting in the 1970s, the focus was more economically-politically oriented and dealt with the structural aspects of people and their environment from a Neo-Marxist historical-materialist perspective, highlighting class-based struggles over the environment and the distribution of natural resources. Later, a second era of political ecology started: studies focused more on the actors, especially as they struggled for access and control of natural resources (Bryant 1998). This also meant a concern about the relationship between knowledge and power, the practices and techniques of subject formation, the political and cultural relationships, their discourses and the identity politics involved, and by symbolic disputes around humans and nature (see e.g. Escobar 2010; Huijbens 2019; Rasch and Kohne 2016).

A recent publication analyses 'posthumanist political ecology' or 'III-phase political ecology' stating that many studies within this discipline belong to a new generation of texts that, with their own influences, central themes of analysis, and advantages, "help [to understand] our relationship with the environment, at a time when it is increasingly difficult to distinguish between the domains of the social and the natural" (Durand and Sundberg 2019:7; see also Escobar 2010). These authors agree with the previous paragraph in that political ecology refers to what is essentially an evolving socio-political set of events.

The distinction between nature and society is seen by Durand and Sundberg (2019) not only as a colonial legacy, but also as a prime cause of socio-environmental degradation, based on what Grove (1990) has labelled 'ecological hegemony'.

There are iconic cases relating the politics of resource extraction and the environment. The Chevron Texaco vs. Ecuador case started in 1993 when local inhabitants accused the petroleum company of massively polluting water and soil in the Ecuadorian Amazon. The tortuous legal journey[1] included the sentencing by the provincial court of Sucumbíos that Chevron had to pay 9.5 billion dollars to compensate victims for socio-environmental damages. But the International Court of Arbitration of the Hague ruled in 2018 in favour of the company. It declared Ecuador responsible for violating the Bilateral Investment Treaty, denying justice and not providing fair and equitable treatment to Chevron, based also on alleged acts of corruption that involved lawyers as well as those affected. Many other cases are documented in Ecuador and worldwide where large extractive industry companies are not hold accountable for social and environmental damages. One other such case is the case of the politics of mining and conservation in Ghana. Small-scale mining is treated as illegal and polluting, while large-scale mining, mostly foreign based, is incentivised. Even if large-scale mining, at least in the superficial type, has been seen as a prime source of pollution and environmental degradation, it is not given the same treatment, and mining entrepreneurships are even hailed as 'growth poles' (Abembia and Mawuko-Yevugah 2019). As will be seen, something akin happens with irrigation water in the Pisque watershed: although local agriculturalists are not considered to be doing anything illegal *per se*, they are indeed seen as backward and inefficient in contrast to the modernising, forward-looking new agribusinesses.

Nature and society interact and influence each other, *produce* each other. According to Robbins (2012), socio-environmental problems are not natural nor inevitable or destiny-governed, and "their history can be traced, and their invention analytically discovered" (p. 124). These non-naturalness and 'constructedness' (Hacking 1999) entail, on the one hand, a power play in which elite communities secure their power and control over both natural resources and less powerful groups, and, on the other and concomitantly, a process that naturalises the perceived reality, hiding its social construction, and impeding or ostracising alternative views and the possibility of resistance and change. Thus, political ecologists think that these concepts, ideas,

[1] A detailed chronology can be read here: https://confirmado.net/2018/09/10/cronologia-de-la-cruda-realidad-del-caso-chevron-texaco/.

entities, and processes can be unmasked, reinvented, and changed to achieve a more sustainable future.

Durand and Sundberg (2019) explain their belief that there is a third generation of politico-ecological studies based on the fact that previous studies, even if addressing society and nature, have had an anthropocentric bias that sees non-humans (animals, plants, and objects) as elements passively subjected to human political and economic dynamics, without any agency. This broader conception of the environment encompasses socioenvironmental conflicts, including disputes over environmental knowledge systems, rights of nature and the norms, meanings and values that bind humans and nature, that are certainly encountered in the Pisque watershed concerning specifically irrigation water. Of course, these non-human actants are not defined by their own essence but, relationally, by their capacity, at some point, of acquiring the ability to produce outcomes. This is not dependant on their volition or conscience, but on the net of interactions and relations they have with other human and non-human entities (see, e.g., Huijbens 2019). In the case of this thesis, these relationships have changed along the history of the watershed, but *páramos*, canals, certifications, weather, and water itself have certainly been a major factor in the development of the current situation, as will be seen in the thesis.

How the tenets of political ecology relate to the encroachment of water resources in the realms of agribusinesses, mining, and hydropower generation is explained, among others, by Espeland (1998), Mehta (2005), Perreault (2014), Zwarteveen and Boelens (2014), Yacoub et al. (2015), Bakker (2003; 2015), and Vos and Hinojosa (2016). Boelens et al. (2018:4) define the political ecology of water as: "the politics and power relationships that shape human knowledge of, and intervention in, the water world, leading to forms of governing nature and people, at once and at different scales, to produce a particular hydro-social order". These authors concur with previously cited notions that see political ecology as inherently connected with encroachment and conflicts, and therefore goes beyond the mere analysis of the complex multi-scalar relationships between environmental changes and human societies. These are mediated by political, cultural, economic, and technological drivers that cause contradictions and conflicts via an unequal distribution of natural resources and decision-making power (see also Huitema et al. 2016; Huitema and Meijerink 2017; Swyngedouw 2009). Moreover, these conflicts also include contradictions and disputes over the way environmental knowledge itself is produced

(Forsyth 2001). Political ecology aims not only at *understanding* these mechanisms but at *finding, conceiving, and promoting alternatives* to develop socioenvironmental relationships that are "economically fairer, politically more democratic, and ecologically more honest" (Boelens et al. 2015:19. See also Perreault et al 2015; Rasch 2018).

Hence, political ecology is a particularly combinatory and integrative set of concepts coming from disciplines that include not only policy- and environment-related notions but also those connected to human and cultural geography, political economy, rural sociology, anthropology, historiography and gender studies (see e.g. Recharte and Gearheard 2001). This, and the above-mentioned widening of their scope, also make political-ecology studies quite heterogeneous in themes and approaches. Yet there is a core of shared aspects that render them coherent. These will be analysed later vis-à-vis the different core chapters of this thesis.

Under this general umbrella, each chapter possesses its own design grounded on concepts and methods that are explained specifically in each case.

1.2.3 Research sites

Although the study site is fundamentally the Pisque River watershed, and more specifically the floricultural area within it (both of which can be mapped quite accurately in physical terms), the scale of the research is quite fluid, as will be seen in each of the next chapters. It goes from the household scale, where many interviews were held and where new 'local' roses are grown, to communities that struggle, contest and adapt, to regional and national governments with erratic discourses, to the global scale where roses are shipped and sold, and where certification standards are set. Thus, each of the following four chapters will have their setting and methods explained.

In a nutshell, the Pisque River watershed is one of the many inter-Andean basins in the middle of the two cordilleras, eastern and western, crossed by transversal *nudos* (knots or massifs), that make up the ladder-like Andes in Ecuador. The Pisque River is the result of various smaller streams that start in the glaciers and *páramos* of the Cayambe volcano on the Eastern cordillera (upper part of the watershed, up to almost 6,000 metres above sea level), flow to the inter-Andean valley to the west (middle part, around 2,800 metres above sea level), and converge in a river (lower

part) that feeds the Guayllabamba within the large Esmeraldas basin that drains into the Pacific Ocean.

These mountain valleys have been the sites of human settlements and agricultural activities for millennia (e.g. Mayer-Oakes and Bell, 1960), and the Pisque is one of the small number of areas – the largest one – that have welcomed flower agribusinesses during the last three decades. Previously, as will be seen, the foreign wheat and cows had been the protagonists of earlier chapters in history. Figure 1.1 is a panoramic view of the floricultural zone of the Pisque River watershed.



Figure 1.1. Panoramic view from the east of part of the middle-altitude zone of the Pisque River watershed [2]

The two main towns in the area, both municipal capitals, Cayambe of the Cayambe *cantón* and Tabacundo of the Pedro Moncayo *cantón*, have grown very rapidly in the last decades, due mainly to the presence of floriculture. The typical bucolic hamlets of yesteryears have been replaced by bustling towns where cinemas, hotels, real

[2] All photographs in this thesis were taken by the author.

estate offices, posh restaurants, and malls still intertwine with tiny stores, street vendors, traditional food places, and horse carts (Figure 1.2).

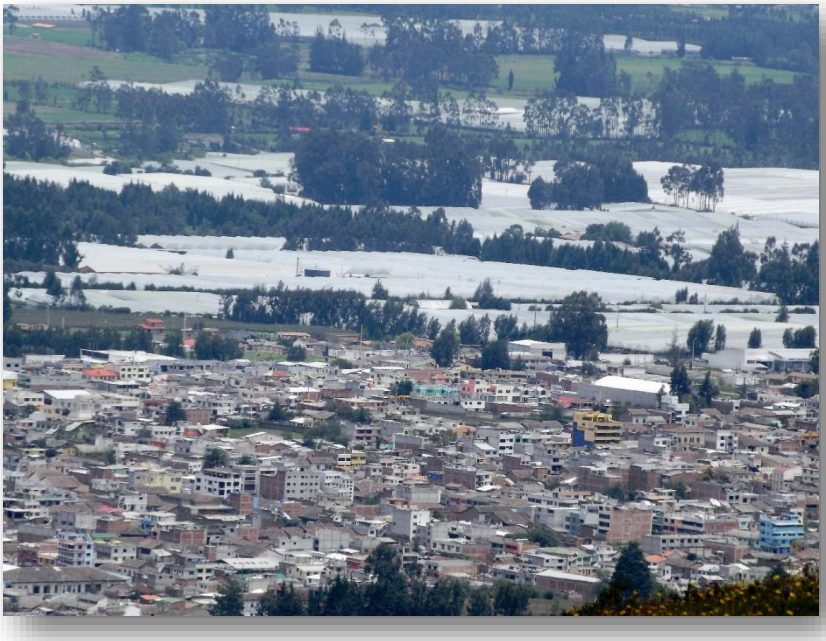


Figure 1.2. The bustling municipal capital Cayambe keeps growing next to large and small rose greenhouses

1.2.4 Methods

The fundamental method was the compilation of primary data from open, semi-structured and structured interviews (done mainly by the author but with collaborators mentioned in the acknowledgments) with all the actors involved in floriculture, from small local farmers in Pisque to international certifiers in the Netherlands, and including community leaders, large farm representatives, rose breeders, and local and national governmental officials. The semi-structured and structured interviews were done manually but were entered as 'virtual' interviews using an online software package[3], which much facilitated data registering and processing. Annex 1 is the main interview format used at the beginning of the field

[3] www.encuestafacil.com.

work period and Annex 2 presents a general analysis of the observations and data thus gathered. Farmer group discussions and participatory observations were another important research method. Literature review, including academic papers and books as well 'grey literature' and newspaper clips next to archival research constituted another main method. Academic roundtable debates and discussions with lecturers and students at WUR and the University of Utrecht, and with participants at the Water Justice Alliance gatherings[4], were used to develop the papers. Each of the following chapters presents a detailed description of the research methods applied in each particular (sub)study.

The data compiled from this interview process, which spanned as much of the middle part of the basin as possible, served as the starting point to better structure the sub-questions within the main objective of the study. As stated, the main novelty at this point, one that would be a major component of the whole process, was the 'discovery' of very small, locally owned rose farms that had not been reported previously (Mena -Vásconez 2016; 2018).

My previous activities related to biology and ecology collided for a while with this methodological approach. In 'hard' sciences, ideally you should start with a hypothesis and go to the field (or the lab) and gather specific data to see how your empirical findings agree or disagree with the hypothesis (to accept or reject it). In my first biological degree (*licenciatura* in biological sciences) I entertained the hypothesis that the East African Alpine vegetation and South American *páramos* where ecologically equivalent, albeit taxonomically quite different, and that the life-forms of plants would prove that (or not). I gathered data and analysed literature based on that hypothesis and none other. Other findings along the way were just accessories that might or might not spark some kind of scientific interest, but they were besides the goal of the thesis.

In other words, you should not go out to the field and start gathering data and *afterwards* see if these data 'ask' you something that could be transformed into a scientific study. That is what I first felt I was doing with the general interview approach. But things are not that dichotomous here either: firstly, at some point, someone must have gone to the field and noticed, without any previous hard hypothesis, that the landscapes of the East African peaks and the South American

[4] www.justiciahidrica.org.

tropical highlands, both close to the equator, are quite similar even if separated by the Atlantic Ocean and the bulk of two continents. I was basing my hypothesis on that hypothetical original observation, indeed developed by other researchers before me (e.g. Hedberg and Hedberg 1979).

Secondly, even if I went to the field with a general interview at the beginning of the process, this tool was not based on asking everything to everyone: it was grounded on the main question of the project to which my study belonged. One could say that there indeed was a non-explicit but clear 'null hypothesis' to be tested, that of long-standing and ongoing conflicts related to irrigation water between local inhabitants and foreign stakeholders, conflicts that had overflowed traditional local and national spheres and were reaching global scales via new the exporting of non-traditional goods, such as roses, by agribusinesses. And from a very pragmatical standpoint, as a person who had a not-too-broad knowledge of the site and its problems, it seemed only reasonable to start my journey with a wide tour of the watershed and a general set of questions, but one related to a clear, general objective.[5]

The research benefitted greatly from the feedback received from users, as well as from the making of the documentary based on chapter 4 of this thesis (see below) and the debates on water conflicts with Water Justice members in Ecuador.

1.2.5 The five complementary analytical frameworks used in the thesis

This thesis is based on scientific articles that use five analytical frameworks to analyse different, complementary aspects of the flower business in Ecuador. In this subsection I introduce these five analytical frameworks and relate them to the political ecology approach described above.

The conceptual frameworks used throughout the thesis are: (1) The echelons of rights analysis (ERA), (2) Fraser's three locations of struggle (3 R's), (3) Valuation languages and framings, (4) Mimetic desire, and (5) Gaventa's Power Cube.

To discuss the relation between these five analytical frameworks and the overall political ecological approach of the thesis, I describe the analytical frameworks in their treatment of the following theoretical notions, important in political ecology theoretical thinking: (1) the relationships between nature and society, (2) power

[5] The details of the NWO-WOTRO Integrated Research Programme can be found at https://www.wur.nl/en/show/The-Transnationalisation-of-local-water-battles.htm

relationships, (3) materiality (geography, water, technology), (4) scale issues (time, geography) and (5) discourses and narratives.

1.2.5.1 The Echelons of Rights Analysis

The four echelons of rights analysis framework (ERA) (e.g. Zwarteveen and Boelens 2014; Boelens 2015) addresses governance, inequalities, and conflicts related to natural resource governance. It distinguishes four levels of conflicts over water and natural resources management and control: (1) over material distribution, (2) over the contents of norms and rules, (3) over legitimacy and authority, and (4) among discourses (see e.g. Duarte-Abadía et al. 2015; Stoltenborg and Boelens 2016). The way social groups think about nature-society relationships and the most appropriate natural resource governance regimes (discourses) influences what and who they accept as legitimate authority to make governance rules, what rules, regulations and rights to devise or accept, and how the distribution of resources, costs, and benefits are to be organised.

The echelons address the conflicts and differences in power of stakeholders relating to use of resources, rules that regulate the use and distribution of resources, authorities to make decisions on that, and the discourses that underpin those acceptances (and oppositions). The basic idea of the four interacting echelons is that discourses reflect crucial modes and workings of power as they generate acceptance of authority, rules and distribution patterns. The power of discourses ("power/knowledge" or "truth regimes") is linked to the idea of "governmentalities" discussed by Michel Foucault (Foucault 1991; Fletcher 2010).

Foucault (2009) was interested in the fundamentals of power relations, specifically in the ways the State exercises power over the population, looking particularly at the way power was employed through disciplinary norms and institutions. Governmentality is deployed through several modes of power; among which sovereign power (exerted by e.g. kings and armies by laws, State institutions or sheer force); disciplining or ' normalizing' power; and a neoliberal mode of power (defined by the installation of market rules and forces that consider humans as individual profit-maximisers). In particular the latter two forms of governmentality is decentred, relational, and dispersed, including self-government (and control) by the individuals in society. Discourses aim at imposing certain tenets that are accepted as natural by the governed subjects, which start exerting a self-censorship and control on their behaviour so as to tailor it to the expected one.

The ERA framework fits within the first- and second-generation political ecology approaches in that it addresses power relations that lead to a certain (unequal) distribution of resources and control over decision making. It goes beyond more 'classical' approaches as it does not take the discourses of the stakeholders for granted, but instead puts the study of the discourses and their power effects at the heart of the investigation.

In the Pisque watershed case, the contestations over access to water play clearly at all four ERA levels. They are confrontations over rules, meaning, norms, knowledge, identity, authority and discourses. The distribution of Pisque's irrigation water is a result of these struggles . The ERA approach helps unravelling the specificities of these layers and its interrelations.

1.2.5.2 Fraser's three R's

This framework was originally developed in feminist studies (e.g. Fraser 2005), but the three dimensions of justice struggle are also used in more general social studies on emancipatory struggles. The three R's represent three social settings of tension and justice struggle: Representation, Redistribution and Recognition. These settings can be regarded as the dimensions of struggle for increased social justice (Fraser 1997; 1998). These dimensions are irreducible ends of the struggle. Nevertheless, a particular struggle of an actor or a social movement at a particular time might emphasis one of the three dimensions in their fights for social justice; for instance, they strive for cultural recognition, political representation or economic redistribution.

It is important to stress that recognition, representation and redistribution are strongly related. With increased recognition, a stakeholder is likely to get more political representation in "platforms" where decisions are being taken. With more representation, a redistribution of access to resources can be better administered. However, the three R's also relate in other ways: e.g. with access to economic resources, material-financial pressure can be exerted or the fight for recognition financed. Increased representation will also facilitate increased recognition. Thus, the three dimensions of justice are very much connected and mutually dependent; they can support but also deplete each other in case one prevails over the other. The lack of recognition and representation, and the unjust distribution of costs and benefits related to resources, are all deeply and dynamically linked.

Redistribution refers to the restructuring of the access to resources. These can be productive resources (land, water, labour) or economic resources (jobs, capital, income, property, subsidy, rent, credit, inherence). The struggle of representation is a struggle for political influence. For instance, in the debates on water governance there is an increased attention for the multi-scalar strategies of water users' organisations to foster their political clout (e.g. Huitema et al 2016). The development of powerful and resonating discourses to demand the three R's is a basic element in the struggle: more recognition (resonance of the discourse) could lead to more representation and a more equitable distribution.

Recognition can be related to the cultural dimensions of social struggles. The struggle for recognition relates to the respect for and acceptance of particular meanings, imaginaries, identities, values, norms, beliefs, morals and knowledges, but also forms of organisation, of a subaltern group. In the discussions on water governance, there is increased attention for local water institutions and the non-economic values of water. In many places, the historic and cultural meaning of water is important in political struggles over water (e.g. Boelens and Seemann 2014).

The 3 R's framework contributes to my political ecology approach as it addresses power struggles to access resources and representation, while also focusing on the cultural politics of identity.

Specifically for the Tabacundo irrigation system in the Pisque watershed, the dimensions of social struggle proposed by Nancy Fraser are used to analyse these three events: the management takeover from a municipality by local water organised irrigators; the tensions around water for large flower agribusinesses or for traditional food crops in one of the main *acequia*'s irrigation sectors, and the emergence of small locally-managed export-oriented flower farms.

1.2.5.3 Valuation languages

Valuation languages are essentially discourses about the values assigned to elements like water, land and ecosystems, or any other product, object, subject, or idea (Martínez-Allier 2002). Value systems are rooted in socio-natural relationships that evolve historically. Local valuation framings in water control settings in the Andean highlands tend to be diverse, and often not, or only partially, commodity based. Different framings of water values and meanings in the Andes see nature differently: universalistic frames tend to reflect those of powerful external actors

that usually try to impose it on local ones. Local values usually reflect a longer relationship with the landscape. For local inhabitants, technology and water are directly related to historically rooted forms of water governance and collective sustenance. External actors intervening in the Andean highlands tend to value water and technology as universal tools for overcoming nature obstacles while making profit (Gelles 2000; Groenfeldt 2006; Rodríguez-de-Francisco and Boelens 2015; Duarte-Abadía and Boelens 2016; see also Pattberg 2007).

The valuation languages framework builds on and contributes to political ecology approaches as it addresses struggle for control over resources and forms of discursive dominance over nature and society at once, generating or reflecting on an ontological and epistemological order. The valuation languages framework enables to identify diverse and intangible water worlds while providing insights on the struggles over different meanings and different forms of valuation by the stakeholders.

In the Pisque watershed, dominant valuation languages do not recognise Andean communities' land and water institutions as the glue that binds together their rights systems nor their valuation of the water use and management rules. As will be seen, however, the languages of valuation are not dichotomous; rather, many diverse hybrid valuation languages are deployed by different social groups to legitimize water allocation (cf. Rasch and Kohne 2016).

1.2.5.4 Mimetic desire

The nature of needs and desires as relational interhuman psychological comparisons is not often the subject of inquiry by political ecological studies. Rather, those needs and related interests are regarded as strongly linked to the specific position of a group of people vis-à-vis ownership and control over capital and labour. However, the regard of needs as being socially produced widens this scope and adds a new and interesting field of study. Mimetic desire analyses the creation of wants by psychological processes where a person relates her or his position to the position (and possessions) of nearby others (Girard 1961; Illich 1978, 2005; Achterhuis 1988; Farneti 2009; Achterhuis et al. 2010). Mimetic desire also results in wants that are ever increasing and can never be satisfied, thus generating a deeply experienced scarcity. Self-imposed commodified wants and desires can be regarded as part of neo-liberal governmentalities (Foucault 2009), where norms about economic status and economic efficiencies are internalised. In this way subjects are created that respond to neo-liberal incentive structures. This creates power relations that result in

redistribution of benefits and costs. In that sense, mimetic desire is an interesting contribution in the conceptualisation of water access struggles since it looks at the ever increasing wants of people driving so much of world consumption and, in this case the Andean smallholder families' production needs, longing for a "western" way of life.

In the case of Pisque we do not suggest that mimesis has *better* explanatory power than other theories. Other factors do play a role to facilitate the move towards flower production but using mimetic desire as the main focus refines the question of why a smallholder would want to change the mode of farming.

1.2.5.5 The Power Cube

As a conceptual framework to investigate the possibilities of social change by agents, Gaventa's (2006) power cube is three-dimensional: it deploys spaces for participation, levels and places for engagement, and forms of power (Figure 1.3). The power cube does not refer specifically to nature/society relationships. In a general way, being able to participate in these spaces makes it possible to forward ideas and take decisions, including those related to nature, its distributive issues and its governance questions. Places of engagement and forms of power also shape people´s opportunities for making changes and joining in the benefits of resource use and governance.

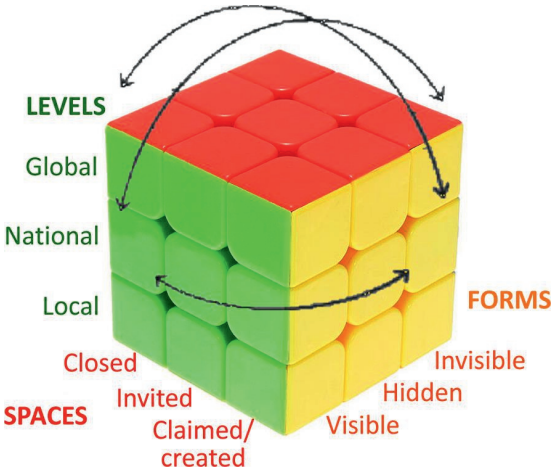


Figure 1.3. Gaventa´s Power Cube (Source: Gaventa 2006)

Closed spaces imply a controlling power for those who are inside and exclusion of the others. Invited spaces are typically those of participatory processes where powerful actors invite less powerful ones to be informed and express their ideas. Claimed spaces are created at the people´s own initiative and by means of struggle by the less powerful. Claimed spaces provide access and control to subalterns.

Visible power refers to coercive and institutionalised forms of power (violence, infrastructure, laws). Hidden power refers to agenda setting and the conscious manipulation of actors and interests. Invisible power refers to the production and steering of narratives and discourses to get them accepted and internalised. In Gaventa's cube, invisible power refers to discourses as power/knowledge or truth regimes related to Foucaultian governmentalities.

Gaventa's cube does not explicitly deal with the material world or resource use. Yet it is in closed and claimed spaces where critical decisions are taken regarding resource use. Hidden power sets the agenda on what to discuss and decide upon, including control over water, technology use, access to credit and other resources.

Gaventa's power cube includes three levels: local, national, and global. At each level power struggles can be identified in the three different types of spaces (closed, invited and claimed) where actors deploy the three different form of power: visible, hidden and invisible. Power struggles manifest themselves also between the different levels.

The Power Cube provides a practical way of analysing power. Hence it is a very useful tool in political ecology analysis at the local and national levels in the Andean highlands, where transnational business enterprises intervene to foster flower production according to visible, hidden, and invisible forms of power, and different actors struggle to develop and apply socio-environmental regulations

1.2.6 A guide to this thesis

From the above description of the five frameworks used in this thesis it has become clear that those draw on diverse academic approaches, but all have in common that they support and specify a political ecological analysis with a strong focus on the power relations among diverse and divergent actor groups, the discourses that are deployed, and the valuation of needs.

In chapter 2 – *Roses: the latest chapter in the conflicted history of controlling irrigation water in the Ecuadorian Andes* – I use the ERA framework to analyse the saga of struggles over land and water at the levels of resources, rules, authorities and discourses in Cayambe as a dynamic background and breeding stock for the contemporary water use and governance situation.

In chapter 3 – *Fighting over water values: Diverse framings of flower and food production with communal irrigation in the Ecuadorian Andes* – I discus how natural resource conflicts are often ex-pressed in different valuation systems and languages in the Andean highlands. To do so I combine Nancy Fraser´s three principles of justice to examine valuation conflicts: recognition, representation and redistribution, with the concept of framings as discursive communication.

In chapter 4 – *Food or flowers? Contested transformations of community food sovereignty and water use priorities under new market and legal regimes in the Ecuadorian highlands* – I employ mimetic desire as a key driver for smallholder farmers to shift from the peasant to the entrepreneurial mode of farming, within a context of an increasing commodification of production relations.

Finally, in chapter 5 – *Why and when to certify? Flower production practices in the Andes of Ecuador* – I undertake an analysis based on the power cube of Gaventa, used basically to investigate the possibilities of social change. The examination of certification practices through the lenses of the cube´s three dimensions of power scrutinises if, why, how, and where environmental and social regulations are designed and applied.

In the Discussion and Conclusion chapter of the thesis I evaluate and reflect upon the outcomes of the analyses with the five frameworks and present my answers to the main question and sub-questions.

CHAPTER 2

ROSES: THE LATEST CHAPTER IN THE CONFLICTED HISTORY OF CONTROLLING IRRIGATION WATER IN THE ECUADORIAN ANDES[6]



Roses receive prime treatment at a large floricultural agribusiness

[6] This chapter is based on:

MENA-VÁSCONEZ, P., BOELENS, R. and VOS, J. (in prep.). *Roses: The Latest Chapter in the Conflicted History of Controlling Irrigation Water in the Ecuadorian Andes*. Submitted to Water History on April 2019. As of October 2019, reviewers had been appointed.

2.1 Introduction

Ecuador is a particularly biodiverse country. The Andes, crossing Ecuador roughly in a north-south direction, create a natural ladder of ecosystems and climates that harbours an astonishing variety of living beings between the Pacific and Amazonia (García et al. 2014). This has made that, for instance, Ecuador is hailed as "the land of orchids": more than 4,000 species have been recorded and more continue being described (e.g. Meisel and Woodward 2005). However, if one asks around the world (and even within the country): "What flower is Ecuador famous for?", most answers would be in the vein of: "Those amazing roses". A Google search with keywords 'Ecuador' and 'flower' produces a mixture of results with native and non-native flowers, of which more than half are 'export roses'. The vast assortment of autochthonous species is making way for a very non–native comrade. The Andes are the environment where rose agribusiness started to boom three decades ago.

Best-selling Spanish fiction writer Alberto Vázquez–Figueroa (2012) used this fact for his novel *Codicia* (Greed). Here is my translation of a dialogue in modern-day Madrid taken from it. One of its protagonists—a very wealthy Ecuadorian woman residing in Spain—asks an acquaintance:

> *'Have you ever presented someone with those long–stemmed Ecuadorian roses?'*
> *'Yes, occasionally…'*
>
> *'You see, my father was one of the first to exploit them, given that they grow best in certain conditions of soil, height and weather found only in lands very close to the middle of the world.'*
>
> *The woman got closer to a vase from which she took a perfect flower; after inhaling its fragrance, she went on:*
>
> *'Well, it turns out that my family owns thousands of hectares of that type of lands. So, we now export all kinds of flowers throughout the whole year, we manage our own chain of flower shops […] and we have tons of money …'*

This exchange hints at several circumstances needed for the emergence and growth of fresh-cut roses agribusiness in the Ecuadorian highlands: an appropriate and distinctive biophysical setting; historically powerful families with vast expanses of suitable land; the concentration and flow of considerable amounts of money; and the existence of an international market for these goods.

Yet some other conditions, also vital to develop successful flower farming in the tropical mountains, are not explicitly mentioned: an abundance of water and cheap labour; the presence of fitting infrastructural elements (irrigation systems, roads, airport); the existence of fiscal incentives typical of the emergence of a neoliberal globalising economy; and the arrival of external—frequently international—investors (Mena-Vásconez et al. 2016).

Export flower production in Ecuador is mainly clustered in the Pisque watershed, around the towns of Tabacundo and Cayambe, about one-hour drive north of the airport of the capital Quito. Within the context of the rise of rose floriculture in this watershed, this text traces and examines the conflicts around access to and control over irrigation water for local food production. Food sovereignty and water justice have been at the core of the history of a territory that has been subject to encroaching and subjugation; at the same time, the original dwellers have, on the one hand, fought fiercely to maintain their autonomy, and, on the other hand, struggled to adapt to the ever-changing biophysical, socioeconomic, and political realities of the Pisque watershed (Becker and Tutillo 2009; Hidalgo et al. 2017). The article will characterise the region´s present status as an aftermath of past and contemporary events. The central question is: How have socio-environmental conflicts related to irrigation water developed throughout Pisque basin´s history and shaped the contemporary flower-dominated hydrosocial territory?

This analysis is relevant beyond just this case study because it illustrates the importance of historic continuities and changes in understanding present day export-industry related conflicts.

After this introduction a conceptual framework outlining the notion of 'hydrosocial territory' and presenting the Echelons of Rights Analysis approach is established. These highlight the interconnectedness of biophysical, technological, legal-institutional, socio-economic and cultural-political factors in grasping the complexity of 'water grabbing' and local struggles against it. With these analytical instruments the historical and current interactions between local producers and powerful

external actors are examined in relation to the interconnected arenas of disputes over resources, rights, authorities, and discourses. Next, a brief relation is offered of the history of the watershed from pre-Columbian times to the present, with an emphasis on the access to, and control of, water resources. Finally, the conflicts and draw concluding remarks are analysed.

2.2 Hydrosocial territories and the echelons of rights framework: Conceptual notions

Historical and current development of water governance in the Pisque basin show that water control is the result of deeply contested political processes (Hidalgo 2010; Mena-Vásconez et al. 2017; Roa-García 2014). Water governance reflects socio-economic, political-administrative and cultural-symbolic power, steering decisions regarding the control of water; this becomes materialised in different modes of water resource allocation, use, development and management (Hoogesteger 2012; Perreault 2014; Zwarteveen and Boelens 2014). Although Integrated Water Resources Management (IWRM) policies in Ecuador, and worldwide, are founded on inclusive, participatory discourse as well as liberal premises in which civil society and its governance are portrayed as a set of democratic forces and technological development that provide ample opportunities for all citizens to fend for their interests, the Pisque power structures bear witness of how different actor groups have different power to steer water access and control (Yacoub et al. 2015; Manosalvas 2016). *Campesino* and indigenous smallholders are characteristically excluded from formal governance and, in policy-political (racist) practice, often not considered 'legitimate, knowledgeable' stakeholders (Boelens et al. 2015). Mainstream water policies to involve socio-economically marginal/marginalised interest groups, therefore, do not alter the water/power hierarchies and deep-seated inequities, and continue to produce socio-environmental conflicts, with sometimes violent appearances.

As heightened by political ecology studies, water governance is about how nature, technology, and the social are intrinsically interrelated and entwined through power structures and societal forces (Boelens 2014; Meehan 2013; Swyngedouw 2014). Here, power relationships shape water flows, and vice versa. As has been argued (Linton and Budds 2014; Vos and Hinojosa 2016), this becomes manifest in how water is distributed and used in river basins, how and by whom water use systems

are designed and managed, how virtual water flows are directed by markets, and how entire hydrological cycles are transformed by human interventions. As a result, it is fundamental to examine how the contents of, and interlinkages among, natural, social and technological components are established, by which agents, according to which interests and powers, and with which outcomes. To examine and comprehend these interrelationships between water, nature, space, technology and society, and how these elements are signified with meaning and linked in networks with particular boundaries, the notion has been proposed of 'hydrosocial territories':

> *the contested imaginary and socio-environmental materialisation of a spatially bound multi-scalar network in which humans, water flows, ecological relations, hydraulic infrastructure, financial means, legal-administrative arrangements and cultural institutions and practices are interactively defined, aligned and mobilised through epistemological belief systems, political hierarchies and naturalizing discourses* (Boelens et al. 2016).

Territories are not 'natural' but dynamically produced by a myriad of (diverging) actors (Agnew 1994; Elden 2010). Dominant imaginaries and efforts to realise particular hydrosocial territories – intrinsically political constructs that nonetheless often are portrayed as objective and neutral entities – challenge local, alternative notions of hydro-territorial ordering. The disruption of existing, locally practised notions of water governance is often the result: hydro-territorial configurations that dislocate local authorities, institutions, water rights and distribution systems. Thereby, these dominant hydrosocial territories commonly also undermine local notions of socio-environmental justice (Hommes et al. 2016; Hommes and Boelens 2017; Vos and Hinojosa 2016; de Vos et al. 2006).

Rather than constituting passive victims of transformation, indigenous families, peasant communities and grassroots federations contest. Creating alliances, they defend existing and reshape alternative hydrosocial territories that interact and encounter with dominant territorial orders, thus producing 'territorial pluralism' (McGarry and O´Leary 2014; Hoogesteger et al. 2016), whereby water flows, technologies, resources, rules and authorities are constantly negotiated and transformed at multiple scales and in different arenas of contestation (Swyngedouw and Boelens 2018; Vos and Hinojosa 2016; Perramond 2016). In every day water

battles vested powers and dominant socionatural configurations are challenged (Marks 2019; Rasmussen and Lund 2018), at different scales, and these may form the basis for the advancement of emergent forms of inclusion and social justice in water governance (Boelens et al. 2014; French 2018; Wilson and Inkster 2018; Hoogesteger and Verzijl 2015). Powerful, vested interests such as state institutions, large corporations, and landlords are challenged, which forms the basis for a re-negotiation of water allocation and control. These struggles also challenge the legitimacy of formal authorities and dominant discourses and practices (Sanchis-Ibor et al. 2017; Rogers and Crow Miller 2017).

As we can also clearly see in the case of Pisque, territory-building projections and strategies compete, superimpose and align to strengthen specific water-control claims of various interests. As a result, actors continuously recompose the territory´s hydraulic grid, cultural reference frames, and political–economic relationships (Hommes and Boelens 2018). These contestations are not mere skirmishes over natural resources only, but battles over meaning, norms, knowledge, identity, authority and discourses: the arena for the conflicts related to irrigation water at the Pisque watershed consists of different layers of issues over which actors struggle. To unravel the specificities of and relationships among these layers we use the Echelons of Rights Analysis (ERA) framework (Zwarteveen and Boelens 2014; Boelens 2015).

The ERA framework holds that water rights, rather than constituting uniform and universal property relationships (that would provide a neutral and objective basis to compare, measure or even transfer water among different uses and users), are socionatural, cultural-political relationships and expressions of power. ERA considers the enormous variety of existing water rights forms as dynamically evolving hybrids of plural legal repertories played out in local water territories (Roth et al. 2015; Jackson 2018). Beyond resource battles, water conflicts are an intrinsic part of struggles over access to and control over water. ERA therefore proposes to examine water conflicts as encompassing four connected echelons (Boelens 2009; Duarte-Abadía et al. 2015; Stoltenborg and Boelens 2016).

The first echelon relates to the dispute among actors over access to the *resources*: water itself, its control and use, as well as all the material means to implement water rights, i.e. infrastructure, money, labour, inserted in floriculture as the inheritor of powerful actors that have been benefitting from the resource to the detriment and contestation of local communities and towns.

At a second level are the conflicts linked to alternative sets of *rules* related to the acquisition of water rights and the operation and management of a system; they include roles and responsibilities of users, and how and when water is allocated within a heterogeneous set of values and meanings; they refer to the contents and meaning of 'water rights'. Pisque is a showcase of legal frameworks (e.g., communal, official, entrepreneurial) that interact and sometimes collide.

The third echelon refers to the conflicts that arise over the definition and exercise of authority concerning water control. It is common to find multiple sources and forms of authority that aim at formulating and enforcing rules and rights; in other words, the dilemma about who is authorised to impose norms, decide, and apply sanctions within a system of hierarchies involving class, wealth, gender, ethnicity and age. Here, the legitimacy of particular positions and forms of authority regarding irrigation water in the watershed is fundamental.

The most abstract level is that of *discourses*, i.e., the (hegemonic and alternative) regimes of representation that legitimise or contest resource distribution, rule contents, and authority. These discourses link and shape the social/technical, human/natural, and scientific/practical water scenarios morally, institutionally, and politically: they defend shaping (or conserving) given hydrosocial territories. As such, they can be understood as truth-constructing manifestations and practices that establish, impose or defend certain schemes of governance, while delegitimizing, oppressing or resisting alternative perspectives and accounts of reality (see for example Foucault 1995 [1975]). Discourses are practice- and action-oriented, aiming at gaining adherents and demobilizing antagonists through inspiring and legitimizing activities and campaigns in an evolving process in which the framing of one discourse is more effective if it succeeds in resonating its values with the framings of other stakeholders (Benford and Snow 2000; Bain and Selfa 2013; Hulshof and Vos 2016). At the Pisque watershed, the apparently simple original dichotomy of 'local versus foreign frames' has developed into a complex net of differing perceptions, value systems, and discourses – and, consequently, diverse, contested and hybrid hydrosocial territories.

2.3 Flowers in the Andes: Old and new origins

Flower agribusiness, specifically rose farming, appeared rapidly some 30 years ago in Ecuador´s political geography, particularly in the Pisque watershed in the

northern highlands, some 50 km to the north of Quito. The factors contributing to this fast rise of the flower business include several socio-economic and political circumstances that begun at least with the Spanish Conquest at the beginning of the 16th century.

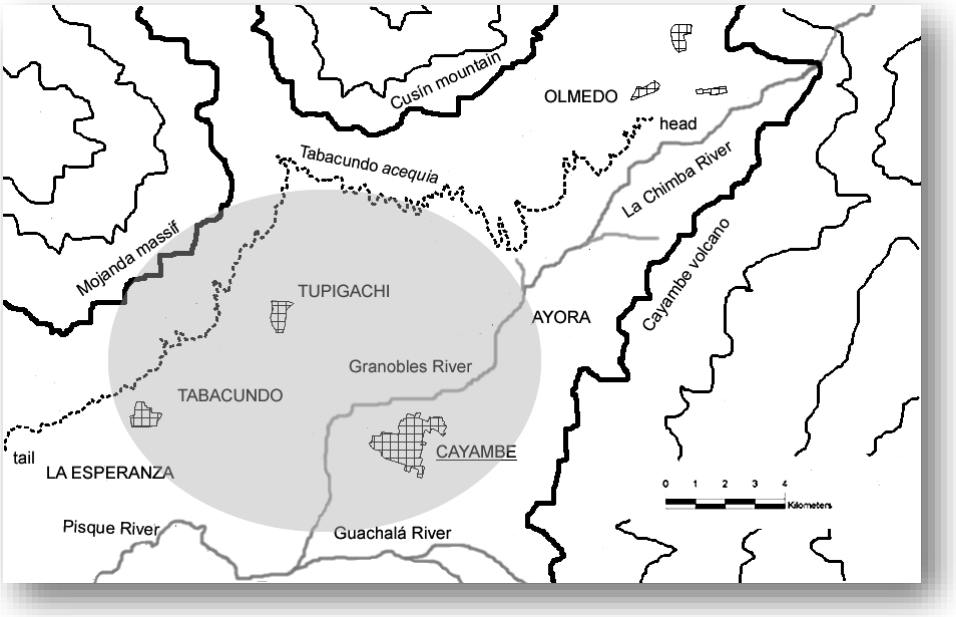


Figure 2.1. Study area´s main features. The light grey ellipse shows the floricultural zone

2.3.1 The Pisque River watershed: from corn to wheat

Although inhabited for millennia, the details about the early years of the region´s human story are scanty. Prior to the Inca and Spanish invasions varied groups occupied the territory of current Ecuador; the Pisque region, now comprising basically the Cayambe and Pedro Moncayo *cantones* in Pichincha Province,[7] was part

[7] Ecuador is politically and administratively divided into 24 provinces, these into *cantones* (municipalities) and these into *parroquias* (non-religious parishes). The Pichincha province is home to the nation´s capital, Quito. The study area is located ca. 80 kilometres to the north of Quito.

of the territory of the Caranqui (Figure 2.1). A relatively large indigenous group, they occupied the plateau that runs from Guayllabamba River (north of Quito) to the Chota and Mira rivers, near the contemporary Colombian border. This federation, including the Kayambi, tried to assemble itself more strongly to face the Inca invasion (Becker and Tutillo 2009). The Caranqui peoples had come from the north thousands of years before but "their diverse languages, unintelligible to one another, have utterly disappeared; there are no written records and their last speakers died in the 18th century" (Murra 1946).

Archaeological evidence (e.g. Athens 2002) shows that early Pisque inhabitants were agriculturalists who grew corn, quinoa, potatoes and beans, and bred guinea pigs and llamas. They applied irrigation via *camellones* (mounds surrounded by canals). Some of these infrastructures still exist, mainly as part of larger, more modern systems (Zapatta and Mena-Vásconez 2012). This allowed a more complex occupation of the territory, but there were never large town-like settlements: families lived scattered across the hills. A prominent feature of the landscape were the *tolas* (ceremonial mounds) and pyramids, a manifestation of a complex social, religious, and political organisation (Bray and Echeverría 2014).

The Incas, albeit having been in the territory that is now Ecuador for just a few decades, changed the course of history drastically and ended what Enock (1914, cited by Becker and Tutillo 2009) called the unparalleled linguistic and ethnic Babel. Huayna Cápac, the eleventh Inca emperor, reached what would become the northern border of the South American Incan empire shortly before the Spaniards´ arrival. The Caranqui joined forces and fought a bloody 17-year war against the Incas. Finally, the Incas triumphed only 20 years prior to the Spaniards´ entrance (Costales and Costales 2002).

Some of the Caranqui were taken away as *mitmaes*—uprooted people moved forcefully to far-away places—a strategy used by the Incas to subjugate rebel populations, strategically locate friendly populations at the empire´s expanding borders and impose the kechwa language over the conquered territories. Correspondingly, many persons were relocated as *mitmaes* to Cayambe, and probably most indigenous inhabitants nowadays are descendants of *mitmaes* brought in from the southern parts of the Inca empire (Ramón 1987). In terms of agriculture, different from what happened with Inca religious, cultural, and civil institutions, the short period of Inca occupation did not allow for notable and lasting

changes. For example, the famed Inca terraced agriculture never established itself (Meyers 1998).

The Europeans arrived in 1534. Sebastián de Benalcázar, Pizarro´s lieutenant, after founding Quito advanced northwards and conquered the lands along the way. The Caranqui became part of the Otavalo *corregimiento* of the Quito Royal Audience, within the Lima Viceroyalty. During a century (1450-1550) the inhabitants of the region suffered a severe and far-reaching loss of independence, the consequences of which are still felt nowadays and have had a profound relationship with the new agribusinesses; it deeply shaped the imminent historical spectrum of contemporary agricultural practices and power relationships.

Salomon (1980:195) cites an anonymous account of 1573 that gives us a glimpse of how the Europeans found the territories around Quito:

> *The natives lived in localities one distant from the next one ... the chiefs and Indians obeyed their* cacique*, who, when he wanted some farming to be done or to bring some wood from the hill or make a house, sent a crier who loudly declared his will, and this was understood by the captains, who usually had houses near the cacique, where they resided or had people who warned them of what was needed, then sent their* cachas*, meaning messengers, and then the people gathered to fulfil the will of the lord.*

The Spaniards quickly subjugated the same people that had fiercely resisted the Inca incursions. The explanation for this is manifold. First, the population was tired of the long war that annihilated much of their people and their socio-administrative cohesion; moreover, a good portion of the population was made up of *mitmae* immigrants with weak connections to their new land. Second, the invaders had horses, firearms, and the unforeseen assistance of diseases that hit target before the arrival of the armies. Spaniards took advantage of the progress the Incas had achieved in subjugating these peoples and, for example, imposed Quichua as a *lingua franca* more successfully than the Incas themselves[8].

[8] The Kayambi spoke 'commercial' Kechwa before Huayna Cápac´s invasion. The Spaniards found it easier to impose the language of the Incas (at least during the first period) instead of teaching Spanish to the conquered populations. Missionaries judged that

At the beginning, local leaders were normally quite willing collaborators; local people even became part of armies that subjugated other indigenous peoples. Gradually more 'whites' started to settle in Catholic monasteries and increasingly Spanish-styled towns and estates. The political economy of the area changed dramatically. Spaniards introduced wheat, barley, and farm animals (cows, horses, donkeys, sheep, and pigs). A Castellan-type feudal system was established, with indigenous people forced, as serfs, to perform —in inhuman conditions— predominantly agricultural, mining, and textile tasks. All the rights they had on land and water were grabbed and encroached upon. Among other things, they had to surrender the old irrigation systems that characterised the existing hydrosocial territories and build and maintain new ones that gave water to the new landowners. These systems are a crucial part of the later chapters of the Pisque chronicle (Terán 1994).

The history of this era is not only of subjugation and suffering, but also one of resistance and mobilization. A silent yet powerful version of this happened within the religious context. Spaniards tried to force Catholicism on their subjects, seemingly succeeding. Yet a syncretism emerged where Christian elements are not more than the skin of a system that keeps old beliefs underneath. Many indigenous festivities related to the Sun and the arrival of the rainy period, for example, were fused with their European counterparts. A different type of resistance was that of the rebellions against local, and sometimes wider-ranging, oppressors. They included personal resistance such as suicide, destruction of tools, and 'laziness'—what Scott (1985) called "everyday forms of peasant resistance"—but also large uprisings against institutions related fundamentally to the *haciendas*.

Haciendas became institutions that embodied the *zeitgeist* of those years. Managed by religious communities or 'white' families, they encompassed sometimes immense expanses of agricultural and natural lands where indigenous people were assets; they had to work in a slave fashion, forced to pay taxes and tithes for catechisation and for land and goods that barely allowed survival (Larraín 1980). Most of these estates endured the peasant and indigenous mobilisations and subsequent reforms and entered the Republican era; some can still be seen in the present as one of the most durable and anachronistic manifestations of past inequities. Indeed, many of

evangelization tasks could be achieved more rapidly using native languages (see e.g. Aspiazu 2014).

the new large flower farms were established on the remaining *haciendas* and their water concessions, and on the best lands of the Pisque watershed.

2.3.2 The Pisque River watershed: from wheat to cows

The transition to the Republican era in the years 1820-34 did not entail a deep change in the situation of the *haciendas*. The colonial era had installed the *huasipungo*. This Kichwa word (meaning 'house gate') refers to the institution of precarious work imposed by Spanish in agricultural work in the Andean highlands; it was maintained by the landlords throughout the *Colonia* and much of the Republican period. This exploitative form of precarious agricultural work that rendered the indigenous population subjugated lingered. In physical terms, a *huasipungo* was a small portion of land that the owner of the *hacienda* granted the pawn´s family in exchange for labour. Usually, the *huasipungo* sat on poor, non-irrigated soils located in the heights, where families lived in *chozas* (shacks).

In exchange for permission to cultivate and get at best a meagre additional remuneration, the family laboured in the *hacienda*. They were subjected to *concertaje*, a bond by which an indigenous person was forced to perform agricultural work in a lifelong and hereditary way, without any wage or receiving it minimally. Indigenous people were forced to work several days a week on the land and irrigation canals of their master in exchange for the use of a small plot (where they barely managed to cultivate some Andean crops). This was usually accompanied by the permission to collect firewood and graze their few cattle on the least productive lands. Water came from rain or the irrigation canals that had been built by the indigenous population previously or as part of the *hacienda* tasks, i.e. almost exclusively for the owner´s use. *Huasipungueros* were always available and, in addition to their agricultural work, delivered services such as taking care of children, house and pets, etc. The *huasipungo* originated in the beginnings of the Spanish conquest. The new aristocracy of the wealthy Creole consolidated the system and their descendants continued it for about five hundred years, even after attaining independence from Spain (Borja 2012).

Taken from Icaza´s (2006 [1950]: 54)) piercing indigenist novel Huasipungo, two paragraphs help understand the situation of the local population in these years, especially in relation to irrigation water:

> *The alleyway is tattooed by an* acequia *of turbid water, where cattle of the* huasipungos *finds troughs, and there pigs make their beds of mud to wallow their ardour, there children, on all fours, quench their thirst [...]*
>
> *In the gorge of the mountain he could make a hundred Indians who, led by the* mayordomo*, surely go to the* minga *at the ravine. Every month, the same story: water gets stuck up there and it is necessary to clean the channel so that the flow does not decrease and, above all, so that it does not stagnate. In winter, the strong thaws and storms of the peaks unfasten obstacles and dams, releasing the waters that, when rushing into the valley, devastate the animals and the* huasipungos *on the banks.*

The Andean *haciendas* maintained a local level of influence while the Coast was the scenario of agricultural development with an international scope through the successive booms of cacao and bananas (there too, based on the exploitation of local and immigrant labour force). The construction of the railroad meant, among other things, a higher integration of the regions, and some produce of the *haciendas* could reach Guayaquil and other large coastal cities. This augmented the integration of Andean goods into the national market. The 1895 Liberal Revolution entailed several changes such as the abolition of *concertaje* and the expropriation of *haciendas* that belonged to the Church. The 1908 liberal Law of Beneficence or 'Dead hands law' – *Manos muertas,* untouchable lands and waters that belonged to God, administered by the Church, protected by the Spanish Monarchy – confiscated hacienda land and water from the ecclesiastical communities and transferred them to social-service state institutions (Borja 2012). Again, no fundamental changes in the situation of inequity were witnessed by the oppressed rural population, especially in relation to the profoundly unbalanced land ownership and water distribution that the conservative-theocratic regime and its feudal economic order had established. The traditional *hacienda*, now in governmental and private hands, incorporated itself gradually into the national market. More intensive techniques and the increase in the restriction to access to land and water for local peasant populations meant an extension of cultivated lands (Albornoz 2014).

The introduction of Holstein Friesian cows in the beginning of the 20th century meant a new vitality for the *haciendas*. Those with good soils and irrigation saw in milk a new opportunity and many became dairy farms. For the peasant population, this

meant both less availability of jobs and a further confinement to upper, unproductive, non-irrigated lands. This, in turn, prompted men to migrate to urban centres to get employment as low-paid construction workers and women as generally exploited housemaids.

It is only in the 1960s when a series of events spurred developments, such as an indigenous movement that finally gathered pace, agricultural modernisation promoted by large landowners, and the reforms implemented by the Cuban revolution. This hodgepodge of ingredients already points at the development of a contradiction-plagued agrarian reform. Indeed, the 1964 Law of Agrarian Reform aimed both at eliminating precarious relations of production and granting lands from state-owned *haciendas* to peasants, while dismounting an agrarian syndicalism that was in the hands of leftist groups. Far from being a pacifying tool, this law kindled land struggles and, consequently, powerful indigenous organisations were established. Over the years, these two conceptions of agrarian reform (social justice/modernisation) coexisted and established an uncomfortable relationship (Brassel et al. 2008). The development of productive forces and import substitution lead to a second agrarian reform in 1973, whose confiscatory nature was feared and contested by landowners who managed to pass a law guaranteeing the security of lands that were efficiently worked. In the words of Jordán (2003: 302):

> *The agrarian transformations of the last decades can be synthesised in two major processes: the displacement of the production axis towards agroindustry and export, and social heterogeneity and occupational diversification that currently characterise the rural and agrarian universe. Such processes have had a heterogeneous character, in some cases, they have maintained the features of inefficiency and have configured the presence of a rentier-type business, and in others, have led to the emergence of a modern business, particularly linked to non-traditional export processes.*

The Pisque hydrosocial territory was an integral part of this chronicle. Some large haciendas, such as the legendarily vast Guachalá (now partly dedicated to floriculture) covered most of the watershed. The production of Andean crops such as maize, potatoes, quinoa, and local tubers had been done mainly for domestic and

local consumption within increasing areas dedicated to wheat, barley and later dairy cow pastures, all destined to local and regional markets.

The region is famous for the indigenous leaders that led local revolts and that are symbols of the continuous rebellious nature of the region´s inhabitants. Personages such as Dolores Cacuango, Tránsito Amaguaña, and Segundo Gualavisí are illustrious milestones in the path to the agrarian reforms of the 1960s and 1970s. Through mainly peaceful mobilisations and marches, which earned them imprisonment and affronts, they were able to, among other things, ascertain their status as citizens, achieve bilingual (Kichwa) education, and pave the way towards powerful indigenous organisations (Becker and Tutillo 2009).

Yet, again, these reforms did little to changing the precarious livelihoods of the peasant population. But some local communities entered the dairy boom and nowadays have established well-functioning cooperatives.

2.3.3 The Pisque River watershed: from wheat and cows to roses

Ecuador´s industrial floriculture was launched during the country´s neoliberal turn between 1978 and 1980 (Gaybor 2011; Guerra 2012). In the agitated history of the last 40 years, neoliberal ideas have solidified 'the Ecuadorian way'. Hence, the origin and development of fresh cut–flower agribusinesses in Ecuador came about within a political and economic environment that included a significant promotion of 'non–traditional' agricultural products export that involved not only roses and other flowers, but also shrimp and broccoli (Acción Ecológica 2000; Breilh 2007). As in other Latin American countries, neoliberal policies proposed a free (unregulated) market that would be not only capable but also good and desirable to generate economic development and institutional balance.

The Ecuadorian flower agribusinesses started developing in those within a neoliberal environment. Manifesting Karl Polanyi's early perspectives in his 1944 work *The Great Transformation* – and true to, even, neoliberal godfather Hayek's (1960) *Road to Serfdom* –, the 'free market' flower dream could only come true through strong state support, and not because of State-withdrawal or any invisible hand. From the early 1980s, in Pisque, the Ecuadorian state had been actively devoted to creating what Harvey (2015) examined as an "appropriate institutional framework" for securing private property rights and guaranteeing the functioning of agribusinesses and markets. Some thirty years ago, a few international

entrepreneurs saw this welcoming environment as an opportunity, offering to construct the biophysical, socioeconomic, and political hydrosocial territory they envisaged. International investors and landowners noticed the exceptional biophysical niche, abundant, relatively cheap labour, and market-oriented government regulations. They established export-rose farms on the remaining hacienda lands (Korovkin and San Miguel-Valderrama 2007; Hidalgo 2015). Relatively good roads and the nearby airport enabled flower transport (Guerra 2012). Favourable fiscal and market conditions enhanced competitiveness bolstered by foreign investment. These zones lie close to the equatorial line and benefit from several comparative advantages: constant day-length and high insolation; cool temperatures in mountainous areas; low labour costs, and proximity to international airports. In all of them, communities and flower agribusinesses share irrigation water, often with conflicts.

With ups and downs, flower agribusinesses have mainly succeeded and even become one of the main Ecuadorian exports after petroleum and bananas. After a start with less than a dozen enterprises, in 2014 Ecuador was the world´s third-largest flower exporter, after the Netherlands and Colombia. Volumes rose from ca. 8,000 tons in 1990 to ca. 139,000 tons in 2014, increasing from 0.5% to 4% of Ecuador´s total exports (from 14 million to 798 million US$). The Pisque watershed has most of Ecuador´s large flower companies, some 150 big (>2 ha) companies producing for export. They average 11 hectares with (some very high-tech) greenhouses. The sector employs some 48,000 direct and 55,000 indirect workers.

Less than a decade ago, local families ventured into setting up their own small flower greenhouses based on their experience as workers in large businesses and pressed by dwindling agriculturally based incomes. In 2015 some 300 small (<2 ha) greenhouses had been established by smallholders, in many cases taking advantage of their previous relations with the big flower farms (experience gained, facilitation of some materials and market-related contacts, etc.) and the possibility to obtain credits, both private- and state-sponsored. Against all odds, some local floriculturists have been able to establish very risky yet successful businesses within the flower market chain. The problems they have had to face include, among others, conflicts with their own neighbours and communities related to an overuse of irrigation water by the new small rose greenhouses compared to their previous use for cattle and/or traditional crops.

Even if acknowledging that flowers have provided jobs and stopped emigration, local people are alarmed about the impact on water security and food sovereignty by a non-edible, individually produced commodity that has a high-water demand. They also encounter severe problems of pollution, health, and sociocultural conflicts. Flower firms reply that they have modernised the regions where they thrive and have bettered local purchasing power, and that they abide by governmental, national, and international socio-environmental standards. The recent boom of small local farms complicates a conflictive context that seems novel since it concerns the export commodity that many communities first rejected and now start to produce themselves. However, it shares many features with the previous chapters in a continuing history of contested, ever changing hydro-territorial configuration, driven by struggles over resources, rules, authorities, and discourses.

2.4 Examining the water conflicts

In this section we focus on the conflict over water in the Pisque watershed the past decades. The hydrosocial territory of the Pisque watershed was imagined very distinctly by different stakeholders. Dominant stakeholders imposed their discourses, authority, rules and water distribution practices shaping the materialisation of the hydrosocial territory in a way that concentrated water and land in the hands of a few families and businesses. However, the indigenous communities also maintained and furthered their imagination of the Pisque watershed and struggled to gain increased access to land and water. The four echelons of the ERA framework are applied below to analyse the struggle over the hydrosocial territory in the Pisque watershed.

2.4.1 Conflicts over resources: the first echelon

Irrigation water comes from the high-Andean ecosystems called *páramos* (Mena et al. 2011). Their special climatic and pedo-ecological features allow the accumulation and gradual delivery of water - sucking and releasing water like sponges - that comes from rain and the thawing of glaciers. These seemingly unproductive, but in fact extremely important landscapes, have been part of indigenous territories since the first human settlements of the Andes. They became part of the *haciendas*, a time when they were mainly used to maintain sheep and were the agriculturally marginal land that was given back to the indigenous population after the agrarian reforms.

Nowadays, specifically at the Pisque River watershed but within a broader conflict frame, the *páramo* lands are part of a struggle over the configuration of the valley´s hydrosocial territory, since their water is craved by the large city of Quito, and more locally by large farms (including floriculture) and small landowners (including those who now produce flowers) (Manosalvas 2016).

Water flowing down from the highlands is used directly from the streams or directed towards irrigation systems, some of which have existed for centuries. The *haciendas* and later the Republican State assumed control of all the indigenous canals. In the Pisque watershed two irrigation systems are important for the flower business: the Tabacundo and the Pisque irrigation system. A new canal has been under construction for over a decade. The Tabacundo and Pisque irrigation systems were constructed by *haciendas*, with help of forced labour by the indigenous communities. The new irrigation system is being constructed by the government. The Pisque watershed has been the stage for many struggles to regain the control of these canals, as will be explained below.

As a prime example (Hidalgo 2010), in February 2006 ca. 3,000 peasants took over the Tabacundo *acequia*, a vital irrigation system in the area, at that time managed by the Municipality; protesters demonstrated against floriculture since they felt it was inequitably getting most irrigation water from the bureaucratic managers. These mobilisations got the canal turned over by the state to a new community-based institution (Castillo 2006). This inter-community organisation, CODEMIA[9] operated and maintained the Tabacundo acequia, established shifts and collected differentiated fees from small traditional farmers and large agribusinesses. Nevertheless, each community established its own rules, for example, to decide whether to allow floriculture in their territory. CODEMIA faced some difficulties: smallholders complained about entrenched favouritisms towards larger users who paid more and still monopolised water. All command-area communities received water regularly, but the percentage of redistribution has been relatively small. Table 2.1 shows the considerable imbalance water use by grower types, in terms of both acreage and flow. It has been estimated that in 2013 smallholders used some 15% (2 Hm^3) of the irrigation water, cattle haciendas some 30% (4 Hm^3), and flower

[9] The Cayambe and Pedro Moncayo Development Consortium for Integrated Management of Water and Environment groups communities and water users' associations along the Tabacundo *acequia*. CODEMIA's directive board is made up by the presidents of each of the five sectors of the irrigation system and constitutes a second tier, i.e. inter-community, organisation (Hidalgo 2010; Hidalgo et al. 2017).)

agribusinesses some 55% (8 Hm^3). Smallholder communities get only 15%, though they have almost 60% of the irrigated land (Ochoa 2013). The new boom of smallholder flower businesses intensified water conflict inside already water-deficient communities.

Table 2.1. Landholding and water use per sector in the Tabacundo acequia

Sector	Total irrigated area (ha)	Number of units	Average landholding per unit (ha)	Average water use per hectare* (m^3/year/ha)	Average irrigation water use per sector* (Hm^3/year)	Percentage of total water use (%)
Smallholder subsistence agriculture	2,400	2,535	1	800	2	15
Large flower companies (>2 ha)	1,045	91	11	8,000	8	55
Dairy cattle haciendas (>10 ha)	760	26	38	4,000	4	30
Total	4,205		-		14	100

* This table shows how the overall water allocation to the three different types of users is estimated from the irrigated area and the net irrigation requirements for the respective crops. One Hm^3 is 1 million cubic meters.

Sources: Ochoa (2013) and Mena-Vásconez et al. (2017).

2.4.2 Conflicts over the contents of rules: the second echelon

Article 318 of the 2008 Ecuadorian Constitution establishes a priority gradation for water uses. Below 'human consumption' (drinking water) is 'irrigation that guarantees food security', followed by 'ecological flow' (adequate natural water provision for ecosystems) and 'productive activities' (diverse industrial and economic uses). This regulation is at the base of the conflict that exploded after the appearance of the Pisque flower farms. Before the 1980s all the agricultural production was aimed at regional food security. The change to dairy production did not change this since milk and its derived products are also deemed part of the region's food security. However, new legal rules consider not only food security (which might be materialised either locally or by non-domestic food production elsewhere), but also food *sovereignty*: Article 1 of the Food Sovereignty Regime Law declares that the state must "… guarantee persons, communities and peoples the permanent self-sufficiency of healthy, nutritious and culturally appropriate food". Thus, it is not only

a matter of consuming enough food but of doing so in a nutritionally and culturally sound manner and having *control* over food self-provision (Mena Vásconez et al. 2019).

Flower farms, for the first time in the history of the watershed, started producing a blatantly non-edible new item, changing Pisque's socionatural configuration into an industrial hydrosocial territory. This means that, according to the Constitutional prioritisation, roses are at the bottom of the list since water is used for an industrialised 'productive activity' that does not bear direct relation to human alimentation. Here, the Constitution formally supports indigenous peasant community claims and customary rights frameworks ('uses and customs') many of which give water rights prioritisation to subsistence crops over commercial products, to guarantee families´ and community livelihoods (Boelens 2015).

This idea is contested by large commercial rose farmers on two fronts. First, they say that this prioritisation is unviable. In fact, they dispute the new rules that would literally ask for putting into practice the Water Reform – long hoped for by peasant communities, detested by powerful land/water owners. This reform is prescribed by the new Constitution, but until today remained merely lip-service to the poor rural communities whose water rights have been historically dispossessed. Second, they claim that flower agribusiness requires high water rights prioritisation, because with the modernisation and technological development brought in by rose farming people can now access foods and goods that were previously unreachable.

2.4.3 Conflicts over legitimate authority and decision-making power: the third echelon

The Ecuadorian Constitution declares that irrigation water is a public good and thus it is the state´s obligation to control its allocation and distribution. The Territorial Organisation, Autonomy, and Decentralisation Code (COOTAD, emitted in the year 2010) is the Law that organises the level of government that oversees the different public services. Irrigation water lies within the provincial domain, so formally the Pisque irrigation should be primarily managed by the Pichincha Province's Prefecture. But the story is more complicated.

One of the two main irrigation systems in the watershed is the eponymous Pisque system, which runs along the eastern portion of the basin (Figure 2.2 shows the main features of the area). Its convoluted history is akin to that of many irrigation systems

in Ecuador, i.e., first, landlords owned the system as a private asset, next, the state took over control of infrastructure and water, and then a partial and gradual transferral of management duties took place, from the state to communities (Hoogesteger 2012). This entailed large authority conflicts within changing hydrosocial governance patterns. Pisque system is managed nowadays by a water users association.



Figure 2.2. Map of the main irrigation canals (in variegated black), municipalities, towns (dark grey circles), and roads (orange) in the study area. The light-grey oval shows the approximate location of the rose boom zone

Besides the many small irrigation systems and canals that connect water flows, land and people in Pisque's hydrosocial territory, the other main irrigation system is the Tabacundo *acequia* (see page 56). As said, after a long struggle between communities and the municipal government and private farmers, water governance is now organised by the afore-mentioned peasant and indigenous users´ organisation CODEMIA. This organization has been considered a cornerstone of indigenous and community struggles to gain and maintain water access and decision-making rights, against the interests of powerful, usually external actors. The fact that large flower businesses have had to comply with the dictates of a peasants-lead organisation bears witness to this fact. Nowadays large farmers or their representatives attend irrigation assemblies as common members.

The construction of a new canal (Canal Cayambe-Tabacundo), which will replace the Tabacundo *acequia* as an autonomous entity, has been a remarkably cumbersome

and long process that seems to be in its final phases. This will mean that CODEMIA will lose its position as manager of the system and become a mere part of a new institutional arrangement led by the provincial government, as dictated by the COOTAD law. Organising this new institutionality will constitute the next historical phase of disputed control over Pisque's hydrosocial territory, materially, politically and culturally. The water conflict among flower producers and subsistence farmers, over water resources, rules, rights and authority, will unavoidably rise again.

2.4.4 Conflicts about discourses: the fourth echelon

As the most abstract level, the conflicts about the water, the rules and the authority can be related to the discourses, imaginaries, norms and values of the different stakeholders involved. Currently, mainly two conflicting discourses exist about the use of the water in the Pisque hydrosocial territory: first, water should be available to the indigenous communities for *food sovereignty*, and second, water should be used to its *highest economic potential*, read flower business, which will also create jobs for indigenous community members. The 'flowers' discourse strongly emphasises the progress and modernisation roses have brought into the regions where it has flourished, while the 'food' discourse intensely questions its inception on grounds of pollution, food and water security, and cultural erosion (Mena-Vásconez et al. 2016).

'Local food' versus 'alien flowers' material and discursive contradictions would be an upgrading of previous struggles between local peasant communities and varied external actors. Perhaps at the beginning, divisions and power relationships were indeed strongly dichotomous, both materially and discursively: Kayambi versus Inca, indigenous communities versus Spaniards, and later white-*mestizo* elites, *haciendas* versus *huasipungos* and indigenous peasants; more recently indigenous communities versus large capitalist flower farms. But already in early history some indigenous communities allied themselves with the invaders creating a sort of intermediate stakeholder that saw in the invasion a way to improve an already-existing iniquitous status. Dynamic negotiation and hybridisation of positions and powers has coloured Pisque's hydrosocial territory historically. With the advent of cows, the dichotomy became more blatantly insufficient since at least some communities took in the new commodity and, as said previously, even became quite successful.

Flowers show some similarities to the previous dairy-related production mode, yet at least one sharp already mentioned difference emerges: *you cannot eat flowers*. Even if cows could be deemed a foreign element, milk, cheese, and other dairy foodstuffs had been part of the diet for decades and even some local *criollo* races of cows and varieties of cheese had been developed, as well as local grasses adapted as fodder. On the other hand, discussions about food sovereignty and security do not seem to have had a high priority in the social arena at the time of the dairy boom. With flowers, a non-comestible, highly demanding commodity, but with the advantage of bringing jobs and a general sense of prosperity, impelled at least some of the community members to pursue the dream of having something that had never been destined for them.

Thus, the dichotomous discursive struggle of, on the one hand, modernity, prosperity, cultural integration and universalization of rules and governance (typical of large farmers and, to some extent, deployed by local authorities), and, on the other hand, that of food security and sovereignty coupled with self-determination and cultural independence ideas (exposed by local leaders and the community in general), became an increasingly entangled scenario of values: some community members were tempted to grow roses in their small plots, albeit keeping at least some area for traditional agriculture, finding that it was not only possible but also desirable and even multipliable (Vasco et al. 2017).

A new episode in this ultimately value-based material and discursive struggle is budding: after not having been able (or willing) to establish associations among the smallholders due mainly to the lack of confidence in the leaders, it seems that finally small Pisque (flower) farmers are increasingly embracing a 'strength-in-numbers' approach. An upscaling of their isolated small business into multi-member associative entities could mean a huge advantage in economic and political terms[10] -- that is, for those smallholders who are able to join the flower game.

[10] Milk farmers had success in establishing dairy associations, but it was done based on edible things that were consumed locally and regionally.

2.5 Conclusions

In this paper we have examined Pisque basin´s changing hydrosocial-territorial configuration focussing on water flows, rights and governance forms as constituted by historically shaped power relationships. We have scrutinised water conflicts as encompassing four connected echelons: over access to resources; over the substance and meaning of the norms and rules defining water allocation; over legitimate authority to manage the irrigation systems and define rules and norms; and over discourses. The latter, as regimes of representation, impose or defend particular water hierarchies and policies, legitimizing the patterning of these resource distributions, rules, and authorities in hydrosocial territories 'convenient' for those who (think to) benefit from that particular territorial configuration.

Currently, in Ecuador as in many other places, it is increasingly the water resource what triggers mobilisation and shifting contradictions, continuously reconfiguring the economic-political relationships and socionatural composition of the hydrosocial territory. The history of the Pisque—focused on the conflicts related to the access to and control of irrigation water—is a stage where, for centuries, local actors have suffered, struggled, and mobilised against powerful external encroaching actors.

The recent boom of large export flowers—and the even more recent boom of small local flower producers—constitutes the latest chapter in this struggle. The seemingly abundant Andean water has been the cornerstone of a series of conflicts at several levels that demonstrate that even if the ecological sponges of the highland *páramos* are able to collect and distribute good water to the lowlands, a scarcity has been constructed that is a product of a profoundly skewed distribution of the resource rather than abstract 'climate change'. This inequality does not relate only to water, which could be understood as the most noticeable element, but also to land, credits, supplies, knowledge about marketing, and connections.

A cyclic phenomenon is recognisable in the various chapters summarised in this article. In general, without denying internal frictions and large inequities, it has been always a tale of local people seeing their rights to water and land encroached upon by powerful outsiders. There have been always resistance and insurgence, and some rights have been reclaimed, even if the situation of the indigenous population of the Pisque has not really structurally improved. Currently it is obvious, for example, that local people are not a serf-like population under the orders of the

higher classes anymore but have reclaimed their dignity. Yet profound inequalities linger and continue to develop.

The cycle is clearer in more recent times. With dairy farms, some of the communities were able to successfully establish powerful associations that competed well with the remaining *haciendas* still in hands of 'white' elites. The advent of the roses in large farms, with international funding and deeply-commoditised production relations, led to the idea that this was an endeavour totally outside the capabilities of small farmers, and so it was for some three decades when they only participated as low-level waged workers that could only dream of becoming floriculturists.

But the new boom of successful small locally managed export-quality rose greenhouses has proved the initial assumption wrong, at least partially or momentarily. Thus, a traditional dichotomy has become a more complex net of conflicts where battles over resources, rules, authorities, and discourses structure a situation that, having parallels to the dairy arena of yesteryears, presents an unpredictable outcome in terms of justice, equity, and self-determination. The new trend of association between these initially partnership-wary actors could mean a leap into more competitiveness and progress, but at the cost of impinging even deeper on long-cherished notions such as autonomy and food and water security and sovereignty.

CHAPTER 3

FIGHTING OVER WATER VALUES: DIVERSE FRAMINGS OF FLOWER AND FOOD PRODUCTION WITH COMMUNAL IRRIGATION IN THE ECUADORIAN ANDES[11]



Street sign proclaiming Cayambe as the producer of the most beautiful roses in the world

[11] This chapter is based on:

MENA-VÁSCONEZ, P., VINCENT, L., VOS, J. and BOELENS, R. 2017. *Fighting over water values: diverse framings of flower and food production with communal irrigation in the Ecuadorian Andes.* Water International 42(4):443–461.

3.1 Introduction

Communal natural resource management is often studied through communities' institutional rules (e.g. Ostrom 1990, Ostrom et al. 1999). This approach tends to gloss over diverse values and interests within communities and complex interactions with communities' institutional environment. Fights over water values and over the value of water use and control are at the heart of communal governance.

The Tabacundo irrigation system (*Acequia Tabacundo*)[12] in Northern Ecuador is a good example of a dynamic fight over water values. Irrigation water in Northern Andean Ecuador is scarce and water access is contested. The Tabacundo *acequia*, built about a hundred years ago, irrigates ca. 4,200 ha. After a protest march in 2006, a board representing smallholders took over control over the canal from the Municipality. However, most of the water is still allocated to a hundred large flower companies. More than 2,500 families use the rest of the water for subsistence agriculture. Recently, some smallholders have started growing roses in small greenhouses. Their claim for irrigation water intensifies battles over who controls the irrigation system and its water resources. This case shows how social mobilization around issues of water quality and quantity necessarily changes the context for agriculture, in both large capitalist industrial production systems, and in smaller family-held traditional production systems (see also Gasteyer 2008; Hoogesteger and Verzijl 2015).

Export flower production in Ecuador started in the late 1980s. By 2001, a hundred flower companies exported US$ 238 million. In 2012, there were 571 companies on 4,000 hectares, exporting US$ 608 million. Flowers became Ecuador's fourth-largest export commodity, after petroleum, bananas and shrimp, and generated some 48,000 direct and 55,000 indirect jobs (Harari et al. 2011, Guerra 2012, Expoflores 2013, ProEcuador 2013). The dollar amount of flower exports grew continuously by 11% per year (2001-12), while the tons exported during that period grew by some 5% per year (ProEcuador 2013). Compared to other flower-exporting countries, Ecuador is currently third in total cut flower exports (US$ 798,433,017; 10%) after the

[12] The name "Tabacundo irrigation system" can be confusing because a larger one locally known as "*Canal Tabacundo*" is being built. In Spanish, the existing system (studied here) is "*Acequia Tabacundo*", while the new one is officially "*Canal Cayambe-Pedro Moncayo*".

Netherlands (US$ 4,672,015,016; 45%) and Colombia (US$ 1,374,245,753, 16%), and above Kenya, Belgium and Ethiopia (Workman 2015; UN Comtrade 2018).

However, concerns about the impact of industrialised floriculture are widespread: resource concentration, health, food security, ecosystem sustainability, and community well-being (Lobao and Stofferahn 2008). Specifically, rose agribusinesses have been criticised for environmental, water and food security, health, labour, and social issues (e.g., Breilh 2007; Brassel and Montenegro 2011). Local smallholders have mixed feelings: they see the advantages of wage-earning labour, but feel the impact of pollution, water insecurity and decreased food sovereignty (Guerra 2012). Especially women work in the flower business, which has significant effects on gender relations (documented in Colombia by Ferm (2008) and Patel-Campillo (2012)).

This study shows how a complex set of diverse values plays a crucial role in irrigation water distribution among different water user sectors in a communal irrigation system. We use the three principles of justice formulated by Nancy Fraser (1998, 2005) to highlight struggles over these values: recognition, representation and redistribution. We scrutinise the ways in which stakeholders strategically frame their water claims and values, and examine their practices, to highlight the political dimensions of socioenvironmental perceptions (Stott and Sullivan 2000) and explain conflicts in terms of value-laden struggles over visions of production, authority and practice (Watts 2000). Concretely, this chapter addresses the following question: How have the discursive framings used by two main current irrigation stakeholders – i.e. flower agribusinesses and local peasant and indigenous inhabitants – to defend and foster their values and practices on water allocation developed in the Pisque watershed?

We examine how these different stakeholders, who value water use in different ways, battle over water control. According to stakeholders' relative power, these struggles change the system's water use valuation, smallholders' representation in the irrigation system's management and, to a lesser extent, distribution of access to irrigation water.

3.2 Conceptual framework

To analyse the Tabacundo irrigation system's tensions and struggles, we apply a values-based political ecology conceptual framework. Martínez-Allier (2002) discusses how natural resource conflicts are often expressed in different valuation systems and languages. These values manifest how social groups understand and relate to the world around them, with norms and behavioural frames that orient people's action and judgment to support their decisions (Farber et al. 2002). Duarte-Abadía and Boelens (2016: 4) explain how such languages of valuation:

> *... concretise actors' regimes of representation: they represent actors' worldviews and knowledge systems, socio-economic interests and cultural and political relations, expressed through concepts, discourses and normative frames. Divergent local territorial imaginaries and materialities and their respective valuation languages face off and also interact with dominant imaginaries and languages, as a subset of the contradictions and conflicts produced in the confluence of different societies.*

We agree with Forsyth (2001:148) in that "the construction of [socioenvironmental issues involves] a hybrid blend of physical impacts, social framings and values that reflect the perspectives of more powerful groups." However, local research into environmental management among small farmers can question, or indeed contradict, the dominant, often market- or science-grounded basis of such powerful discourses and valuation languages (Martínez-Allier 2002).

In the Andean highlands, dominant valuation languages fail to recognise the cultural and cohesive function of Andean communities' land and water institutions, their complex rights systems, and their multi-layered resource use valuation and management relationships (cf. Gelles 2000; Groenfeldt 2006; Rodríguez-de-Francisco and Boelens 2015). These value systems are rooted in, among others, "the historical evolution of local communities' socio-natural relationships that link people, place, and production while shaping local water territories, organisations, identities, and cultures. Universalistic frames [of appraising and pricing water, its allocation and its governance] that impose commensurable values and a commodity-biased worldview tend to undermine existing non-commodity exchange and collaboration

mechanisms that are crucial to local peasant economies and sustainable land and water management" (Boelens et al. 2014:85-86). Here we show that this division is not a simple dichotomous one; rather, current praxes generate hybrid valuation languages and blended forms of valuing water use.

Nancy Fraser (1997, 1998, 2005) proposed three principles of justice to examine valuation conflicts: recognition, representation and redistribution. Her three R's represent inter-related social tensions and conflicts and dimensions of social struggle. These three areas are irreducible ends of the conflict. Nevertheless, a particular struggle by a societal movement at a particular time might emphasise one of the three dimensions in their fights for social justice: they may strive for recognition, or political representation, or economic redistribution.

Recognition involves the cultural dimension of social struggles. The struggle for recognition is about power over a subaltern's perceived meanings, imaginaries, identities, ideas, values, norms, beliefs, moral and knowledge. Discussions on water governance increasingly focus on water's non-economic values (Groenfeldt 2006; Castro 2007). In the Andean context, the cultural meaning of water is equally important in political struggles over water control (Guillet 1983; Gelles 2000; Boelens 2014).

The struggle over representation seeks political influence, decision-making, legitimacy and authority. Local representativeness influences debates on water governance, with increased attention for water user organisations' multi-scalar strategies to enhance their claims to share in authority and decision-making, and thus defend their values (e.g., Bolin et al. 2008, Hoogesteger and Verzijl 2015).

Redistribution refers to restructuring access to resources. These can be productive (land, water, labour) or economic resources (jobs, capital, income, property, subsidy, rent, credit). However, economic means are also intrinsically social; following Fraser (1998: 40):

> *Culture and economy are thoroughly imbricated with one another. (...) Even our core economic practices have a constitutive, irreducible cultural dimension; shot through to the core with significations and norms, they affect not only the material well-being of social actors, but their identities and status as well.*

This idea is also at the heart of the moral economy approach based on the ideas of Polanyi (1944), Thomson (1971) and Scott (1976). Scott, based on Chayanov's (1966) ideas, described a 'peasant' logic of production based on risk aversion and solidarity, and not exclusively on individual profit maximizations.

Values and ways of framing values (valuation languages) intrinsically and strongly interlink the complex struggles for recognition, representation and redistribution. Recognizing a stakeholder's values will result in stronger political representation on decision-making platforms. More representation can redistribute access to resource administration. However, the three R's also inter-relate in other ways: e.g., with access to economic resources, the fight for recognition can be financed. Increased representation will also facilitate increased recognition. Thus, the three locations of justice are co-dependent in complex ways.

Studying the *framings* used by stakeholders and their behaviour reveals the substance and role of values among these tensions. Framing is strategic discursive communication. Benford and Snow (2000: 612) describe framing processes as:

> *"(...) the generation, diffusion, and functionality of mobilizing and counter-mobilizing ideas and meaning (...)". "[Frames are] intended to mobilize potential adherents and constituents, to garner bystander support, and to demobilize antagonists (...) Collective action frames are action-oriented sets of beliefs and meanings that inspire and legitimate the activities and campaigns of a social movement organisation (...)"*
>
> *"[And frames are] the outcome of negotiating shared meaning"* (ibid, 614).

Thus, framing is a dynamic, evolving process. Frames are effective if they have a higher degree of articulation and 'resonate' with the values of other stakeholders (Benford and Snow 2000). These 'others' can be policy makers, the general public, or opposing groups. Thus, stakeholders can try to integrate their values with those of 'others', or they can try to convince, inspire and mobilise 'others' with credible, consistent arguments (Bain and Selfa 2012).

3.3 Field research methods

Fifty-five semi-structured interviews with floricultural farm representatives from the area (owners, managers, technicians) in April-May 2013, and informal interviews with 20 irrigation users from all five Pisque irrigation sectors were conducted. All interviewees who had established small local rose farms had worked at large farms, mainly as laborers. Follow-up field research was done throughout 2013 and 2014, concentrating on water distribution and control, and the practices of framing water use values. This included 15 open interviews with local government representatives, flower export association personnel. and other relevant rose-exporting actors. In-depth open interviews with the five canal sectors' presidents (see below) between October 2013 and January 2014 were fundamental to flesh out the whole spectrum of perceptions. Two presidents/coordinators of communal irrigation intakes for each of the system's five irrigation sectors were queried regarding irrigation and flower farms via semi-structured interviews between December 2013 and December 2014. The names of the persons whose views are presented here have been kept anonymous.

Official databases and normative documents were gathered and examined regarding water concessions and irrigation systems' technical features and governance, and analysed academic and media sources pertinent to the article's themes.

Satellite images were utilised to identify and track the development of large and small flower greenhouses. The QGIS software was used to compare available images for the area during this study (2002 and 2013) for the appearance and area covered by large and small rose farms. Large and small rose farms were divided by size: all small locally managed farms have less than 2 hectares, while all agribusiness-type farms are larger than 2 hectares. In fact, these large farms start at around 5-6 hectares.

3.4 The water question and Ecuador's flower boom

The Tabacundo system is in one of the global hotspots for flower production, the Pisque River watershed, others being Aalsmeer (Holland), Bogotá (Colombia), Lake Naivasha (Kenya), Arusha (Tanzania) and the Central Rift Valley (Ethiopia) (ProEcuador 2013, Morales and Suárez 2006, Mano and Suzuki 2011). Production sites in East Africa and South America share four favourable conditions for year-

round flower production: constant day-length and high insolation because of proximity to the equator; relatively cool temperatures because of altitudes at 1,500-3,000 metres; relatively low labour costs; and a nearby international airport. In Tabacundo, as in Kenya and Tanzania, local farming communities share the water needed to irrigate flowers in greenhouses. As in Africa, in Tabacundo those communities dispute flower companies' water use (see, e.g., de Bont et al. 2015).

In Tabacundo, the communally managed Tabacundo *acequia* irrigates more than a thousand hectares of greenhouses with water from the Pisque River, which flows down from the massive Cayambe volcano to the east.

Between 1903 and 1924, big *haciendas* (feudal-like landholdings) started building the Tabacundo *acequia* with forced labour from indigenous communities. In 1924, the Municipality invested in extending the canal to bring water to Tabacundo. From this time, until 2006, the Municipality of Pedro Moncayo (its capital is Tabacundo) managed the Tabacundo *acequia*, allocating irrigation turns, collecting fees, and organising maintenance. *Hacienda* owners and later their heirs, commercial dairy and big flower companies, dominated the council (Poats et al. 2007; Hidalgo 2010; Zapatta and Mena-Vásconez 2012). Most water was allocated to large landholdings, and only a small part went to smallholder communities for subsistence crops (corn, potatoes and vegetables).

The system irrigates a total of 4,200 hectares. Irrigation water is scarce: the main canal transports only some 500 l/s.

In Ecuador, the 1960 and 1973 Land Reforms redistributed some land to smallholders, but many *haciendas* – especially those owned privately and not by the State or the Church – maintained large tracts of land. From 1964 to 1970, just 10.2% of peasant families in the Ecuadorian Andes received land (Becker and Tutillo 2009). In the 1970s, many large haciendas became intensive dairy farms. This intensification paved the way for (even more capital-intensive) flower production. According to Becker and Tutillo, in the area:

> *"… agrarian reforms only meant deeper capitalist penetration, concentration of agricultural enterprises, and development of agribusiness. The Government gave land to the peasantry but no machinery, seeds or technical assistance [which impeded] their transition to sustainable agriculture. … [f]ormer hacienda workers became a cheap,*

> *unskilled labour force that now lacked … water, pastures and roads"* (2009:213).

The 1980s globalizing neoliberal environment fostered the emergence of these export flower agribusinesses. To enhance competitiveness, favourable fiscal and market conditions were instituted, bolstered by foreign investment (Acción Ecológica 2000; Korovkin 2003; Larrea 2006; Hidalgo 2010). From 1990 to 2000, flower production boomed. In those years, national and foreign investors found their way to Tabacundo. In some cases, *hacienda* families themselves became flower growers; in other cases, foreign companies bought large landholdings. By 2007, according to Harari et al. (2011), in the study area more than 80% of the flower farms were national investments, 5% mixed foreign and Ecuadorian, 9% US, 4% Dutch and 1% Colombian. By the turn of the century, some 90 bigger (>2 ha) companies produced flowers for export on about a thousand hectares (Ochoa 2013). Some 40,000 people work in the flower industry, and related activities, in Tabacundo and Cayambe (Soper 2013). A former laidback provincial village, Tabacundo became the (self-proclaimed) 'Rose Capital of the World'. The nearby Cayambe township also developed from a tranquil provincial town into a busy commercial centre where (according to a large road sign) 'We grow the world's best roses'.

However, smallholder communities have benefited little from the commercial boom. On the contrary, they receive less and less irrigation water for their food crops and dairy cattle. Local people view the flower industry with mixed feelings: they appreciate the chance for a job; but regard the environmental degradation, social fabric erosion and the shift to a 'commercial' lifestyle as negative (Soper 2013). Since 2005, some smallholders have built their own greenhouses and started to produce roses themselves. The investment capital was provided by either a big commercial flower company (using smallholders to expand their production, evading the ban on further commercial flower development) or as a loan from the national development bank (at the time Banco de Fomento) and other local sources.

Although indigenous communities gradually took over management tasks in the irrigation system, the Municipality continued to allocate most irrigation water to big flower companies. This led to a massive protest march in February 2006, and indigenous communities took control over the system. In 2008, the water users' organisation received the official concession from the national water authority.

Surprisingly, this did not result in a substantial redistribution of water from the big flower companies to smallholder irrigators.

3.5 Three successive fights over water values

Three successive struggles over water and water values in the Tabacundo irrigation system will be analysed using the three justice principles proposed by Nancy Fraser. These struggles are (1) the management takeover from the Municipality of Pedro Moncayo by the Water Users' Associations of Tabacundo; (2) tensions around water for big flower companies or food crops within each of the Tabacundo *acequia*'s five irrigation sectors; and (3) the emergence of locally-managed small flower-production units.

3.5.1 The takeover of the Tabacundo irrigation system by CODEMIA

After the land reforms (1960, 1973), Ecuadorian indigenous communities got access to more land; however, irrigation water distribution remained very unequal. In Tabacundo, only 12 out of nearly 60 communities in the Tabacundo *acequia´*s command area had 'permanent' water rights, whereas all *hacienda* land in the command area had permanent water rights (Hidalgo 2010). The Municipality had a major incentive to favour cattle farms and especially flower companies in water allocation: the water fee (paid for 24-hour irrigation turns) for flower producers was many times higher than the fee for smallholders. This difference was legitimised as a social measure, as flower producers were supposed to be able to pay more for the water than smallholders were but amplified the unequal allocation enormously.

With increasing political organisation by indigenous people in Ecuador (starting in 1992 with the "500 years of indigenous resistance") as well as increasing political recognition of indigenous rights by successive national governments, communities increasingly questioned this unequal distribution. Locally, smallholders' frustration with the Municipality grew due to a systemic discrimination against smallholders by bureaucrats in distributing water turns. Smallholders had to wait many hours in long queues at the municipal building to pay for their irrigation turns, while large flower producers and cattle ranchers could simply order water by telephone. Moreover, though smallholders paid for their turns, they were often not delivered, and re-programmed turns often did not reach their fields either, while dairy *haciendas* and big flower companies were assigned permanent water flows.

A severe drought in 2005 was the turning point. Several second-tier communal organisations (STOs)[13] along the canal established a Pre-Directorate to take over canal administration[14]. The Salesian University and NGOs helped communities organise. On 18 February 2006 a general protest march was called, with some 3,000 users, to take over the canal. Protesters marched along the canal, breaking all gate security devices and putting on their own padlocks, thus physically controlling water distribution. The takeover led to a series of conflicts with the Municipality, flower businesses and *hacienda* water users, who were opposed to this new governance scheme. In January 2008, the National Water Authority (SENAGUA) recognised administration of the canal´s water by the Pre-Directorate, now called CODEMIA-CPM[15]. In April 2008, SENAGUA granted CODEMIA the use concession for the canal's water (Hidalgo 2010).

Spokespersons for indigenous communities in Tabacundo gave three main reasons to justify their takeover of the irrigation system from the local government. First, their ancestors worked to construct and maintain the canal: water values are history- and culture-rooted. Second, water should be used for food production, and not for flower production: water values need to be livelihood-based. Third, the irrigation water should be distributed equally; presently the flower companies received much more water: water has an important social value. Manuel Castillo, at the time CODEMIA's President, stated their position: fighting against rich people's power over water issues, which even displaces indigenous communities to move flower enterprises in, often preventing them from using their traditional land to grow food crops. He also mentioned guaranteeing efficient irrigation water use; respecting each sector's peculiarities in water use; coherent, transparent social management to

[13] Second-tier indigenous organisations (STOs) are community organisations at parish (*parroquia*) level. Communities are the first tier. Each rural parish with indigenous communities in Ecuador has an STO. They establish territorial control over rural areas in parishes with indigenous population, parallel to State organisations. STOs engage in advocacy for access to land, water, and agricultural inputs, and training for their member communities. They also deal with education and health care, organising programs and projects for their members.

[14] It is unusual for an STO to be directly involved in managing irrigation systems, as non-irrigation water communities and users are also STO members. In Ecuador, as in other countries, water users are usually organised in Water Users' Associations that manage (parts of) irrigation systems.

[15] *Consorcio de Desarrollo de Manejo Integral del Agua y Ambiente Cayambe – Pedro Moncayo – CPM* (Consortium for the Development and Integrated Water and Environmental Management of Cayambe-Pedro Moncayo-CPM).

warrant respect, and defending peasant rights by participation and recognition of capacities and preceding efforts (Moya 2010). In a press interview, Castillo has said[16]:

> *"[F]or indigenous peoples, water is the blood that nurtures the Pacha Mama. When asked to whom water belongs, they answer unambiguously: 'It is ours!' Therefore, technical language is unimportant for them and they speak plainly: 'The only thing that will provoke a massive upheaval is if they mess with our water'."*

Thus, communities framed their claims to take over canal management as an 'indigenous issue', which increasingly resonated with the regional and national government and the broader public opinion in Ecuador. Recognition of indigenous rights was an important issue in the election campaign of President Rafael Correa, who came to power in 2007. Moreover, claims for taking over canal governance were also in line with the new Constitution of 2008 (especially Articles 3, 281, and 334), which promote redistributive politics to enable farmers' access to land, water, and other productive resources.

The Pre-Directorate encompassed four STOs – located in the upper and middle segments – and a Water Users' Association (WUA) – in the lower section of the canal. This established five irrigation sectors, each sector corresponding to the irrigated territory of a parish (Figure 3.1 shows a map of the irrigation system locating the five irrigation sectors). Inside an irrigation sector, water is distributed to three types of users: communities, cattle haciendas, and big flower companies. The 59 communities manage water inside their community territory. The highest irrigation sector is the territory of COINOA (Council of Indigenous Organisations of Olmedo), followed by UNOPAC (Federation of Popular Organisations of Ayora, Cayambe) and TURUJTA (Council of Indigenous Organisations of Tupigachi). The WUA of Tabacundo later replaced the Tabacundo STO (UCCOPEM). La Esperanza's WUA was established in the tail section. All the water users within these sectors are members of the General Assembly, and delegates from the five organisations form the Board of Directors (Hidalgo 2010, Ochoa 2013). Administration by CODEMIA is based on an "organised community management formula that respects the autonomy

[16] http://www.elcomercio.com/actualidad/agua-rebelar-indios.html.

of STOs and traditional smallholder water use organizations, communities, haciendas and flower companies" (Ochoa 2013: 69).

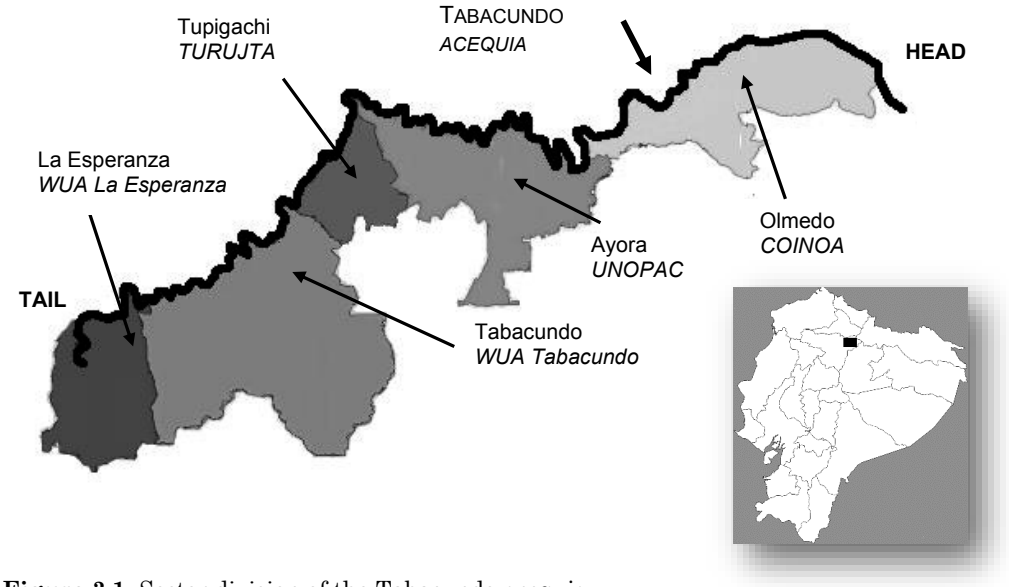


Figure 3.1. Sector division of the Tabacundo *acequia*

Irrigation water demand in the Tabacundo irrigation system command area systematically exceeds the canal's supply.[17] The president of CODEMIA has stated that they aim to redistribute water from flowers to food crops, and claim to be doing so:

"The Tabacundo *acequia* is the product of our ancestors´ hard work, which gives us rights since, historically, we have been its permanent users; we live on this water and we are able to manage it as we have done with other resources. Our fight is

[17] Annual referent evapotranspiration is about 1,070 mm, while average effective precipitation is about 600 mm. The 470 mm deficit (mainly July to September) for some 6,000 ha of potential command area (assuming permanent grass cover) is some 28 Mm^3/yr. The canal has a capacity of only 500 l/s and the Pisque River supplies less than 500 l/s from August to December. Consequently, the canal can deliver a maximum of 14 Mm^3/yr. Therefore, the water deficit is large and structural, even if all greenhouses used rooftop-collected rainwater.

based on notions of participation, equity, and transparency, and on the principle that water is for all" (Castillo 2006).

Indeed, since the takeover of the canal in 2006, all 59 communities in the command area receive water regularly (once every nine days). However, the percentage of redistribution is relatively small. Rough estimates for 2013 indicate that smallholders used only some 15 percent (2 Hm^3) of irrigation water, while cattle *haciendas* used some 30 percent (4 Hm^3) and the big flower companies used some 55 percent (8 Hm^3); see Table 2.1. Table 3.1 also shows the major differences in water allocation: 8000 m^3/ha/yr for the 91 big flower companies versus only 800 m^3/ha/yr for 2,535 smallholder families. Nevertheless, water users, and especially smallholders in the tail-end irrigation sector of La Esperanza, have expressed their satisfaction with their increased access to irrigation water. The big flower companies legitimise their claim to water by stressing the many jobs they generate. They also stress their right to use the canal water based on long-standing vested-use rights.

Smallholders have adapted their cropping strategies to low irrigation water availability. They grow corn in the main rainy season (January - March) and potatoes – which need less water and are more drought-resistant – in the dry season (June - August). Smallholders might also demand irrigation during the *veranillos,* occasional dry spells (Ochoa 2013).

Partial redistribution from big flower companies to communities led those companies to find other sources of irrigation water, adopting three main technological innovations: (1) they built reservoirs to store canal and rooftop water. Almost all big flower companies have two reservoirs: one in the upper part of their plot to store the canal water, and another one in the lower part to collect rainwater from their greenhouse rooftops. Satellite images show that in 2002 there were 184 reservoirs in the system´s command area, which increased to 377 in 2013. (2) They drilled wells to use groundwater. About half of the major flower producers had a groundwater tube well (Ochoa 2013). (3) They pump runoff water from gorges. Besides those measures, application of drip irrigation inside greenhouses is also being optimised.

Interestingly, the biggest change following the takeover of the Tabacundo irrigation system was not a redistribution of the canal´s water, but the symbolic submission of flower companies to community rules and customs. Representatives of the big flower companies now have to attend the water users' organization´s general assembly and participate in *minga* work parties to clean the canal. CODEMIA enforces this

symbolic recognition of indigenous rules by the big flower companies. If big flower companies do not attend a general assembly or *minga,* their water supply is shut off.

3.5.2 Smallholder communities demand water for food sovereignty

This section discusses struggles between water users with different ideas about, and valuation of, the use of irrigation water for certain crops. There are two main frames for irrigation water use from the Tabacundo irrigation system. One is the 'agribusiness frame': the best way to use irrigation water is for export flower production because it maximises its efficiency, creates paid jobs for many people, modernises and fosters cultural and economic dynamism in previously impoverished zones and contributes notably to the country´s GDP within an environment of CSR.

The other frame is the 'food sovereignty frame': irrigation water should be used to produce traditional Andean food crops because it provides food security and sovereignty for the local and regional population, and food crops use less water than agribusinesses. This framing also involves dairy *haciendas,* as local food production (although this is highly industrialised capital-intensive cattle breeding).

In general, flower industry entrepreneurs and workers use the 'agribusiness frame' to legitimise allocation of most irrigation water for flower production in Tabacundo. Many smallholders and some local leaders use the 'food sovereignty frame' to fight allocation of most irrigation water to the flower business. Some leaders of communities and water users' organizations, as well as local politicians and governmental authorities, use both frames dynamically and look for ways of strategically blending water use values.

Different framing and relative power of the stakeholders has led to particular water allocation in each of the five irrigation sectors among subsistence farmers, cattle *haciendas* and flower producers. The presence of *haciendas* in the irrigation sectors has historical roots, reproduced in the daily practices of water distribution.

A greater or lesser presence of floriculture in the different sectors reflects the region's history from the 1960s onwards. Some irrigation sectors include more haciendas that turned into flower companies than others (Larrea 2010, Zapatta, pers. com. April 14, 2014). It is clear that communities respect vested (colonial) irrigation rights.

However, communities' contemporary institutional organisation and leadership, and shifting opinions about flower or food production, also influence current water

allocation and corresponding valuation languages. Table 2 shows, for each of the five irrigation sectors, water allocation among smallholder communities, cattle *haciendas*, big flower companies, and the recently emerging small flower producers. Decision-making on expanding or establishing new flower farms is complex. The Municipality must grant permission for any change in land use. They look at environmental risk and distance from urban areas. Large companies' economic and political buying power has huge influence on the decision-making process. The elected board of the irrigation sectors and community leaders also have decision-making power; however, they refrain from opposing new flower expansion because of flower production's high potential economic return (further explained in the next section).

Table 3.1. Type of water users in the five irrigation sectors of the Tabacundo irrigation system

Irrigation sector	Total irrigated area (ha)	Number of smallholders	Number of cattle haciendas (>10 ha)	Large flower companies (>2 ha)	Small flower producers (<2 ha)
COINOA	575	226	0	0	0
UNOPAC	1,160	631	9	4	5
TURUJTA	715	378	8	15	20
Tabacundo	1,600	926	8	65	120
La Esperanza	415	374	1	7	14
Total	**4,465**	**2,535**	**26**	**91**	**159**

Source: Ochoa (2013). Small flower producers' greenhouses were counted on 2013 satellite images.

These data show flower companies clearly concentrated in Tabacundo and, to a lesser extent, in the TURUJTA sector. UNOPAC and La Esperanza have some flower producers, and COINOA has none. It is not the altitude that dictates low flower production in the COINOA and UNOPAC irrigation sectors[18]; rather, it is irrigation-sector and community leaders who curb flower business expansion because they

[18] One small flower farmer, having returned after working for larger farms, was happy and seemingly prosperous with two small farms at 3,000 metres above sea level, possibly the highest rose plantation ever. At higher altitudes, roses grow slower but taller. Large tall-stemmed roses are known to be favourite in Russia.

value subsistence agriculture and dairy farming more than flower exporting. In La Esperanza, part of the reason for few flower producers is the systems' tail end, with relatively greater scarcity discouraging water-needy roses.

Below is an illustration of the framing by certain key stakeholders in the five irrigation sectors:

COINOA:

> *"Milk is better than flowers: can you eat flowers? We need to have better territorial planning to avoid this boom of small flower farms"* (President, COINOA, 09/10/2013).

In the Ayora (UNOPAC) sector, there are few flower farms, divided evenly among small and large ones. Political authorities of the Ayora parish[19] stated that there are eight rose farms (between 5 and 8 hectares of size), but they also acknowledged that this tally did not consider several micro-farms that had appeared recently.[20]

UNOPAC:

> *"We should only allow strawberries or organic summer flowers. There is indeed more income in flowers and pastures, but it is merely money. There are other considerations and other costs"* (President, UNOPAC, 12/10/2013).
>
> *"There are more disadvantages than advantages with flowers. It is true that there is more business, but there is also less water, and also more violence, divorces…"* (Vice-President, UNOPAC, 12/10/2013).

[19] Personal communication by the President and Vice-President, Ayora Autonomous Decentralised Government (Interview 20 Dec. 2012).

[20] The owner of one of them, not within the Tabacundo system, is the protagonist of "Ana, volar sin alas" (www.justiciahidrica.org/Ana-VsA/Ana-FlyingWithoutWings.htm), a documentary linked to this project that chronicles the struggles and dreams of a peasant woman who established a tiny rose farm.

TURUJTA:

> *"People prefer to work their own land, but they do not have sufficient irrigation water. Working in the flower greenhouses is very bad for workers' health"* (President, TURUJTA, 13/10/2013).

Tabacundo:

An indigenous community leader, who led the protest march in 2006, has been president of the Tabacundo irrigation sector and member of the board of CODEMIA ever since; he says:

> *"We should not demonise the flower companies. Territorial planning should be better; we should diversify"* (President, Tabacundo, 11/10/2013).

La Esperanza:

> *"Flower companies use rainwater very efficiently. Fifty percent of our people work with big flower companies"* (President, La Esperanza, 25/10/2013).

Large agribusinesses have their own ways of framing the social and economic valuation of water uses. At some points these agree with the community, more specifically with those families who have started a small flower farm. According to a large flower owner and manager in the neighbouring zone of Píntag:

> *"We hire 10 times more people than any other crop and we use water from the same concessions more efficiently… Water for flowers is much more efficient than for, say, corn … Regarding food security, it is a term that has to be used and analysed carefully. Traditional crops are risky businesses. Any weather phenomenon such as hail or frost can destroy the harvest, while flowers grow under controlled environments. Maintaining traditional crops in these conditions is a romantic utopia. Look at what happened in Tabacundo. People were fleeing the area. Flowers have transformed it into one of the wealthiest cantons of the country, with a per*

> *capita income similar to Chile's, when it was one of the poorest 20 years ago. Women who were destined to be prostitutes in Quito are now harvesting roses. Women, who were second-class citizens as hacienda milkmaids, are now respected persons and have signed contracts"* (interviewed 16/01/2013).

Another large flower farm manager in Cayambe and Tabacundo adds to this view:

> *"Our workers get benefits that would be impossible if they had their own plot, with flowers or traditional agriculture. I mean free transportation, day-care centres, annual leisure trip, and extra free days"* (interviewed 05/03/13).

And a third interviewee adds:

> *"The community has benefited not only from jobs but from the maintenance of road infrastructure and other services that the company carries out, benefiting the entire neighbourhood"* (interviewed 05/03/13).

Local authorities find themselves on a slippery middle ground, trying to accommodate divergent water use values by combining discourses. They defend water uses for food-based smallholder agriculture, for large-scale flower production, and in particular, also for small flower producers:

> *"Small businesses have also developed an activity that gives them profit. What we want is for these growers' children to study and prepare themselves and stop migrating. How many migrants do we have? The country needs to generate more jobs. While it is true that we cannot control everything, that's because the State does not collaborate with us, does not tell us what we need to do. We need to support these small businesses"* (Local municipality Environmental Management Director, interviewed 09/06/13).

> *"Obviously, several smallholders have worked in large floriculture and have gathered that it is a profitable activity, so they apply what they have learned. They have told us they belong to the sector; it is an activity that*

> *creates jobs, and these people are part of the* cantón. *Most floriculture companies belong to foreigners; they have invested because they have resources. Therefore, the small ones are upset because they don´t get permits. The municipality has started regulatory processes for large and small ones; we are ensuring that there is no environmental pollution. We have conducted a workshop on the use of pesticides since small floriculturists do it empirically, from what they have learned or seen. Improper application of pesticides does serious harm because farms are very close to houses"* (Local municipality Manager of Solid Wastes, interviewed 09/06/2013).

Unequal water allocation, defended and opposed by framing, is reproduced on a daily basis in distributing scarce irrigation water. Some 150 manually operated undershot sliding gates (*óvalos*) distribute the water along the canal. Each *óvalo* has a certain opening, equivalent to a fraction of a *molino*. A *molino* is a nominal flow of 32 l/s. There are gates that allow 2, 1.5, 1, ½ and ¼ of a *molino*, thus representing nominal flows of 64, 48, 32, 16, 8 l/s. There is a fixed water delivery programme with irrigation turn frequency once every nine days, lasting 24 hours. However, the schedule is adjusted by CODEMIA according to vested rights, crops, fee payment and water availability in the canal. Four *aguateros,* canal operators appointed and paid for by CODEMIA, operate the gates.

After receiving water at its *óvalo*, each of the 59 communities delivers it to their users according to their own rules (which vary notably among communities). Their own presidents regulate water allocation and distribution to individual water users. Communities also organise maintenance, infrastructure improvement and fee collection. Many communities have constructed reservoirs and a piped distribution system to individual plots. In communities with small flower producers cropping up, water meters are installed in the piped systems to monitor and control the volumes delivered to each water user.

Aside from the unequal water allocation, irrigation water is also stolen. Especially in drier periods, at night flower companies send armed guards, while communities organise *rondas*, groups of men armed with *machetes*, to defend the water scheduled to their communities (Hidalgo 2010). Moreover, some flower companies pump water

from the canal to irrigate flowers upstream of the canal (on the uphill bank) which is against CODEMIA's rules.

In several cases, a major flower company's intake from the main canal is located inside its own property, so neither the *aguatero* from CODEMIA nor community representatives can enter the property to check whether the gate is opened/closed according to the established delivery schedule.

The differential tariff system (see Box 1) introduced by the Municipality remained in place when CODEMIA took over irrigation system control. As explained above, this system was designed to foster a solidarity mechanism, but ended up being a strategy to get more money by granting extra water to those who paid more.

BOX 1

Fees are paid at two levels: at the first level, all user groups that take water directly from the main canal (big flower companies, big cattle rangers, micro or middle-sized flower growers, or [parts of] communities) pay a monthly fee to CODEMIA. This fee is based on the designed opening of the offtake (1, 1/2, ¼ or 1/8 of a *molino*), the number of days the offtake is scheduled to receive water, and the type of user. The fees, based on a ¼ of a *molino*, according to user types, are US$ 0.40/day for communities, US$ 1.90 for cattle ranchers, US$ 3.75 for small flower growers, US$ 5.00 for mid-sized flower growers, and US$ 10.00 for big flower companies. Thus, big flower companies pay 25 times more per cubic meter than do smallholders. Fees are multiplied by 2 for a ½ *molino* offtake and by 4 for a complete *molino* offtake. This is hydraulically not correct, as the *molino* refers to the diameter of the gate opening, which conveys more than twice the water if twice the size. Thus, users with a big gate pay relatively less per cubic meter.

The monthly fee is the same every month, regardless of actual water delivery. The CODEMIA Board sets the fee based on their planned budget, using revenues collected (some US$ 12,000/month) to pay for management costs, operation and maintenance of the main canal and pay the SENAGUA water-tax. Fees are paid at the office and fee recovery is high, as non-payers are punished by closing their gate.

The second level is fee payments inside communities. Each community establishes its own fees. Total fees should cover the CODEMIA fee plus costs to construct reservoirs, piped systems etc., and operation and maintenance costs inside the community. Most communities charge a volumetric fee (e.g., US$ 1.00 per hour for non-flower producers and US$ 2.00 per hour for small flower producers).

Although the unequal water allocation system and the differentiated tariff system are relatively 'stable arenas' (without fundamental changes during recent system governance transformations), they do constitute points of reference and dispute when diverging value systems clash.

3.5.3 Emergence and growth of small local rose farms

Since ca. 2008 all irrigation sectors have seen the emergence of small (up to 2-hectare) flower farms owned and managed by local people, many if not all of whom had worked for large farms. Very small greenhouses have materialised both within urban conglomerates and next to oxen-ploughed corn and potato fields. A GIS analysis shows that in 2002-2003 there were no small flower farms in any of the sectors, while in 2013 there were close to 300, especially located in Tabacundo and La Esperanza and, to a lesser extent, in Tupigachi. Even Ayora and Olmedo show scattered small flower farms located at very high altitudes (Table 2.1).

As explained above, some small flower farms were established with help and financing from a big flower company to whom the small rose producers sell their flowers. In this way, some big flower companies seem to have evaded CODEMIA's ban on greenhouse expansion and probably evade strict control of production and labour conditions. Other smallholders have established their small greenhouse without direct assistance from a flower company. Some received a loan from an intermediary or the Banco de Fomento (a State bank that provides loans at preferential conditions to smallholders). Smallholder flower producers are not organised into producer associations and have no shared post-harvest facilities, so they depend on intermediaries or big flower companies to be able to export their flowers.

The amount of land devoted to flower farming in the Tabacundo irrigation system has not yet increased substantially with emerging small rose farms. Up to 2013, a total of 102 hectares of small flower greenhouses had been installed in the area. They use some 5 percent of the irrigation water, which is about one third of the water allocated to smallholder communities. Nevertheless, the seemingly uninterrupted growth of small rose farms raises much concern about the allocation of scarce irrigation water. The allocation of the canal's water for subsistence crops is not year-round and not sufficient to grow roses in greenhouses.

This boom of small flower producers in certain irrigation sectors while not in others does not relate to biophysical conditions, as explained above, but to collective water rule-making structures and community leaders' discourses and framing in these sectors. Community leaders in the upper sectors (COINOA, UNOPAC and TURUJTA) have stated that they are against flower farms, big or small, but that the communal assemblies hold the final decision. That is how some small flower farms got permission from the community. A TURUJTA leader says:

> *"Those farms already established cannot be ousted, but it is important to set limits; yet that is going to be tough. Currently we do not have any instituted boundary"* (President of TURUJTA, 13/10/2013).

In the tail-end sectors, Tabacundo and La Esperanza, floriculture is growing, and their framing and practices are different. Here, communities also decide on whether or not to allow new small flower producers. Community leaders express their concerns about prohibiting smallholder flower farms and the re-valuation of so-called 'appropriate water uses' is more prominent. A former president of the Santo Domingo 2 water users' organisation, states:

> *"How can we say 'yes' [about establishing flower greenhouses] to some and 'no' to others? It would imply an unjust denial of the opportunity to get a better income for fellow* comuneros*"* (President, Santo Domingo 2 WUA, 25/10/2013).

Thus, despite strong framing against more flower production, most irrigation sector presidents do allow establishment of new (mainly small) flower farms in their sectors. Their main argument is that they cannot oppose community decisions or be unfair to the majority.

The financial incentive for smallholders is high. Apparently, the potentially income is high, and they accept (or are not yet aware of) the high risks. As of April 2015, a small rose farmer[21] averages about 0.17 US$ per rose via intermediaries.[22] They can

[21] Pers. comm., Ana Farinango, small intermediary-dependent rose farmer, interviewed April 4 2015.

[22] Up to November 2014 she could get as much as 47 cents per flower until prices plummeted due to international economic dynamics.

harvest some 100 roses per m^2/year (Franze and Ciroth 2011). This means that a small greenhouse of 0.25 ha generates a turnover of about 43,000 US$/yr, which will repay the investments over 10 years (some US$ 60,000 for the greenhouse and patents for the roses) and interest of some US$ 9,000/yr (assuming an interest rate of 5% per year [only possible with government loans]). With other production costs, such as fertilisers, energy, irrigation water, transport and insecticides, estimated at some US$ 10,000/yr, the average income for a small rose grower family (assuming three family members can work fulltime in the greenhouse and no other personnel is hired) of some US$ 24,000/yr. An alternative wage-labour income (at US$ 300/month) for three family members is around US$ 10,800/yr (assuming year-round full-time employment). Alternatively, subsistence-crop income at local prices for the total 1.0 hectare they own would be some US$ 5,500 (assuming production of 10 MT/ha of potatoes at US$ 0.5/kg and a second crop of corn, 1 MT/ha, at a farm gate price of US$ 0.5/kg). Thus, the income from the small rose farm seems financially attractive.

Several small flower growers also express their pride as independent entrepreneurs in the flower sector:

> *"Not only can I receive more money, but with the greenhouses I am also free from floods and frosts. I care for each one of my roses as if they were my daughters, not as in large farms where they expect a percentage of spoiled flowers"* (Small flower grower, Santo Domingo 2, 28/03/2013).
>
> *"With flowers I have been able to keep my family together. It is also for psychological reasons that I preferred flowers over cattle or vegetables"* (Small flower grower, Tabacundo, 13/06/2013).
>
> *"I am not getting ahead by standing here with my arms crossed! This is really hard work, but it helped me finally pay for my son´s vital hernia operation"* (Small flower grower, La Esperanza, 01/04/2013).
>
> *"A brother of mine, who was against this rose business, now realises it works and wants to plant his own little roses. We could work together and post-harvest and transport ourselves"* (Small flower grower, Olmedo, 27/03/2013).
>
> *"I thought first of planting tomatoes because I needed more cash, but since I worked at large rose farms I decided to go with flowers… I am doing quite well; the problem now is that the community has decided to prohibit*

more plantations… now I can't expand" (Small flower grower, Tabacundo, 07/10/2013).

However, the financial risks are very high: pests, diseases, low prices, lack of water and laborers, use of unfashionable varieties, land ordinances, etc. might all drastically diminish the income for the small rose producer. In addition, small rose producers report problems collecting their payments from intermediaries.

Small rose producers' high (potential) income puts pressure on food sovereignty framing and non-commodity water use valuation. The small rose growers' sector now generates some US$ 9 million annually for smallholders, using some five percent of available canal water, but this share is rapidly growing. Even community leaders who favour food sovereignty framing hesitate to prohibit small-scale flower production because it deprives fellow *comuneros* from potentially higher incomes. If asked about the decision-making process and rules about new flower greenhouses, community leaders 'pass the buck'. They want the Municipality, the Parish or CODEMIA to prohibit flower expansion. The growing number of smallholders turning to rose production (some of whom may be big companies 'in disguise') makes water allocation an increasing problem. Allocation to the subsistence sector is already low (only some 15%), so now also the big flower companies' share of water (now 55%) is under stress. Big companies will not readily agree to another cut in their water assignment. Ultimately, the fight over allowing smallholders to grow roses is a fight over water control. This battle involves different social groups, in particular smallholder food-producing communities, large flower companies and small flower growers, all embedded in a broader arena constituted by, among others, local municipalities, supplier and buyer intermediaries, politicians, banks, and others. In this arena, water valuation languages and water use valuations are dynamically deployed, in such a way that, between the 'poles' of 'food or flowers', many hybrids develop. Ultimately, they all strategize to creatively enhance 'recognition', 'representation' and 'redistribution' in ways that may materialise their interests in the definition and implementation of 'appropriate water uses'.

3.6 Discussion

Here we want to reflect on the "values-based political ecology" approach applied to analyse the Tabacundo irrigation system. The three 'locations' of struggle used by Nancy Fraser – recognition, representation and redistribution – have proven useful to understand the complex struggles over values, the diversity of strategies and the distributive effects.

Stakeholders gain relative power if others *recognise* their values and interests. They use strategic framing to advocate their values and to gain legitimacy for their claims. Discussions on community water governance, in particular new-institutionalist perspectives, habitually neglect the diverse values and multiple identities and discourses within communities. For instance, the widely used eight "Design principles for Common Pool Resource (CPR) institutions" by Ostrom (1990) imply a rather homogenous community and common interests. While the Ostrom school later incorporated more variety (e.g., Ostrom 2009), its universalist neo-institutional language and approach continues to struggle with fundamental concepts such as contextuality, cultural diversity, power differentials and contingency (see, e.g., Duarte-Abadía and Boelens 2016; Espeland 1998; Rodríguez-de-Francisco and Boelens 2015). In practice, not only is the value of the water itself disputed, but especially the value of water use, and also the value of who controls the water. In this sense, water rights are not only sustained by local principles such as 'hydraulic property' (Boelens and Vos 2014), but also by recognition of a legitimate value for irrigation water use. And here, as the Tabacundo case shows, the battlefield of valuation systems and languages is not simply restricted to 'capitalist versus non-commodity producers'. Value perspectives driving smallholder flower producers, such as individual self-determination, individualised water security, externalization of farming rationality and knowledge, and commoditization of inputs and outputs, are not always or necessarily shared by smallholders who use irrigation water for food crops and who may see flowers as a, perhaps too far-flung, way to escape poverty.

So, recognition of values significantly involves the struggle for *representation* on decision-making bodies. Studies of community water governance (e.g., Lam 1999, Ostrom et al. 1999, Agrawal 2001) do not usually pay much attention to how legitimacy for communal leadership is tied closely to regional and national political ideas. Power differences and conflicts within communities tend to increase when

government regulations recognise, make explicit, or de-legitimise the community leadership's values. Within communal leadership institutions, the dynamics of communal water resource management are complex and Janus-faced. In Ecuador, the Tabacundo irrigation system leaders could remain in power by strategically framing their claim to governing water in 'indigenous movement' language, while also strategically using the financial benefits derived from allocating water to commercial flower producers, who pay 25 times more per cubic meter of water. Community leaders 'passed the buck' of forbidding proliferation of small flower greenhouses, dodging the responsibility for taking potential income away from their fellow community members. Discourse shopping, creatively drawing sometimes on indigenous/food security discourse and at other times on the discourse of neoliberal entrepreneurship, is part of this strategy.

The struggle to *redistribute* access to productive resources and income in Tabacundo is clear at different levels. Flower export earnings are significant. Studies on community water governance often assume that irrigated crop production is for subsistence or the local market. When commercial agriculture depends on community water management, other dynamics are at play, rather than the neo-classical economic thinking of individual profit maximization. In addition, 'moral economy' explanations fall short because risk aversion and solidarity are not central to smallholders' choice to grow flowers for export. Values of pride, economic returns and self-determination or food sovereignty seem to be more important. Thus, the struggle to control water implies a struggle over irrigation system imaginaries (either as food provider or exporting hotspot), but also over income generation possibilities. 'Profitability' is central to the observed shift of smallholders from working in big flower companies to establishing their own relatively independent flower production units. This has created a new set of practices and behaviours that feeds the notion of frames as dynamic, adaptable entities. This new frame can be seen as a dialectical result of the confluence of two previous ones, the agribusiness and the food-security ones, which is actually not new to Ecuadorian Andean communities. Something similar happened with the adoption of cows by communities after *haciendas* turned to pastures from traditional agriculture decades ago. It remains to be seen if the new frame will reflect a successful way to cope with ever-more-rapidly changing realities or not.

What will happen with local flower farms? If they succeed, beyond a few isolated cases, several things could ensue. Local non-commercial values will get a (further) setback. Agribusinesses and local authorities will have to respond and adapt, and their own discursive frames will evolve. All this would develop within a socio-environmental setting where irrigation water is getting increasingly scarce because of growing demand (more uses and users) and lesser availability (e.g., climate change and environmental degradation). Even without this full scenario, the apparent lull without numerous, deep, overt conflicts among current irrigation frames could escalate toward a more active situation in which recognition of local values and knowledge, representation in local political decisions and redistribution of a scarce, vital resource will be critical.

Using strategic framing and valuation languages to understand struggles over the three R's yields interesting insights into these complex, layered struggles. Strategic framing is dynamic and requires interpretation of stakeholders' values and interests and the framing context. As framing changes and adapts to the context, frame interpretation must be integrated and heuristic (see Noack and Pouw [2015] for a Kenyan case). Therefore, it is essential to observe actual practices, including biophysical analyses such as hydrology (climate change, crop water needs) and hydraulics (in water distribution). Financial analyses also further fathom economic interests and valuing. They all converge in the arena where divergent water valuation languages are being disputed, transformed, and strategically blended.

3.7 Conclusions

The communally managed Tabacundo irrigation system in the Northern Andean Mountains of Ecuador has some uncommon features: most of the increasingly scarce irrigation water is used by about a hundred big export flower producers; we found broad diversity in rules on water use in the different irrigation sectors of a single system; and recently smallholders have established their own small flower greenhouse boom.

The present-day skewed access to canal irrigation water in the Tabacundo irrigation system, a legacy from the *hacienda* era, was not challenged much by the smallholder-controlled water user organisation that took over irrigation system control in 2006. Smallholders in the two irrigation sectors with the most flower companies accepted their vested water rights, and most smallholders believed water for the big flower

companies was good as it generates income. However, the boom of small-scale flower production by smallholders is increasingly coming to the fore economically and socially. Beyond dichotomous conflicts between large capitalist flower growers and haciendas versus community subsistence agriculture, this generates growing intra-community debates and conflicts and significantly challenges the existing community allocation rules' moral values. It also leads to actors' strategic shopping in and creative blending of multiple 'food' and 'flower' discourses and valuation languages, renewing and upsetting existing perspectives on water use values.

Only by carefully identifying stakeholders' strategic framing and practices, scrutinizing resonance of values that produce legitimacy for claims and authority, unravelling interaction and investigating changes in actual water distribution and economic behaviour, can one understand the interplay among values, framing, and the resulting communal water governance.

CHAPTER 4

FOOD OR FLOWERS? CONTESTED TRANSFORMATIONS OF COMMUNITY FOOD SOVEREIGNTY AND WATER USE PRIORITIES UNDER NEW MARKET AND LEGAL REGIMES IN THE ECUADORIAN HIGHLANDS[23]



Cows and roses compete for dominance in the rural landscape of Cayambe

[23] This chapter is based on:

MENA-VÁSCONEZ, P., BOELENS, R. and VOS, J. 2016. *Food or flowers? Contested transformations of community food security and water use priorities under new legal and market regimes in Ecuador's highlands*, Journal of Rural Studies 44:226–238.

4.1 Introduction

In the early 1980s large farms with national and international financing started growing roses for export in Ecuador's highlands, especially in some northern inter-Andean valleys. This boom started amidst a globalising, neoliberal environment, taking advantage of exceptional biophysical and societal features (Gasselin 2001; Brassel and Montenegro 2011; Harari et al. 2011). Rose agribusinesses can be seen as the latest player in a history where local communities have struggled to keep their rights over irrigation water and other crucial resources against powerful external actors, i.e. national (urban) and international investors (Breilh 2007; Guerra 2012; Hidalgo 2015).

Large-scale flower farms mainly utilise the land of *haciendas*, which commonly have water concessions and for centuries used it Andean crops and pastures. While acknowledging that flowers provide jobs, local communities have expressed concern about the impact of these activities on local water security and food sovereignty by yielding a non-edible, individually produced commodity, with high water demand and aimed at the international market (Soper 2013; see also Anderson 2013). Flower firms retort that rose agribusinesses have modernised the regions where they flourish, and enhanced local purchasing power; thus, floriculture has contributed significantly, albeit indirectly, to improving local food availability (Zapatta and Mena-Vásconez 2012).

The tense social context has been largely understood as a conflict between the production of large-scale commercial flowers for export vs. local production for food security and sovereignty, a conflict that has included – as shown by Hidalgo (2010) – overt situations involving bribing, water theft, and mobilisations (see also Soper 2013). However, the recent boom of very small rose farms managed by peasant families has rendered this dichotomy inadequate. Some local households have tried to follow the promises of modernisation, replicating capitalist technologies and practices, and now engage in the risky endeavours of export farming. This phenomenon intensifies water use for export crops in a region already suffering from water scarcity, and significantly adds complexity to irrigation water use and rights conflicts in the valley (Zapatta and Mena-Vásconez 2012).

Aside from pollution and health problems (e.g., Breilh 2007), water over-extraction and large water demands by a (flower-growing) minority generate tensions inside

communities. Moreover, community collective water control faces internal divisions and new individualised needs. Local discourses defending water for food sovereignty are now being threatened. Concomitantly, many community members do understand their neighbours' wish to 'follow their dreams' (see, e.g., Gasselin 2001; Hidalgo 2015).

Parallel runs a changing institutional and legal setting. The current (2008) Ecuadorian Constitution categorises water use types (Article 318); rose farms' use is classified as 'productive', falling into the lowest status below 'human consumption', 'irrigation for food sovereignty', and 'environmental flow'. The Water Law (2014) and its upcoming by-laws are expected to regulate and control implementation of this categorisation. Given the deep contradictions in actual water control situations, this seems to be more a formal declaration than an enforceable policy. In the field, local water users' organisations have traditionally defended their water rights against the agribusiness, but now must deal with their own members' small local rose farms.

This chapter focuses on peasant families copying the capitalist export farming dream, producing new water-related complexities, and water rights prioritisation regarding agricultural water uses – 'food versus flowers' – both in everyday water rights conflicts and under the new Water Law. It discusses how the material and discursive water rights conflict between flower export agriculture and subsistence-based food production has evolved with diversifying local production relationships and changing national water priorities.

The main question for this chapter is: How can the recent appearance of small local floriculturists be explained and how does it fit into the food/water security-self-determination vs modernity-efficiency controversy in discursive, legal, and factual terms? Four related sub questions that will be answered are (a) What modes of farming prevail in Tabacundo and why did some smallholders change from subsistence to small-scale flower production? (b) How did this induce conflicts over access to and control over irrigation water? (c) How does the Ecuadorian government plan to intervene in the water rights through prioritization of water use? And (d) How does the prioritization regulation affect the autonomy of water control by the smallholder communities?

The study was carried out in different periods from October 2012 until October 2014, with follow-up research in 2015 and 2016. The fieldwork included participatory observation and structured and semi-structured interviews with large and small

flower farms. Farmers were selected so to have representative information from all irrigation sectors of the two main irrigation systems with flower production in the watershed: The Pisque canal and the Tabacundo *acequia*. Next to questions about production figures, rationalities and histories, interviewees were asked about the fundamental reasons for establishing their rose greenhouses, and concerning their dreams, motives, aspirations, and desires, as well as role models that have prompted their resolution to do so. Also, interviews were conducted with authorities at various administrative levels, community leaders and Latin American academicians involved in the Ecuadorian debate on the new water legislation and food sovereignty issues. Structured feedback and debates on the preliminary research findings were organised with political ecology scholars in two Water Justice alliance meetings in Quito (November 2013) and Cusco (November 2014).

In the Santo Domingo community, an in-depth study was done around the case of one small flower producer. Interviews were conducted in Spanish (fluently spoken by the authors). Additionally, two workshops were organised with community members to discuss current developments in the agricultural and water domains, the impact of flower businesses on community dynamics, as well as the influence of new constitutional and legal regulations. An audio-visual documentary was made with food and flower growing communities, serving also as a discussion and reflection instrument among researchers and peasant families. The maps were based on available satellite images.

In these lines the theoretical framework using the concept of 'mimetic desire' to analyse the driver of peasants to shift to an entrepreneurial mode of farming is explained. Then, the historical development of agrarian change and water management and conflicts in the region is summarised. To illustrate the socioeconomic and politico-cultural relationships and locally specific dilemmas regarding the 'food or flower' debate, the case of a community is presented where some smallholders have decided to follow the floricultural path. Next, there is an examination on whether the new water law and its changing legal priorities regarding water uses could be beneficial for the smallholder communities. After a discussion, conclusions are offered.

4.2 Conceptual framework

The research follows a political ecology approach to examine the change in mode of farming, water conflicts and water uses prioritization, focusing more in particular on contradictions and interactions among community and commodity spheres (Golte and de la Cadena 1983; Zoomers 2010; Boelens et al. 2014; Higgins et al. 2014; Cid Aguayo and Latta 2015). It elaborates on the modes of farming and the shifts induced by 'mimetic desire' mechanism in the social construction of needs and scarcity (Girard 1961; cf. Illich 1978 2005; Achterhuis 1988; Achterhuis et al. 2010). Finally, we link the social construction of needs to the water prioritization regulation introduced by the Ecuadorian government and analyse how it effects the autonomy and water control by the water users' communities.

4.2.1 Commodification of the peasant mode of farming

To understand the dynamics of the shifts in orientation of the production by part of the indigenous peasants [24] from subsistence agriculture to small-scale flower production we start with looking at the spheres of production and reproduction of the peasant households and communities. The reproduction and production logic have changed under the influence of the capitalist mode of farming. Three (interconnected and overlapping) modes of farming may be distinguished in Andean agriculture: the peasant mode of farming, the entrepreneurial mode of farming and the capitalist mode of farming (Van der Ploeg 2008).

In the peasant mode of farming the means of production are mostly owned by the farmers' family. Implicitly, the main purpose of the agricultural production process and its underlying rationality is the reproduction of family livelihood. Part of the production is for consumption of the family and the surplus can be exchanged or sold on the local market. The majority of inputs for the agricultural production is

[24] The concepts of 'indigenous', 'peasant' and 'community' are used as contextual, dynamic, relational constructs. In the Andean region, as Boelens observes: "the class-based definition (peasant, *campesino*) melds with ethnicity-based identification (indigenous, *indígena*) in complex, fluid ways, depending on who uses which labels in what period, context or place. ... Both *campesino* and *indígena* concepts are part of fiercely debated identity politics. In the Andes, indigenous groups commonly use territory-bound names to refer to their identity" (2015:36). All smallholders in the Pisque region are considered *campesinos*, and most consider themselves *indígenas*. In this text there is no distinctions made between different types of smallholders and use the category of peasant and indigenous interchangeably.

produced on farm. The income of the farmer's family is sometimes complemented with off-farm employment (locally or by temporal migration). While necessarily engaging and being confronted with capitalist production environments, the inherent rationale is that non-commodity Andean relationships warrant long-term reproduction and offer protection against the vicious circles of poverty, debt and exploitation (Boelens et al. 2014; Mayer 2002; Van der Ploeg 2008).

In the entrepreneurial mode of farming the means of production are mostly owned by the farming family. The largest part of the family farm's agricultural production is for the market. This can be the local, national or international market. An important part of the inputs is bought on the market. The family members provide most of the labour force, but some complementary labour might be contracted. Oftentimes government programmes support the entrepreneurial mode of farming. Specific training and credit programmes are directed to stimulate small scale farmers to make investments to increase production for the market. Nevertheless, in most Andean livelihoods actions in the non-mercantile sphere have not been all supplanted by purely commoditised relationships, despite intensification of a long-running capitalist penetration (cf. Rodríguez de Francisco et al. 2013; Duarte-Abadía et al. 2015). Especially water control has been a mainstay of collective action. For local families and communities, irrigation cannot be sustained and reproduced within exclusively mercantile relationships.

Mercantile relationships – apart from unjust exchanges – can offer important temporary solutions and opportunities, yet without guaranteeing stability for producers with scant subsistence resources. Due to the unfavourable characteristics of Andean peasant agriculture (small, fragmented plots in fragile, steep terrain) and to the asymmetrical exchange relationship in the marketplace, peasants get insufficient value for their products and labour to be able to subsist in a purely mercantile economy: they need to pursue a non-mercantile economy while balancing their interactions with the commodity economy (see Mayer 2002; Van der Ploeg 2008; cf. Shucksmith and Rønningen 2011). The capitalist system uses and exploits peasants who, in turn, manage to use the market to ensure part of the household´s and community's production and reproduction. Dealings between 'community' and 'market' are mutual but not equivalent: they are grounded in unequal powers and on the continuous extraction of resources possessed or generated by peasants.

In the capitalist or industrial mode of farming the means of production (land, labour, machinery and inputs) are obtained through the market. The goal of the agricultural production is the accumulation of capital by the investors. This mode of farming is also frequently supported by national governments through agricultural sector policies and infrastructure development.

These modes of farming do not exist in separate spheres. There is competition over land, water, labour and other resources. The modes of farming are also mutually dependent and entwined through asymmetrical power relationships; for example, peasants may work in entrepreneurial farms or capitalist estates as temporary wages labourers. In that way the estate benefits from the reproduction of labour in the peasant sphere of farming, and the peasants sustain their livelihoods partly with income from their off-farm employment.

4.2.2 'Mimetic desire' as driver for change from peasant to entrepreneurial modes of farming

In these lines we analyse the drivers of farmers to shift from the peasant to the entrepreneurial mode of farming. There are many drivers triggering this shift. Enabling conditions are state programs for subsidies, credit, training and infrastructure (Van der Ploeg 2008). Moreover, many regulations exist to push farmers towards the market and intensify production. Also, the socially generated need for financial resources increases in many regions because services like electricity, piped water, mobile telephones and consumption goods become available. Moreover, health care, education and other public services are increasingly privatised (Mayer 2002). Literature has examined such processes of societal and agro-productive change using a variety of approaches, ranging from political economy to market/management studies.

A factor, not much highlighted in academic literature, is the changing aspirations and demands of peasants; the cultural-political and psychological inclination to 'become like the big farmers'. René Girard (1961) and Ivan Illich (1978, 2005) called this 'mimetic desire'. Neo-classical economics does not look at the generation of the demand: demand is studied through the price paid and price elasticity and satisfied through commercial exchange. Scarcity, therefore, would be established by laws of demand and supply, in direct relation to 'nature's available resources'. Political economy and political ecology studies, however, have shown how scarcities are not

natural and nature-based but politically and materially manufactured by dispossession. Girard's notion of mimetic desire may deepen such a perspective,[25] showing how in modernist (and commodifying/capitalist) societies demands cannot be satisfied; 'scarcity' and 'needs' are ever expanding. The neighbour always has something 'more', new objects of desire; the goal 'to be like the other' can never be attained. This creates a spiralling demand for productive resources. Being like a big farmer is impossible to attain because the smallholders do not have the same networks, access to capital and knowledge about the market, political influence, and advantages of scale. This disadvantaged position of the smallholders often leads to great production and financial risks and (self-)exploitation.

Girard (1961), Illich (1978; 2000; 2005), Foucault (1980; 2008) and Achterhuis (1988) have elaborated on this notion of the societal creation of needs: production also produces the very producer. Besides the lack of resources according to certain absolute needs, needs are strongly mediated by 'the conditions and possessions of the Other'. Different from 'absolute subsistence needs', these 'relational' needs emerge from a comparison among humans. Lack of material and immaterial properties is measured in accordance to what *others* value: it is fundamentally mediated by the norm-providing model. Girard (1961) shows how the mechanism of 'mimetic desire' makes that we are not autonomous; we copy our desires.[26]

Because the need for the object is relative, the result is competition to acquire resources that are scarcer and always insufficient. Relative needs do not refer only to material resources, such as water and high-tech infrastructure, but also to non-material or abstract objects, e.g. development services, irrigation expert knowledge, etc. Moreover, these abstract needs increasingly expand the want for material needs

[25] Mimetic forces are not suggested here as having *more* or *better* explanatory power than other politico-ecological theoretical bodies. Many interrelated variables play a role to facilitate the move towards flower production (for instance: access to credit, knowledge, market prices for inputs, labour and flowers, etc.). However, mimetic desire addresses the question of why a smallholder would want to change the mode of farming. This understanding of smallholders' drive to engage in agro-export farming mimesis is often neglected in political economy/ecology and modernisation/developmentalist studies.

[26] The relationship between the subject (peasant family) and the desired object (flower smallholding) is not direct, but responds to a triangular relationship of the subject, the model (the capitalist entrepreneur's management, technologies, etc.) and the object. The model is the 'mediator'. This mediator is 'external' when actually beyond the social reach of the subject, or 'internal' when subject and object are of the same social standing. In that case, the mediator becomes the rival, and an obstacle to acquiring the object (Girard, 1961).

(Achterhuis 1988; Illich 2000), simultaneously reinforcing the farmers' dependence and subordination.

Mimesis forms part of the smallholders' drive to engage in export-oriented farming and high-tech modernisation (see Taussig 1980). During more than three decades of research in Andean countries we have witnessed how mimetic mechanisms – either imposed, see e.g., Lukes (2005) or through unconscious capillary forces of normalisation, see e.g., Foucault (1980, 2008) – strongly underlay, accompany and complement the cultural politics of water control and the political ecology of livelihood development.

Following Foucault's (1980; 2008) ideas about capillary power and disciplinary normalisation, capitalist flower growers, engineers, and local water users are all effects and vehicles of this power that produces and constitutes them as 'subjects'. The more all want to join in the values, knowledge and benefits of modern agribusiness and water management (and thus be 'equal') and place themselves under mutual scrutiny and self-surveillance, the more this normalising power is deemed productive, beneficial, and efficient. It generates a desire to fit into a 'modern water culture'. This 'equality imperative' makes it easy to measure subjects according to the degree to which they fit the model. Hence, normality is not a stationary condition but the potent desire to belong to the model's mirror community and become its image. Previously excluded groups feel the obligation and need to participate in a game with new rules for their lives, communities, irrigation systems, and households. Yet, despite these unleashed desires, the less privileged cannot meet the equalisation standards. Their participation often results in frustration due to a constant self-measuring in relation to a continuously refined and unreachable norm (Boelens 2015; see also Illich 2005; Allen 2013).

In the Andean communities, just some decades ago this mutual comparison was restricted by explicit social hierarchies and cultural barriers. This produced a limitation on the 'equalisation mechanism' (often also through violence and oppression): ideologies of colonialism, inequality and natural hierarchy prevented comparison with the feudal landlord. But modernist capitalist production rationality builds on the (neo)liberal promise of equal opportunities for all (in a market-commoditised environment of supposedly equal, individual utility-maximisers). Consequently, it generates the need to consume expert knowledge for modern production and water-distribution techniques, and also produces subjects who ask to

become like (mirrored) 'successful actors' and follow their expert models. Thereby, these new 'needs' actively generate new water scarcity; water-intensive market crops replace local-market and food crop security mixtures: as market-competitors, new producers claim 'their' (usually larger) portion of available water, ignoring local balances of 'social water efficiency' and abolishing local rationalities of supply and demand (Boelens 2015; see also Achterhuis et al. 2010). Thus, water scarcity is a not natural phenomenon but socially constructed by the needs of the stakeholders (Mehta 2005; Samuel and Robert 2010). In a similar vein, Swyngedouw (2006) argues how nowadays the social production of water scarcity is a common water governance strategy to make markets seem 'inevitable' – water markets depend on the existence of scarcity. Lynch (2013) shows how the Peruvian government, by over-stimulating capitalist export producers' water demand, actively engineers water scarcity, including the need for large-scale infrastructure and water markets.

4.2.3 Conflict, water rights and water use prioritization

Water is an essential resource for agricultural production. In arid and semi-arid regions, the spiralling demand for water creates conflicts over its control. In most regions access to irrigation water is regulated through a rights system. Water rights not only involve the regulation of benefits and obligations regarding water use but also establish the rules about authority and are related to a particular set of norms and values. In neo-classical economics the 'initial distribution' of water rights is not important, since under free market conditions the most competitive producer will be able to obtain the water rights, and this will be regarded as 'efficient economic allocation', 'good for all' (the 'Pareto efficiency'). In contrast, for political ecology theorists the distribution of water rights is important as access to water is essential to sustain smallholder livelihoods. Peasants will refrain from selling their water rights because these are controlled collectively, and the money obtained from selling the water title will not be sufficient to sustain livelihoods and communities.

Unlike government-granted water rights – which in Andean countries are commonly related to individuals paying fees – community water rights as in the Andes are granted to families for belonging to a collective and for meeting the corresponding collective-labour, organisational and fee obligations (Achterhuis et al. 2010; Gelles 2010). Families build identity, and identify with collective water cultures, by fulfilling irrigation tasks and obligations; the rights of individuals stem from, and

are embedded in, their collective rights and duties (Boelens 2015). Similarly, water rights and usage norms are part of the overall set of community norms. Water-related infractions may be penalised in other fields of community life and vice versa. By contrast, in regions and systems where water rights have become strongly individualised, rights and duties have become 'dis-embedded' and separated from other fields of community life. Usually individualised rights frames allow holders to transfer property (lending, renting or sometimes even selling it, even if not legally allowed, as in Ecuador). This commonly has resulted in a redistribution of rights according to prevailing socioeconomic relationships and buying power. Users compete within their systems, which used to be collectively managed, often endangering their reproduction and aggravating conflicts (see e.g., Achterhuis et al. 2010; Lynch 2012; Roa-García 2014). To avoid such internal competition, communities and water collectives in the Andes make large efforts to keep their members 'inside'.

The promulgation of a law to redefine water use priorities commonly is a fiercely debated issue, seen as a potential, fundamental intervention in existing on-the-ground water rights and local water use practices. Whereas previous neoliberal governments in Ecuador, since the early 1990s, have attempted to install market-based water allocation mechanisms with as few social priorities as possible, the current regime – importantly stimulated by the social movements that initially helped the government in power – has strengthened the social and livelihood-based water use priorities.

4.3 Flower production and water control in the Pisque watershed of Ecuador

4.3.1 The rise of the flower business in the Pisque watershed

The Pisque watershed (Figure 4.1) has been an agricultural region since pre-Inca times, first mainly for native corn, potatoes and other tubers, later intermingled with European crops (wheat, barley, onions, alfalfa and cattle grasses). Since the colonial area the *hacienda* institution (large feudal landholdings) dominated the socioeconomic and political landscape of the area for centuries, using forced labour by the land's original owners and encroaching on their land and water rights (Becker and Tutillo 2009). Even if large landowners allegedly provided safety, education and catechisation (the *encomienda* and *mita* institutions), the relationship was actually

one of slavery (Mayer 2002). Labourers were counted as property and lived in extreme poverty, which included very limited access to water. Some *haciendas* became immense estates and the indigenous population was gradually pushed towards higher, colder, unproductive zones in the Andes (Mayer 2002). Agrarian reforms were enacted in the sixties and seventies of the last century to redistribute land but achieved little in terms of structurally improving indigenous subsistence agriculture (*minifundismo*) (Zamosc 1990).

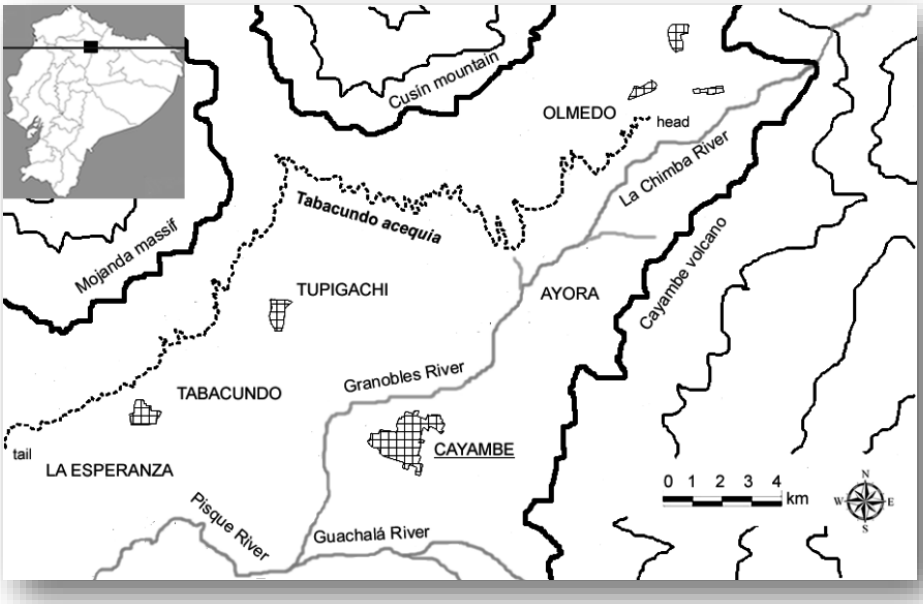


Figure 4.1. The Pisque watershed's main geographical features. The inset shows the location of the watershed in Ecuador

Haciendas usurped water of early irrigation systems from the local population or ordered local workforce to build new ones, but their aim was not to produce beyond self-sustainment and some local marketing (Becker and Tutillo 2009). A notable change took place in the 1960s when *haciendas* fully entered the national market. The impossibility of expanding the agricultural frontier to higher grounds and a State-lead protection against international competition motivated the use of their flat, irrigated lands for cattle grazing. The need for labour decreased and indigenous people found themselves even more confined to marginal lands (Korovkin 1997).

Many communities started to combine *minifundio* staple foods with livestock. In the region, milk and its products were generally perceived as contributing to food sovereignty, part of the local diet, or sold in local and national markets.

The arrival of floriculture was a new shift strongly fostered by neoliberal policies that took place in the early 1980s (Cremers et al. 2005; Soper 2013). International investors and landowners took notice of the exceptional biophysical niche, the abundant and relative cheap labour, and the market-oriented government regulations. They established export-rose farms on the remaining *hacienda* lands (Korovkin and San Miguel-Valderrama 2007; Hidalgo 2015). Relatively good roads and the nearby airport enabled the transportation of flowers (Guerra 2012). Favourable fiscal and market conditions instituted enhanced competitiveness, bolstered by foreign investment (Acción Ecológica 2000; Sawers 2005a,b; Hidalgo 2010; Soper 2013).

In 2014 Ecuador was the third largest exporter of flowers, behind the Netherlands and Colombia (UN Comtrade 2018). Volumes went up from ca. 8,000 tons in 1990 to ca. 139,000 tons in 2014, representing an increase from 0.5 to 4 per cent of total Ecuadorian exports, from 14 million to 798 million US dollars (Guerra 2012; UN Comtrade 2018). The study area is one of the main global zones of flower production in the transitional economies with Bogotá (Colombia), Naivasha (Kenya), Arusha (Tanzania) and Central Rift Valley (Ethiopia) (ProEcuador 2013; Bont et al. 2015). These zones lie close to the equatorial line and benefit from several comparative advantages: constant day-length and high insolation; cool temperatures in mountainous areas; low labour costs, and proximity to international airports. In all of them irrigation water is shared, many times in a conflictive way, by communities and flower agribusinesses.

The Pisque watershed concentrates the largest share of the big flower companies of Ecuador, some 150 big (>2 ha) companies produce for the export market. The average size of these companies is 11 hectares with greenhouses. The flower sector employed some 48,000 direct and 55,000 indirect workers (Harari et al. 2011, Guerra 2012; ProEcuador 2013). A decade ago, peasants have started their own small flower greenhouses. In 2015 some 300 small (<2 ha) greenhouses were established by smallholders.

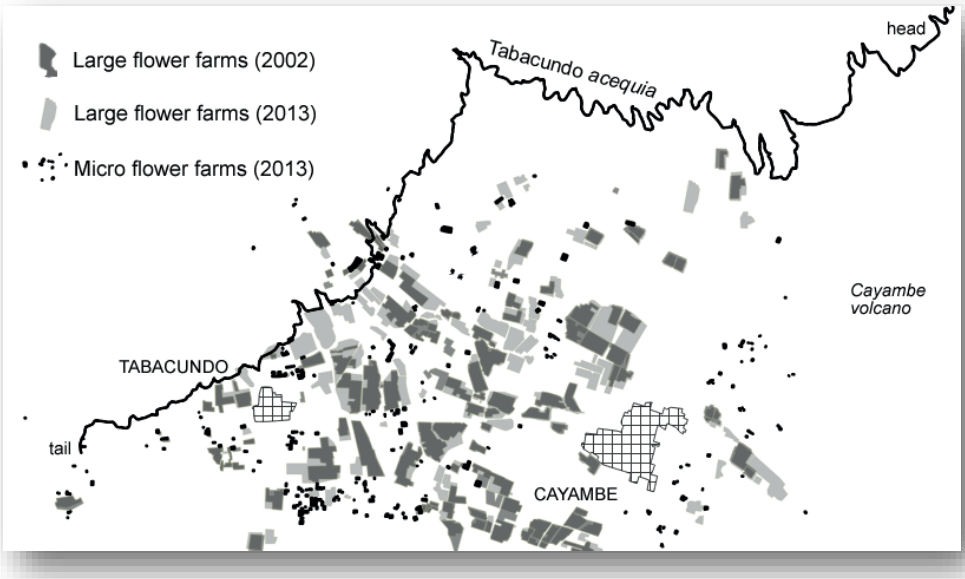


Figure 4.2. The Pisque watershed floricultural development, showing large (> 2 ha) flower farms in 2002 and 2013 (dark and light grey polygons, respectively), and micro, locally managed farms (≤2 ha) in 2013 (small black polygons), of which none were evident in 2002 (processed from Google Earth images)

In the Pisque watershed, water coming down from the highlands is used for irrigation via several systems (Zapatta and Mena-Vásconez 2012). The watershed's main irrigation system used for flower farming, the Tabacundo *acequia* (Figure 4.2), typifies developments in the area. It constitutes a five-sector, multi-community scheme combining small and large farms. Some communities, especially those at higher altitudes and less urbanised areas, have managed to curb the strong proliferation of rose farms; others show a notable and continuous growth of area with greenhouses throughout the past three decades.

Water runs along primarily earthen canals and reaches the plots via open secondary and tertiary canals that start at gates (*óvalos*), controlled manually according to schedules that mainly follow seasonal variations. Some gates along the main canal are used by entire communities, but others are dedicated for one large farm, especially for flower businesses. While traditional agriculture depends on surface irrigation, many cattle grazing farms use sprinklers, while floricultural farms use high-tech drip ferti-irrigation. Large farms possess reservoirs and rain-collecting

facilities to ensure continual water delivery; some even have deep boreholes to pump underground water (Ochoa 2013).

4.3.2 Drivers of change from peasant to entrepreneurial mode of farming: the case of Ana Farinango

> "To be like them. It was the promise of the politicians, the justification of the technocrats, the illusion of the outcast. The Third World will become like the First World, rich, cultivated and happy, if it behaves itself and does what it is told, without saying anything or complaining.
>
> WE CAN BE LIKE THEM, proclaimed a gigantic illuminated billboard along the highway to development of the underdeveloped, and the modernisation of the latecomers.
>
> 'But what can't be, can't be, and more than that is impossible' […] The precarious equilibrium of the world, which is poised on the brink of an abyss, depends on the perpetuation of injustice. The deprivation of the majority is necessary so that the waste of a few is possible."
>
> ("*Ser Como Ellos*", Galeano [1995]).

To provide a better insight in the drivers of change from the peasant mode of production to the entrepreneurial mode of production, the next section will have a look at one typical Pisque watershed community, Santo Domingo, focussing in particular on an illustrative smallholder case.[27]

The community of Santo Domingo II, on the upper Pisque watershed, was part of a large *hacienda* that belonged to the Dominican order. Later, after the Liberal secularisation of the early 20th century, it came under State administration. It was partially distributed among its workers after the agrarian reforms of the 1960s and 70s. Nowadays, most of the plots have been divided among the heirs of the original workers as small parcels. The community has some hundred families dedicated to cattle grazing for milk and cultivating potatoes and corn, mainly for self-supply.

[27] Opinions and information from key actors also include material assembled for the making of the documentary "Ana, Volar sin Alas" (Jellema and Cremers, 2014), part of our research programme.

Many people work for large neighbouring rose farms, where they perform basic tasks.

The small-flower farm boom started a decade ago, when some veteran workers of large rose farms decided to venture into establishing greenhouses on their own plots. In the Pisque watershed less-than-one-hectare greenhouses were absent in 2002, while in 2013 there are more than 300 (Figure 4.2). As Fernando Chencusi, President of Santo Domingo's WUA explained, most peasants combined crops and meadowland, but the area has changed:

> *They used to cultivate crops here. Especially potatoes, maize, wheat, barley. .... Flowers arrived around 1993, 1995... It is either cattle or flowers here. Each plot has it´s assigned water. In case people want to cultivate flowers, they can do so. But if all four hundred hectares were of flowers, there wouldn't be space for cattle and the production of cheese and yogurt.*

Ana Farinango, a woman in her early forties, is one of the *minifundistas* who decided to establish a rose greenhouse on her land, a 6,000 square-metre plot (Figures 4.3a and 4.3b). Having worked for some years at a large rose farm, she became acquainted with plantation and marketing processes. Becoming a rose farmer was her great dream: *"Everywhere I looked, I saw flower farms, and I wanted to do it too*." Divorced, with three children to maintain, rose farming would take her out of poverty, just as the billboards and mass media advertisements explained on every corner of Cayambe's streets, on television, in the local shops: the road to progress, becoming a modern farmer with good income. Roses would also enable her to afford higher education for her children.

What the stories of the 'successful ones' and the dreamlike promises of the commercials did not explain are the manifold risks she had to face: climatically, wind and hailstorms can damage even the most sturdily built structures. Hydrologically, there are signs that, especially during dry spells, irrigation water is waning due to climate change-related variations affecting the icecaps of Cayambe, while competing users block water flowing to the canal she used. Legally, her plantation was located too close to a potentially residential place and could have to be dismantled in a near future. Technically, she did not have post-harvest installations to process or a vehicle

to carry her flowers, rendering her dependant on third parties who were not always readily available, fair in their prices nor punctual in their payments. Financially, although she had been able to pay the loans with few delays, the shadow of confiscation loomed. Using varieties that not necessarily were the most sought-after in the continually changing market for specialty roses was always risky. Also plagues, plant diseases, work related health issues, and decrease in the world-market prices for flowers threaten her business.

Weakly informed about these threats, or closing her eyes to them, Ana followed the rose imaginary and decided to change to floriculture in November 2012. To build the drip-irrigated 3,000-square-metre greenhouse and to buy rose stocks and scions, as well as the first batch of fertilisers, she sold her cow and acquired a debt of USD 45,000 from a State bank and a private loan institution. To obtain these loans she mortgaged the plot, practically her sole possession. The greenhouse frame was built with local eucalyptus poles. She used high-quality plastic material for the greenhouse walls and roof and set up a basic but apparently effective drip irrigation system (Figure 4.3c). Most of the loan was directed to buying plants and chemicals. She was assisted by her new husband and his older sons, to whom she paid the minimum monthly salary (US$ 350).



Figure 4.3. a) Ana with recently planted rootstocks. b) A view of the newly-established small rose greenhouse amidst pastures. c) Part of the drip irrigation system

Ana harvested her first roses in August 2013. Her yield was initially delivered to a local intermediary, Andrés Cacuango, who managed the post-harvest and exportation phases: “Most of my flowers go to Russia, Ukraine, Kazakhstan, Amsterdam.” Ana explained: “He offered to buy my roses, once I produced them... he is my only buyer.” Even if this person was paying her as much as 47 US$ cents per

stem for selected varieties (a relatively high price), payment deferrals had ended in a situation where she is owed more than 9,000 dollars. Retrospectively, Andres' remarks about the risks of the job, once that Ana had invested everything she had, sound bitter:

> *If Ana didn´t have me, she wouldn´t have started. In my office, there is a saying on the wall: 'Only those who dare to fail will reach great heights'. Everything is a risk.*

"*The problem is they don't pay!*", exclaimed Ana after the first year of flower farming. "*I have many loans to pay. In total around 75.000 dollars. And I have to pay the breeder's rights, one dollar each plant. I have 40,000 plants, so... Damn, how do I pay that?!*" This also jeopardised the entire production process. For instance, roses need continual irrigation, but Ana did not pay her water bill for three months, so the water users' organization closed the gate. *"I can't pay, because they haven't paid me..."*

Her sister understands the deep worries Ana has, but she is not able to help her, unlike she did before. Then they worked as a family, embedded in community's collaborative and social-security structures, in an entirely different financial and livelihood context.

> *Why does my sister have so many debts? Her kids have to go to school, and she owes so much ... It´s difficult to owe so much. When I owed less, I was already crying, even if my husband still had cows. You don't have cows, to help you pay. Only by selling flowers you could go on, slowly...*

In 2015 Ana found a new associate, a Russian intermediary who paid only 22 cents per stem. Evidently, she was struggling intensely to maintain the greenhouse; this has even meant that she had to reject a surgical intervention on a damaged ankle (a work-related accident) for she could not afford to leave her business for more than some days. After the accident she limped notably and walking the 200 metres from her home to the greenhouse took her 20 minutes. She hoped that after paying her debts she would start to net enough money to improve her quality of life, and even start post-harvest activities by herself with potential associates.

One could be her brother, who started his own greenhouse beside Ana's. But, in general, intra-family relations had come under great stress after the transformation. Ana: "*Since I told my father that I started a greenhouse, it seems he makes a distinction in our family. To me, all flowers are equal, but he isolates me.*" Unlike her mother, who died two years earlier and encouraged her to follow her dreams, her father refused to collaborate or even speak to her.

> *With a lot of worries you don't sleep well, tired and exhausted, with so many questions. You just hope that the next morning you'll wake up again, and a new day will begin. Just that, and for us to be together, to share things together again.*

Ana deeply expressed how much she misses family and neighbour collaboration, as before. "*I've felt alone. I've lost my mother, my brothers and sisters*."

Individualisation of everyday livelihood production also took place even in irrigation water control, the one activity that, in times of State-led centralisation and market-based neoliberalisation and privatisation, has always been the bastion of collective action in Andean communities. Ana got her water as part of a small irrigation system. Water came down from the Blanco River, a tributary of the Pisque, via an earthen canal to a reservoir located one kilometre east of the community. Water rights were locally administered by the community water users' organizations. A non-local company intended to establish a large rose plantation and even built some greenhouses, but the community opposed it and the facilities were abandoned. The community leaders had their own regulations establishing, for example, that the community's own smallholders could intensify their subsistence production. This included for users to establish up to one-hectare flower greenhouses. However, community president Alonso Quimbiamba pointed at the ominous risks and deep conflicts the community was experiencing:

> *There you see Ana's greenhouse. As a community, we don't have much contact with her. She's just started the greenhouse. It is a rose farm that might help her family but will harm the village at the same time.*

Roses demanded more water than pastures and building more small greenhouses would worsen the conflicts.

> *In our village there are currently six greenhouses. There are eight more about to start. This worries us.... There've been conflicts between villagers because of the greenhouses. Some people do not agree, the water users' organization has seen conflicts. There is water shortage, especially during the summer, but the rose farms irrigate their plants day and night. The others receive the water only one day a week and the greenhouses every single day. This creates tensions.*

Indeed, the water users' organization had claimed that Ana used too much water, affecting the others, even though she denied this. They decided to curtail her allotted water, forcing her to build a small emergency reservoir.

Alonso admired Ana's courage while feeling sorry for her deeply stressful, market-dependent situation, subjugated to outside rules and power-abusive intermediaries (cf. Bryant and Garnham 2014). Time will tell if she is one of the 'successful few'. The community's president, Alonso, allowed intra-community smallholding floricultural development; however, he was firmly decided to let collective water control and community survival prevail. Without it, the irrigation system and the community would fall apart, prey to harsh market forces and encroachment powers in close proximity. As such, it risked the livelihoods of all the others, and rather than intensifying water collaboration in times of crisis, people would face off as competitors, it would unleash the water race among individualised commodity producers. Alonso foresaw the threats of unbridled mimetic desire, deepening instead of solving scarcity:

> *Why does one get water and the other not? If they get the water the entire week, we want it too! That is the problem with the arrival of the rose farms. It creates a divide among the village people.*

Certainly, Ana was not alone in her chancy search for prosperity. When interviewing local heads of families who were devoted to their own rose plantations elsewhere in

the watershed, very similar explanations for starting the 'roses dream' were heard. Illustrative expressions were the following:

Guillermo owned a 3000-m^2 rose farm since 2012. He mentioned being fascinated by the prospect of living a life like the large rose farmers: "*I also wanted my own enterprise, to be able to live better, to put my children in universities, to be able to see some more of the country and maybe even other countries…*"

Rosa was also operating her own 3000-m^2 rose farm since 2012. She used to cultivate tomatoes and alfalfa, as she said, "*entirely for self-sustenance*". With admiration she witnessed the entrance of this new world and world view of rose growers, their technologies and what she thought would be financial autonomy. "*Roses seemed to be a great business and we could even gather rainwater from the new rooftops. … We wanted to be independent, to be able to sleep more than a few hours per day, to build a better house, and maybe even hire people*". Making the step from being a peasant farmer to becoming and entrepreneurial farmer and buy in additional labour and resources, 'just like them', would make life easier. Her definitive dream was showing that she was also able to become a modern flower farmer.

Mariana told a similar story. As the others she saw the large flower companies as her ultimate role models, but particularly also copied the dreams of her smallholder 'equals', in her direct surroundings. She has owned a 1500-m^2 rose farm since 2013. "*I was dazzled by the good prizes after having worked for a large farm for 17 years. Some neighbours started their own greenhouses and I got convinced that that was the way to go, to become prosperous and to stop working for others*".

Mariana added to this, emblematic for many of the smallholder rose farms in these years of crisis and suddenly worsening rose prices: "*Unfortunately, all those dreams of becoming like the big ones have been shattered…*"

In a visit to Ana's home in February 2016 we learned that evidently the price per rose stem plunged to 12 US$ cents or less per stem (from ca. 45 US$ cents in 2013). This predicament was part of a phenomenon that includes low oil prices, the use in Ecuador of dollars as currency (very strong, which means, among others, more expensive supplies), and the Russian crisis, and seemed to be affecting both large and small rose farms. Ana was selling her roses to Chile and the local market. Besides the financial pressure, this implicated that her relatives who, after having been convinced by Ana's dream, started their own small greenhouses, blamed her for

the unfulfilled promises. The 'internal mediator' is seen as the rival, triggering conflicts among 'equals', while the big flower business' imaginary and model is not questioned.[28]

4.3.3 Communal water control

Pisque has been served for centuries by varied irrigation systems (Zapatta and Mena-Vásconez 2012). Roses, cultivated in greenhouses with drip ferti-irrigation, have relatively high water requirements. In contrast to traditionally irrigated crops roses are not seasonal and need daily watering throughout the year. To round out an already deficit supply, big companies built large reservoirs and rainwater collection tanks. Some had also wells to mix aquifer water with *acequia* water. This extraction at the expense of *minifundio* subsistence agriculture generated important conflicts in the watershed (see, e.g., Hidalgo 2010, 2015). Irrigation water has been always critical in the region, and the flows were not enough for these competing needs; Ochoa (2013) estimated a forty percent shortage at peak demand times.

Conflicts over the basic resource characteristically have taken place along class/ethnic lines. The latest overt protests by the peasantry against water accumulation happened in February 2006, when 3,000 peasants took over the Tabacundo *acequia*, one of the main irrigation systems in the Pisque watershed, at that time managed by the municipality. Protesters considered that floriculture was receiving most of the irrigation water from the bureaucratic managers. The result of these mobilisations was the canal being turned over by the State water authority to a new community-based institution (Castillo 2006). This inter-community organisation CODEMIA operated and maintained the Tabacundo acequia, established shifts and collected differentiated fees from small traditional farmers and large agribusinesses. Nevertheless, each community established its own rules for, for example, deciding whether to allow floriculture in their territory. CODEMIA faced some difficulties. For example, smallholders complained about entrenched

[28] A more recent visit to Ana´s farm in April 2019 presented an even bleaker prospect. As if her not being able to get more loans – even after she had been able to pay all the previous ones (but a bit late, which put her in the 'black list') –, the low prices of flowers and high costs of supplies, a bitter separation from her partner, and the eternal unpunctuality of brokers were not enough, unheard-of tornados had badly torn her greenhouse. The post-harvest facility she had been building to be rid of the intermediaries has been abandoned; she hopes she will be able to resume this task as soon as possible. With indefatigable aplomb and optimism, she and her older son were rebuilding the greenhouse, hopeful that the 2019 Mother´s Day (May 12) would help them pull through.

favouritisms towards larger users who contribute more financial resources and who claimed large water shares. All communities in the command area received water regularly, but the percentage of redistribution has been relatively small. Table 1 shows the considerable unbalance in the use of water by type of grower, both in terms of acreage and flow. Ochoa (2013) estimated for 2013 that the smallholders used some 15 percent (2 Hm^3) of the irrigation water, cattle haciendas some 30 percent (4 Hm^3), and flower agribusinesses some 55 percent (8 Hm^3). Thus, water for the smallholders' communities is only 15%, while their irrigated land is almost 60%. Thus, the new boom of smallholder flower businesses intensified the water conflict inside the already water deficient communities.

Clearly, the 'food versus flower' water conflicts in the watershed were not just about accessing the water resources, but also about the decision-making authority. Different stakeholder groups typically used different rules and laws in order to defend their interests and claim certain resources, ranging from formal State and market rules to highly diverse, historically rooted customary frameworks, forming a context of legal pluralism (Boelens and Vos 2014; de Vos et al. 2006). Characteristically, Pisque's subsistence growers and flower companies each gave legitimacy to different authorities: the former tended to respect customary and community-rooted rule making while the latter often turned to formal regulatory bodies.

Also, a conflict could be noted among the different discourses that defended or challenged particular water policies and hierarchies. In a Foucauldian manner, both the 'food sovereignty' and the 'modernist flower' discourses shaped reality by the commensuration of particular relationships between knowledge, truth, and power, aiming to construct the subjects and the worlds of which they speak. In Pisque, floricultural representatives claimed that their agribusinesses were the driving progress and that the region became modern since their arrival. The matter of using water for food sovereignty was circumvented and the issue of food sovereignty was confronted by saying that people had more purchasing power through their monthly wages and thus could buy a wide variety of foods, which in turn boosted the economy (see also Patel-Campillo 2010). Local leaders, on the other hand, tried to stop flowers from expanding more on grounds of food sovereignty, health and environmental issues (for the different conceptual frameworks to examine food sovereignty politics, see Maye and Kirwan 2013).

In recent years, however, the water conflict has not just deepened, but also changed. The flower-growing water competitors came 'from outside', but increasingly involved peasant farmers who used to share in the 'water for food' framework. Many peasants saw roses as a risky, but important alternative to escape marginalisation and thus disregarded or even sacrificed food-related considerations.

Simultaneously, over the last decades after the agrarian reforms the peasantry has managed to organise, federate and reclaim control over several irrigation canals; their struggles have continued up to the present – even more intensively when the powerful adversaries increasingly claimed more water for export farming (Hoogesteger et al. 2016).

Protests against water accumulation by powerful rose farms in a water-scarce context motivated their mobilisation (Acción Ecológica 2000; Gaybor 2011). Equally important was the fact that, whenever these rose farms managed to occupy larger irrigation areas in local irrigation systems, collective water control would be jeopardised, and so would be the survival of the system. In adverse highland contexts, such as the Pisque watershed, irrigation canals can only be managed as a collective endeavour (see Boelens and Vos 2014). While this is already a difficult aim to accomplish, void of any romanticising (see, e.g. Colloredo-Mansfield 2012; Boelens 2015), in the Tabacundo system capitalist farms characteristically fenced off their farms, materially and socially, to focus on just individual farm management, neglecting the overall system (Hidalgo 2010; 2015). This created water insecurity and shortage in the rest of the system, and particularly in tail-end communities (Hidalgo 2015; Hoogesteger 2012).

Besides the individualisation and undermining of collective water control, community organisations also criticised rose agribusiness on other social and environmental impacts. Studies have documented problems with human health (Breilh 2007; Mena Pozo 1999), ecosystem integrity (Breilh 2007; Guerra 2012), food sovereignty (Korovkin 2003), real-estate price speculation (Gasselin 2001), community and social relations (Brassel and Montenegro 2011), and exploitative labour relations, dismissing union rights (Guerra 2012; Harari et al. 2011; cf. Patel-Campillo 2012; Raynolds 2008). Korovkin concluded that, in particular, women's conditions and rights are under stress in the region, finding also

> *… a progressive decline in women's capacity to maintain and influence family networks and community institutions. Until recently, women have*

> *been able to preserve rural communities despite male migration and increase their own influence within them. This community-based empowerment came to halt with their incorporation into the flower labour force. Cut-flower employment has a highly negative effect on the amount of time spent by women (and men) on communal work and assemblies* (Korovkin, 2003:36).

Communities had been weakened in their long-established roles and protective capacities, including autonomous decision-making "*but also helping their members to meet basic food requirements, provide them with potable water and financial credit, support rural schools, and socialise children in the norms of solidarity and cooperation*" (Korovkin 2003:36).

Despite these disrupting transformations, the 'rose culture' imaginary has become the new icon of the region. Throughout the country and internationally, large companies, transnational export federations, and loan-providing banks expressed pride and promoted the discourse of modernisation of formerly 'backward regions'. They were proud about their offer of numerous steady jobs to a formerly emigrating population, their use of water with advanced technology, and how the country became famous for their flowers (Expoflores 2011; 2012). An on-line presentation states: "*[w]ith less than 4,000 hectares, floriculture is the third-largest non-petroleum export commodity. Besides, it is the largest employment generator and the main currency generator per productive hectare*" (Expoflores 2013). Largely disregarding environmental protests or claiming to produce *'green flowers'* (Expoflores 2012), their main concern seemed to be the unfriendly political environment created by the current government´s reluctance to sign economic treaties with main trade partners, unlike neighbouring countries. In this respect, the position of President Correa's Government, advocating its '21st-Century Socialism', was highly ambivalent, entwining a populist-centralist State apparatus with neoliberal policy practices (Radcliffe 2012; Terhorst et al. 2013; Boelens et al. 2015; Hoogesteger et al. 2016).

In the middle of these contradictions among classes, ethnic groups, local and international players, environmentalist and capitalist discourses, food versus commodity production strategies, the conflictive encounters seem to spread and deepen because of the booming arrival of local families–usually ex workers at large

rose agribusinesses–starting small-scale versions of these capitalist flower farms (Figure 4.2).

4.3.4 Proposed regulations for the prioritization for water use

The food-or-flowers and water for food sovereignty issue discussed in this article becomes increasingly urgent. As a climax, in August 2015 thousands of peasants, workers and indigenous peoples took the streets, throughout the country, protesting again the government. Despite the fact that water for food sovereignty has been prioritised on paper and in the official discourse, peasants and indigenous peoples experienced a different governmental practice. As they argued, the Ministry of Agriculture had enforced a ´productive value chain´ policy fostering agribusiness logic, while depriving smallholder communities from opportunities to self-manage their means of production (see also Hidalgo et al. 2013). Nation-wide marches involved protests against current water reforms supporting - what they call – 'neoliberal practices'. [29]

Since 2008, Ecuador has a new Constitution based on the principle of *Sumak Kawsay* (Kichwa: 'a dignified, full life' or 'a good way of living'). It is supposed to incorporate some indigenous traditions and concepts into a modern Constitution, including the Rights of Nature (León 2008). Constitutionally, the different uses of water are prioritised in Article 318 as follows: 1. Human consumption (domestic water); 2. Irrigation for food sovereignty; 3. Environmental flow, and 4. Productive activities.

The recently enacted Water Law (August 2014) does not develop the theme further and it is expected that its forthcoming bylaws will tackle the task of concretising this prioritisation. Prioritization can be interpreted and implemented in several ways. Basically, there are three options: (1) assignment of new water use rights when new water infrastructure is built (2) when water is occasionally scarce, (3) re-assignment of previously assigned or historically vested water rights in existing water distribution systems. The Constitution and Water Law are not clear what interpretation or implementation should be given. However, most actors presume it is only the first and second interpretation.

[29] See e.g. "*Manifestantes retoman las movilizaciones en las calles", Diario El Universo*, 20 August 2015.

According to a former high representative of the water allocation administration (Juan Pablo Hidalgo, pers. comm., October 26 2014), the prioritisation order would be quite difficult to implement in practice, especially inside each irrigation system: "*There are too many actors and norms, besides the water users' associations (still) have a high level of autonomy*", he stated. Engineer Charles Cachipuendo, who has worked for many years on Pisque irrigation matters (pers. comm. October 25, 2014), believed that the possibility of enforcing this prioritisation would depend on collective action generating public policies locally: "*A construction from the bottom upwards, and not the contrary, would be very interesting. If not, governmental officials would become inquisitor*s." He also thinks that a way to regulate development of socio-environmentally friendly production systems was an incentive-oriented policy based on socially responsible use of water, at all levels (from provinces to water users' organizations). The most practical way to accomplish this would be through differentiated costs according to water use: highest for 'productive uses'.

Interestingly, but not surprisingly, this last idea seemed to be shared by agribusiness representatives. A large rose farm owner (pers. comm. January 16, 2013) coincides in that only through differentiated tariffs this prioritisation could be accomplished. In relation to multi-user systems, he asks: "*How is it feasible to prioritise certain uses over others? If, for example, there is a potato field after my greenhouses, are they going to get all the water needed or available first, even if my roses are upstream and I have a legal concession?*" The Provincial government, formally in charge of Pisque irrigation, has been preparing a Provincial Irrigation Plan where the prioritisation would be acknowledged. One of its main objectives was to support food sovereignty and agroecological practices, but the published summary says little about the ongoing agribusinesses expansion and possible ways of materialising the water-use priorities (GADPP 2014).

The former technical director of the organisation managing the Tabacundo *acequia* and at the time director of the Cayambe municipality water agency, Mauricio Ochoa (pers. comm. September 25, 2014) perceived a great gap between the recent prioritisation and the way in which water issues are currently arranged:

> *Some neighbourhoods do not even have any domestic water, while there is plenty for rose irrigation. There is a big challenge for communities and governments. Beyond the official categorisation, there is institutional*

> *competition and a lack of coherence regarding drinking and irrigation water distribution in large mixed systems such as the new canal that will replace the old acequia.*

The transformation from traditional agricultural practices towards small rose agribusinesses was for him a disguised outsourcing that mostly benefited large flower farms and capital accumulation, affecting food sovereignty. Some communities might be able to cope with it through differentiated tariffing (or even banning flower export farms), but many others would succumb. He believed that district-level governments would have to establish peasant community protective norms pursuant to the Constitution.

In the field, even if it seems the official prioritisation had not been internalised and/or used, water users' organizations had the clear idea that certain uses had priority over others, in particular regarding domestic and food sovereignty water uses over watering roses and other agribusinesses. This perception, however, manifested itself variedly. In Paquiestancia, close to Santo Domingo, land was still owned communally, and the community had decided not allowing any flower farm. Their decision was importantly based on grounds of water stewardship, collective land and water control, and food sovereignty. However, most other community leaders interviewed had a middle-ground position. For example, Fernando Chencusi, of the Santo Domingo WUA, considered the necessity to prioritise uses (like the Constitution's order), but "*on grounds of water availability and not of type of uses*" – flower farms were allowed, yet had less priority in times of water scarcity.

Similarly, César Catucuago (pers. comm. 25 Sept. 2014), leader of the *acequia*'s Tupigachi sector, stated that there had been efforts to materialise a prioritisation scheme. They were developing a plan in which only the water that remained after having provided all the food crop and meadowland of smallholdings could go to large farms' reservoirs (supposedly without affecting their concession rights).

As in the Santo Domingo case, the big dilemma was how much to let small rose farming develop because, at that moment, "*you get water if you need it and pay for it, whatever the use*." Increasingly, community leaders wanted to put this issue of 'needs' on the agenda, how these were moulded by the powerful and deeply-rooted flower agribusiness model. Many of them wanted to question how these modernist

models generate new scarcities–of water, technologies, finances, services and knowledge–in a context where, previously, families did not experience these needs in these ways. César coincided with Fernando:

> *The Constitutional prioritisation is okay, but it has to be implemented with things like supporting family agriculture, which does not happen: traditional agriculture has to deal with bad weather, lack of financial credit, fluctuating markets, hence they shift their gaze towards cultivating flowers.*

Their struggle was to show their fellow smallholders that there were and must be alternatives, collectively defined and defended.

4.4 Discussion

During the last ten years, next to capitalist flower company development, hundreds of small rose farms have been established inside communities of the Pisque watershed. Diverse drivers and enabling conditions have been identified during the field work, but an important driver was the copying by many peasants of the capitalist mode of flower production and its associated discourses. The working of 'mimesis' found a powerful expression in the assumed superiority of Western science-based flower agribusiness and water management techniques and models. Copying and internalizing of these rules and values - framed in terms of individualised water control, commoditised water rights and users who rationally pursued the economically most beneficial water use - was a precondition for the model to work. Consciously and unconsciously, the cultural, political and technological standards for 'equality' and thus, for normalising those who were abnormal, were found to be set by the powerful flower export business discourse. The smallholders took high financial risks, and many suffered big financial losses and accumulating debts.

The small flower producers belonged to communities that have been opposing rose farms on health, pollution and food-sovereignty concerns. The new small flower production had intensified both water scarcity and the material and discursive conflict over water-use priorities. In contexts like Pisque, submerged agribusiness-led globalisation, with a growing number of smallholders cut loose from their community ties, protections and restrictions, water scarcity generation was a

fundamental element of the race among 'almost equal' competitors striving to 'become equal'. This process of comparison to the norm-providing model, mimetic desire, generated not only a disenchanted self-measurement when comparing with flower agribusiness models, but also rivalry among internal, intra-community competitors.

Although some communities have chosen to abandon the flower-export mode of production entirely, most leaders and collectives were pragmatic in their choices to defend 'community' and 'food sovereignty'. They felt it would be unfair to restrict local smallholders who decided to plant roses in pursue of increased income. At the same time, the community leaders chose directions that did not allow unlimited growth of inequity, scarcity and environmental harm. While they commonly would not allow the intrusion of more capitalist flower agribusinesses, for them it was not a question of either embracing or denying the smallholding floriculture development; and the mercantile sphere offered complementary resources needed for reproduction.

An effect of the new small flower businesses was the individualisation of the (necessarily) collective irrigation system management. Therefore, the strategic decisions of community leaders related to: a) strengthening endogenous control over decision-making on questions of why, where, how and when to relate to the flower market; b) ensuring access to markets in a collective, equitable, organised manner; c) finding the required balance in the interaction between commodity and non-commodity spheres.

National policy debates and local livelihood pressures led to a central question concerning priority uses and reallocation of water use rights according to these priorities. The discursive battle in many communities of the Pisque region was about the question of whether water should get priority for local and national food sovereignty or for production for export markets and industry. The research shows that the answer to this question is complex and dependents on the local discourses and circumstances. Therefore, general, top-down, legislation about water use prioritization will not resolve the local conflicts over water use rights. With their own valuation languages and under collectively established water and resource control institutions, many communities will need to 're-balance' water use priorities. Their collective institutions are indispensable to endure and defend local livelihoods of mutually dependent families. These institutions, therefore, cannot be supplanted by individual, state or market solutions.

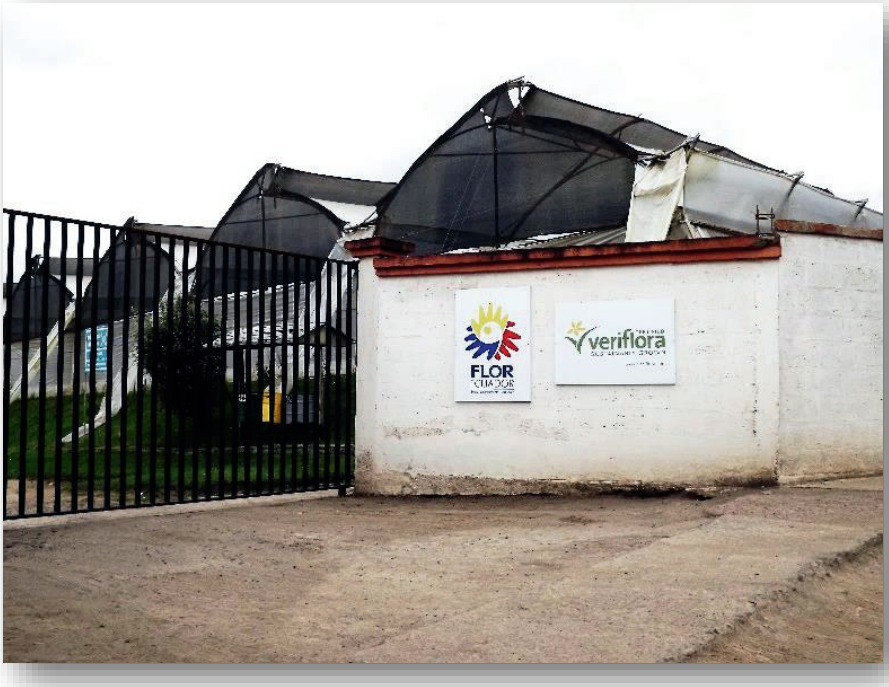
4.5 Conclusion

During the last two decades, peasant and capitalist modes of production have existed side-by-side in the irrigated areas of the Pisque watershed. Recently hundreds of peasant farmers have started small flower production enterprises. This shift was caused by many factors like credit, experience and production knowledge of flower workers, need for financial means, but seems to be especially triggered by the desire to become an entrepreneur, make money and acquire a lifestyle with access to consumer goods and private services like health care and education. Smallholders mimicked the example of the big export flower companies, but have less access to credit, trading networks and production knowledge and technology. This results in high financial risks, and cultural conflicts with the peasant communities they belong to. The increase of smallholder flower producers has also increased conflicts over water.

In the new Constitution (from 2008) and Water Law (2014) the Ecuadorian government set out to regulate the priority uses of irrigation water: first, human consumption; second, irrigation for food sovereignty; third, environmental flow; and forth, productive activities. Thus, water for the big rose companies could be curtailed and priority use granted to peasants in specific circumstances like droughts. However, in practice the vested water use rights and allocation rules are not reconsidered, because of the local power constellation and dependency relations. Instead of a top-down prioritization it would be more beneficial for the peasant communities to have a permanent increased allocation of water. Additionally, the decision on how and to whom allocate the water inside the community should be delegated to the peasant communities themselves and not be bestowed to governmental organisations. Each community can then decide on regulations regarding allocation for subsistence or flower production and the priority rules in case of drought.

CHAPTER 5

WHY AND WHEN TO CERTIFY – CORPORATE SOCIAL RESPONSIBILITY AND FLOWER PRODUCTION PRACTICES IN THE ANDES OF ECUADOR[30]



A large rose farm with two of the main certification labels advertised

[30] This chapter is based on:

MENA-VÁSCONEZ, P., VOS, J, VAN OMMEN, P. and BOELENS, R. 2019. *Flores, acaparamiento del agua y Responsabilidad Empresarial Social: certificación de la producción de rosas y reclamos por la justicia ambiental en el Ecuador,* Cuadernos de Geografía 101:189-214.

and:

VOS, J., VAN OMMEN, P. and MENA-VÁSCONEZ, P. (2019) *To certify or not to certify – Flower production practices in Ecuador*. In: Vogt, M. (ed.). **Sustainability Certification Schemes in the Agricultural and Natural Resource Sectors**. Earthscan Studies in Natural Resource Management. Abingdon and New York: Earthscan.

5.1 Introduction

In most regions of the world, a great boom in international trade of agricultural products is being experienced. Government policies for expanding water-intensive crops have often led to an accumulation of water rights by large agricultural companies. These expansion processes share the fact of competing for water and land with small local and indigenous producers, the degradation of local ecosystems and human and environmental health, the vulnerating of local food security, and the deep alteration of the existing modes of production and income distribution (Lynch 2012; Vos and Boelens 2014; Mena et al. 2016; Hidalgo et al. 2017; Mena et al. 2018). For the communities of peasant and indigenous peoples this environmental degradation and legal dispossession, extra-legal or illegal – not only of their lands but especially of their water sources – often makes it impossible to continue living in their habitat (Hoogesteger, 2012; Roa-García, 2014).

Private certification of agricultural products has become an important governance mechanism in global supply chains. It pertains to the wider activities of CSR. Companies have three basic reasons to engage in private certification (Hughes 2001): First, retailers need to guarantee constant supplies of products of sufficient quality to supermarkets; sustainable standards prevent resource depletion and degradation that could jeopardise the supply. Second, supermarkets are very vulnerable to reputation damage. Low-quality products, health risks, and environmental disasters could easily harm the image of a big company. Third, for an increasing number of companies, fair trade and environmentally friendly products are a niche market that is growing in many countries.

Most private certification schemes have four main characteristics: a *publicly available document* detailing the standards; an *audit* usually performed by private third parties; either a *seal* on the product to notify the consumer or a *label* used only by the retailers; and a *certification organisation* that establishes and communicates the standards, trains producers and inspectors, and authorises auditing agents (Mutersbaugh et al. 2005).

Doubts have arisen regarding the effectiveness of private certification of social and environmental practices of companies (Bacon 2010; Jaffee 2012; Langen and Adenaeuer 2013; Raynolds 2014). Vos and Boelens (2014) identified six general critiques about private social and environmental certification:

1. Technocratic and uniform definition of standards (not adapted to local circumstances and valorisations),
2. Low levels of transparency and democracy in setting the standards,
3. Exclusion of smallholders (fees too high, standards not adapted to their conditions),
4. Negligible environmental benefits (relatively 'good' producers already had good practices before their certification, and companies with 'bad' practices do not opt for certification),
5. Risk of co-opting and less stringent criteria, and
6. Difficulties in auditing and susceptibility to poor auditing and fraud.

Here we examine the effects of private certification and the relative contribution of certifications to the environmental and social change in flower production in the Pisque region of the Ecuadorian Andes. The chapter seeks to answer the following question: How have agricultural certification schemes influenced the socio-environmental conditions in floricultural practices, and how do small local floriculturists perceive the changes triggered by certification schemes?

Large flower production started in the northern Andean region in the early 1980s and since 2010 Ecuador has been among the largest exporters of flowers worldwide (UN Comtrade 2018). The production of flowers, mostly roses, has had enormous impact on the economy of the Cayambe-Tabacundo region, north of the capital Quito. The flower sector has been employing many people from the Indigenous communities, providing a livelihood, but inflicting deep cultural changes. Many concerns have been raised regarding work conditions, including health effects caused by pesticide use, and general environmental effects (Tenenbaum 2002; Sawers 2005a,b; Breilh et al. 2007; Breilh et al., 2009). Although many interviewees stated that pesticide use has been reduced (see also Soper 2013), Victor van Dijk, Area Manager South America with the Dutch flower trader FleuraMetz, stated in 2017: "[W]e strive for 90% sustainably-produced flowers. But in Ecuador we still have a long way to go" (Bloemisterij 2017, own translation).

As irrigation water is increasingly scarce in the Ecuadorian Andes, a conflict arose over the use of a shared irrigation canal between smallholder subsistence producers and large flower companies (Mena-Vásconez et al. 2017). Smallholders gained control over the irrigation system and gained access to more irrigation water but still

most water goes to the big companies. Those companies increasingly use water from groundwater wells and have built rainwater storage reservoirs.

Interestingly, and different from export flower production in other low and middle-income countries like Colombia and Kenya, since around 2005 many smallholders in the Cayambe-Tabacundo region have established their own small greenhouses and sell their flowers to traders or large flower producers. In this region, over 600 small flower producers sell flowers for export to international traders (Mena-Vásconez et al. 2016). This has led to the central questions for this chapter: What is the situation of agricultural certification schemes in relation to Pisque floriculture, what role have them played in the alleged amelioration of the socio-environmental conditions in Pisque, and what is the perception about them among small local floriculturists?

5.2 Methodology

The data for this research were collected during field studies executed from 2013 to 2018. In 2013 a questionnaire was held with representatives of big and small flower producers, including questions on certification. In 2017 and 2018 semi-structured interviews were held with representatives of small -and medium-sized flower companies. During the whole period about extended open interviews were conducted with several owners or managers of small and big companies and representatives of local municipal governments, NGOs, water users' organisations, flower traders, producer associations, certifiers, and breeders. The data was complemented with literature research. Interviewing owners/managers of big companies proved difficult, which might have created a biased view.

5.2.1 Places, forms and spaces of power

In this analysis, environmental and social standards are not treated as objective rules that are applied by objective organisations for the general benefit of all. We will look at specific interests of the stakeholders and use power analysis to examine the making and application of environmental and social regulations in the flower production in Ecuador. In addition, we look at the dominant discourses that legitimise the structure of representation and the accepted norms and values in the environmental governance of the flower industry.

We concur with Lemke (2007, 58) in that to understand social change we should study "*practices instead of object, strategies instead of function, and technologies*

instead of institution". Therefore, this chapter will be structured along the strategies, practices, and technologies of five key agents in the flower business in Ecuador: (a) certifiers and audit companies, (b) big flower producers, (c) small flower producers, organised in communities and water users' associations, (d) governmental organisations at different levels, and (e) NGOs.

A practical conceptual framework to investigate the possibilities of social change by agents is Gaventa's (2006) 'power cube'. The power cube is three-dimensional: spaces for participation, levels and places for engagement, and forms of power (see Figure 1.3). Within the dimension of *spaces*, this framework defines three types: closed, invited, and claimed spaces. *Closed* spaces refer to processes of decision making where policy makers, bureaucrats, or experts take decisions without participation of stakeholders. In *invited* spaces, decision makers invite representatives of stakeholders to be involved in decision making. The degree of say of these representatives can vary from just being informed to a real voice in decision making. However, in invited spaces the topics of discussion and the rules of decision making are set by the organisers. *Claimed* spaces are created when organised civil society groups succeed in obtaining real influence and can shape or determine the agenda and the rules of decision-making themselves.

The dimension of *places* for engagement refers to the scale of governance from global to household. Institutions and regulations are increasingly defined at global levels. Rooted, bottom-up strategies are applied by local organisations to defend themselves against top-down universalising rules.

The dimension of the *forms* of power refers to the type of power in a given place and space. *Visible* forms of power are, for example, the official political structures, the formal rules and procedures of decision making. *Hidden* power is a form of power that is in principle visible, but actively concealed by powerful people and organisations. This power works by excluding others from setting the agenda. *Invisible* power functions through the shaping of meaning and truth, and what is acceptable, desirable, and normal. This is what Foucault called disciplinary governmentality: the internalisation of what is desired, normal, and true (Foucault 1991).

Examining the practices of flower certification through the lenses of the three dimensions of power will help to scrutinise how, where, and why environmental and social regulations are designed and applied.

5.3 Flower production in Ecuador and its challenges

In Ecuador, as was explained, a recent and important dimension of the competition over water is the intrusion of the floriculture sector. The production of Ecuadorian flowers is largely in foreign hands, taking advantage of favourable weather, numerous hours of sun, cold nights and high altitude, cheap labour, permissive environmental regulation, low taxation and proximity to the airport (Soper , 2013; Mena-Vásconez et al., 2017).[31] The quality and size of Ecuadorian roses are world famous. Exports have increased from 195 million dollars in the year 2000 to 881 million in the year 2017 (UN Comtrade, 2018).

Most flower production occurs in the municipalities of Cayambe (capital Cayambe) and Pedro Moncayo (capital Tabacundo), a one-hour drive north of Quito. The flower sector employs over 116,000 workers (USDA 2009), the majority Indigenous, 60 per cent of them being women (Korovkin 2003). Irrigation water is scarce, and Acequia Tabacundo, the main irrigation system supplying water to both big flower companies and peasant communities, has been at the core of fierce battles. In 2006 the irrigation system was taken over by the water users' association CODEMIA, which is controlled by peasant communities (Mena-Vásconez et al. 2017).

There are around 300 big companies (>2 ha) and about 700 small (<2 ha) family-run flower companies[32] (Mena-Vásconez et al. 2017). Most big flower companies were established on former haciendas. They started in the 1980s and developed rapidly. Most are now Ecuadorian companies, but also French-, Dutch-, German- and Colombian-owned companies can be found. Export is mainly to the US, Russia, and Europe.

Big and small businesses consist of one or multiple greenhouses. The plastic-covered structure is built with steel or local eucalyptus poles. The flowers are grown in rows and are all drip irrigated. Drip-irrigation technologies vary from rudimentary rubber tubes with holes in them running over ground, to the most advanced computerised underground systems. Usually, the smaller the business, the simpler the irrigation system. Some of the used agrochemicals are dissolved in the irrigation water. Larger farms include post-harvest (stockpiling, processing, cold-room) facilities while

[31] Although the climate is favourable for rose production, all roses are produced in greenhouses to regulate night temperature and protect from rain and wind.

[32] This divide is somewhat artificial as some family-run flower enterprises have grown to be larger than 2 hectares.

smaller ones usually sell directly to flower traders. Similarly, larger farms possess their own specialised transportation while smaller ones must hire trucks.

Since 2005, hundreds of peasant farmers have started small flower -production enterprises, fomented by several factors: credit, experience and knowledge gained in the big flower businesses, desire for financial means,[33] flexibility in working hours, and the appeal of becoming an entrepreneur (Mena-Vásconez et al. 2016). Smaller businesses are typically family-run but might employ one or more permanent workers. The research of Mena-Vásconez et al. (2016) found that in 2002 there were no under-one-hectare greenhouses in the Cayambe-Tabacundo study area, but in 2013 there were over 300, and in 2016 an estimated 600. The effects this boom of small greenhouse farms has had on the community, social relations, the environment, and the economic situation of the region have not been studied yet.

Smaller businesses build their greenhouses on small pieces of land, either where they used to have cows or traditional crops, or which they bought from someone in their community. Starting a small flower farm was done with the help of the state-owned BanEcuador,[34] which provides credit to smallholders against relatively low interest rates, or private institutions. Credit to build greenhouses is not easily granted to smaller farms. Thus, some families must rely on savings to start up, or get support from a big flower company. Some companies supported small ones by providing training, building materials for the greenhouses, irrigation installations, or pesticides. Working with these small companies is a way for big companies to spread their risk. Family-run farms may thus not be independent, relying on a large company to which they sell their flowers. The company in turn exports the flowers branded as their own, thus reducing the large company's per-unit-unit costs and financial and production risks.

Floriculture in Ecuador has had severe environmental and socio-economic impacts. One of the main problems reported has been the pesticides used (Korovkin 2003; Breilh 2007; Soper 2013). Flowers have been typically grown with the help of large amounts of chemical fertilisers and pesticides (Korovkin 2005), often with products

[33] Increased need for financial means must be seen in relation with increasing privatisation of public services like health and education in Ecuador. See also Mena-Vásconez et al. (2017).

[34] BanEcuador is a public bank that provides credit to small entrepreneurs and farmers. It was created in 2016 as a successor of the Banco Nacional de Fomento, which had the same function.

that have been banned in Europe and North America. Reported symptoms of pesticide intoxication include headaches, dizziness, rashes, nausea, asthma, blurred vision and even stillbirths and cancer (Korovkin 2003; Breilh 2007; Franze and Ciroth 2011). It has not helped that safety gear has reportedly been lacking (Soper 2013). Because of these characteristics and others, like denial of health services, less-than-minimum- wages and forced overtime, the cut flower industry has often been described as harsh and exploitative (Tenenbaum 2002; Sawers 2005a,b). It is not only workers that have been affected through contamination from the use of chemicals, but the entire community, as well as soil and water around the greenhouses (IEDECA 1999; Breilh 2007; Breilh et al. 2009).

Additionally, floriculture can have negative socio-economic effects because it requires a lot of water for irrigation. Conflicts have arisen in communities with flower farms over access to water resources (Mena-Vásconez et al. 2016, 2017; Hidalgo et al. 2017). During the last decade many large flower companies started to use groundwater, and most have constructed reservoirs that collect rainwater from the greenhouses' roofs.

Working conditions have been regarded as harsh: working days were reported to be long (72–84 hours/week), child labour to be common, overtime often not paid, and workers frequently not getting a contract (Franze and Ciroth 2011). Floriculture is also said to have negative impacts on the social relations in local communities. According to Korovkin's research (2003) where she describes the 'erosion of communal organisation' in flower-growing areas, community organisations were falling apart, even though on a national level Ecuador witnessed the rise of a powerful Indigenous and peasant movement. Korovkin blames the individualistic process of production and profit-oriented agribusiness that clashes with Indigenous community norms of collective responsibility and respect for nature (see also Mena-Vásconez et al. 2016; Hidalgo et al. 2017). A book published by the indigenous group 'Cayambis' (GADIP 2015:71, own translation) states:

> *Not only the floriculture in itself has teared up the Cayambis, but also the lack of a fair market has impeded the communal undertakings of the population. The hegemony of an unjust trade favours big producers and not the small ones.*

In addition, gender relations changed because of the high number of women working in the flower industry. This situation made them more economically independent, which changed also cultural gender norms (Korovkin 2003; Ferm 2008).

In recent years the working conditions and environmental impact of flower production have improved (Soper 2013). Several factors have contributed, such as the rise of a more conscious market in the West, which has spurred the growth of standard- setting organisations like Fairtrade International and Rainforest Alliance. These organisations have taken interest in the flower industry and started working together with some flower companies, assuring the consumer that the working conditions on plantations comply with the standards. However, as will be seen below, many other factors have contributed to improve the flower production process: (1) the increased minimum wage set by the national government; (2) competition over workers among big and small flower producers; (3) the struggle of peasant communities and irrigation water users' organizations over the re-allocation of irrigation water; (4) the pressure of local environmental NGOs like Agronomes et Vétérinaires Sans Frontières (AVSF) and CEAS; and (5) national, provincial, and municipal environmental regulations.

5.4 Flower certification

Recent years have seen the rise of a commitment in the flower sector to combat the problems outlined above. Several governmental regulations have been promulgated to monitor the flower sector. Besides these government regulations several private standards have been created by international organisations to reduce the negative social and environmental impact of flower production. Some companies, however, also wanted to give their flowers a better position in the niche market for sustainable and fair -trade flowers. This section gives an overview of different standards in floriculture. Furthermore, the audit process of the certification is described and analysed.

These standards are set in a top-down manner at a global scale in a 'closed space' as defined in the power-cube analysis presented in the conceptual framework section. Private certification practices normalise the idea of regulation through competition in the global market. This empowers the companies that set the standards through the 'invisible power' of the neo-liberal discourse. The big flower companies are empowered because they gain market access (without much monitoring of their

practices), legitimise the use of water for irrigation (because they are 'efficient'), and set the norms about production. Thus, certification strengthens the universalisation of, for example, the 'efficiency' norms of water use. This is a form of hidden power, as the certification bodies predetermine the agenda for the discussion on impacts of the flower industry. It becomes an 'invisible' form of power (a 'governmentality') because the norms are accepted and internalised by the farmers that start to regard their own water-use practices as 'inefficient'. Small farmers consequently accept the large share of the scarce irrigation water taken by the big flower companies.

Below we describe the five most used private standards: (1) Flower Label Program (although this programme ended in 2016 it is interesting because it was the first programme and stands out because it was set up by NGOs together with flower companies); (2) FlorEcuador, (3) Veriflora, (4) Rainforest Alliance, and (5) Fairtrade. Most big flower companies interviewed exported flowers certified by one or more certifying companies, although some reported to not engage in, or not need, certification. The Flower Label Program (FLP) was the only programme where standards were developed with the involvement of local worker unions of flower workers, environmental organisations, farmers' organisations, local or national governments or consumer organisations. In the other cases the standards were set by the standard standard-setting company with some consultation of sector stakeholders. An example of stakeholder involvement in standard setting is the 'Revision and Stakeholder Review Process' executed by SCS Global Services for the Veriflora standard (SCS Global Services 2013). However, as indicated by Bacon (2010) regarding the participation process in the setting of the Fairtrade standard, the decision-making power of affected stakeholders is limited.

Certification is especially relevant for companies exporting to countries in the north of Europe and the US. Other countries, like Russia, China, and Spain, do not require certification. A flower company owner said:

> *In Russia and China, they do not care about our working conditions, they do not need any certifications or labels to prove anything. In the United States they care just a little bit, but it's more the people in Europe who are more conscious and demand sustainability or things like that* (personal communication, 11 May, 2017).

A former broker responds to the question on sustainability and the market's demand: "*No, no, we do absolutely nothing with sustainability. It really does not matter in our business, it's not a subject. […] Organic flower farms? No that is impossible, nor is it very interesting*." (Marcelo Vallejo, personal communication, 13 May, 2017). Flower businesses have a choice which market they want to focus on. Many sell to Russia, a country not interested in certifications. However, some farmers are anxious because the recent crisis left many businesses bankrupt. They spread their risk by selling to the United States, where certified flowers are a growing niche market. About one out of three flower traders in the US requires a label (manager of a 20-ha flower company, personal communication, 10 April, 2013). A former inspector of the FLP Flower Label Program, Orlando Felicita, noticed that many of the big flower company managers wanted to get a certification because of peer-pressure: he paraphrased this idea as follows: "'*if the neighbour has a certification label, we also want one*'" (personal communication, 2 April, 2018).

Flower companies constantly apply strategies between market opportunities, with different certification requirements and costs for certification. As many traders who sell to Russia, Southern Europe, and China do not require certification of flowers, the producers do not really need to have their flowers certified. This can leave flower producers quite critical toward standards standards-setting companies. The standard-setting companies are dependent on the flower producers, and thus have an incentive to reduce the strictness of the criteria. This causes a 'race to the bottom' regarding the strictness of the standards between the companies that compete in the market for standards (Balas et al. 2008). This is a form of invisible power, where the acceptance of the economic discourse (or neo-liberal governmentality) gives power to the big companies that gain market access and legitimise water use, without much strict monitoring.

5.4.1 Flower Label Program

The Flower Label Program (FLP) was established in 1999 in Germany by NGOs and flower businesses. It was a round table certification initiative set up by Brot für die Welt, FIAN, and Terre des Hommes. It worked in several flower exporting countries like Ecuador, Colombia, and Kenya. In Ecuador they worked together with the NGO CEAS. In 2006, there were 56 Ecuadorian flower companies certified with FLP

(SIPAE 2016). It stopped in 2016 because the certification scheme did not involve third-party auditing.

CEAS was quite successful in putting the health effects of pesticide use in the flower business on the political agenda. They put pressure on the big flower businesses to reduce pesticide use and introduce measures to protect flower workers from being exposed to pesticides during their work in the greenhouses. They also put pressure on the government to regulate the use of toxic pesticides (Breilh 2007; Breilh et al. 2009).

5.4.2 FlorEcuador

With their head offices in Quito, Expoflores is an association of big companies that started in 2007. They report to cover 80 per cent of all flowers exported from Ecuador. All their companies are bigger than 15 ha. Expoflores only recognise the existence of around a hundred large flower companies, of which they represent about 30. Members pay a monthly fee depending on the area of greenhouses. Every three months they come together in an assembly to discuss recent and future developments. The association is not in charge of export, all members having their own clients and post-harvest facilities. According to the local representative of the organisation in Cayambe, "*the advantage of working as an association is that you can get more done, share information, and you can also make better deals with, for example, the government*" (personal communication, 10 May, 2017).

Expoflores developed their own standard, FlorEcuador, in 2007. Nowadays, to be part of Expoflores the FlorEcuador certification is required. The standard of FlorEcuador has nine obligatory criteria and 121 criteria of which 80 per cent must be met (Expoflores 2016a). From the obligatory criteria two stand out: one that forbids child labour under 15 years, and one that requires the flower company to have an environmental licence (see below). The other 121 criteria are mainly general requirements relatively easy to satisfy (Expoflores 2016b). Exception An exception is the criterion on quality of effluent water, which is strict. However, the four criteria for 'rational water management' require only a water quality test if the water is used for human consumption, a licence for the use of pumped irrigation water, and a registration of irrigation water use. As a certification can be obtained by meeting only 80 per cent of the criteria, the strict criteria can be circumnavigated. Auditing is done by Bureau Veritas Ecuador.

5.4.3 Veriflora, SCS Global Services

Veriflora is a programme developed by Scientific Certification Systems Global Services (SCS Global Services) from the US. Their vision is: "*…providing cut flower and potted plant producers from all over the world with a detailed roadmap to satisfy the emerging market for sustainable products*" (Jennifer Watters, SCS, personal communication, 20 March, 2017). The audits are done by SCS Global Services. In 2012 in Ecuador 15 flower companies had the Veriflora label (SCS 2012a).

The Veriflora standard, Version 3–1 (SCS 2012b), has nine 'elements' with a total of 152 criteria grouped in two 'Tiers'. Flower companies should comply with all prerequisites (Section 6 about planning and registration) and the 50 'critical requirements'. Furthermore, of Tier 1 criteria, 90 per cent should be met. From Tier 2 criteria 80 per cent should be met. The obligatory criteria require compliance with local legislation, such as pesticide use, record keeping on resource, and input use and planning. Most of the criteria are formulated in a non-quantitative and multi-interpretable way. For example, criterion 9.0 (Element 3), Tier 1: reads:

> *Water conservation is an important component of sustainability. The Producer is required to conserve water through the use of effective water delivery systems, conservation and monitoring methods and technologies, and the institution of water quality management practices to protect the quality of these resources.*

A more strictly formulated criterion is 9.1.2.6. (Tier 2) on irrigation: "*The Producer shall install irrigation systems that minimise water consumption through direct application to the root zone".* However, while all big flower producers comply to this criterion as they all have drip irrigation, this does not guarantee the absence of negative effects of over-extraction of local water resources or competition with local water users.

Criteria for water use refer to 'increased use efficiency', 'water conservation', and 'water saving'. This appears sustainable; however, the production of flowers or any other crop requires a certain volume of water per unit of product. Most of the time, keeping other input constant, reduction of application of this volume of water will reduce the production and thus will not change the amount of water used per unit of product, (see Van Halsema and Vincent, (2012), for further explanation). If

beforehand more water was applied than needed by the crop, this water would runoff or drain to surface water or aquifer and be available for use by other users. Thus, the reduction of applied water will only lead to so-called 'dry water savings' (Seckler 1996), implying that this 'water saving' is not a 'real' one. At the same time, the dominant discourse of 'water use efficiency' is a powerful discourse that provides legitimacy to certification and the flower companies that are certified, and at the same time disempower the small flower producers that do not use advanced irrigation technology. This is a 'hidden' form of power in Gaventa's terminology.

The Veriflora criteria for labour conditions and rights are stricter than the environmental criteria. In conclusion, although the criteria on pesticide use forbid the most toxic chemicals to be used, the environmental criteria are permissive and will not prevent negative impacts on the environment.

5.4.4 Rainforest Alliance

Since 1992 Rainforest Alliance (RA) certifies banana plantation agriculture and since 1993 forests. In 1995 RA certified the first coffee farms, and in 1998 RA launched the Sustainable Agriculture Network (SAN), dedicated to providing standards for sustainable agriculture. In 2001 RA started certifying flower producers.

The RA Sustainable Agriculture Standard (RAS, Version 1.2, July 2017) has five principles, and includes two categories: (1) 37 Critical Criteria, and (2) 82 Continuous Improvement Criteria (Rainforest Alliance 2018a). RAS has seven Critical Criteria regarding environmental protection: criteria 3.1 to 3.7. They concern Integrated Pest Control plans, disposal of wastewater, and use of sewage water. They prohibit the use of genetically modified organisms (GMOs) and certain pesticides and spraying agrochemicals from airplanes when plantation workers are in the field.

Regarding the Continuous Improvement Criteria, to remain certified farms must demonstrate an increasing degree of compliance with them over time. The system evaluates farms according to their level of implementation of good sustainability practices, from 'Good' (Level C) with 65% after one year, to 'Better' (Level B), with 50% after three years, and to 'Best' (Level A), 50% after six years. Examples of Continuous Improvement include: Water-related criterion 3.16: "*Any new irrigation system is designed to optimise crop or pasture productivity while minimising water*

waste, erosion and salinization" (Performance Level C) and criterion 3.19: "*Based on record-keeping, the farm demonstrates reductions in water used for irrigation, processing, or cattle production per unit of product produced or processed*" (Performance Level A). These criteria relate to 'water savings' and 'efficiency' lead to 'dry water savings', like the criteria of the standards described above.

In 2018 a total of 45 large flower producers in Ecuador had an RA Sustainable Agricultural Standard certificate (Rainforest Alliance 2018b). The audit company in all cases was the Ecuadorian company called CyD Certified.

5.4.5 Fair trade

Fair trade certification started in the 1980s by non-profit organisations in Europe to help producer organisations of smallholder farmers in the Global South. The advantages for the smallholder farmers were, firstly, to have long-term contracts to sell to an international market, and secondly, in a minimum price in case the world market price would plunge, advance payments, and an additional premium payment to the producers' association to spend on collective assets. In 1997 the Fairtrade Labelling Organisation (FLO) was started, named Fairtrade International (FI) since 2009. FI now certifies over 300 products in 66 producer countries and sells in 120 consumer countries (Lyall 2014). Apart from FI also other fair-trade organisations exist like Fair Trade USA, the World Fair Trade Organisation (WFTO), and the European Fair Trade Association (EFTA). FLOCERT, ECOCERT and SCS Global Services are their auditing companies.

Since 1994, certain products produced on plantations can be Fairtrade certified. This is an important break with the original idea. Here, labourers should be assured certain labour rights, and the association of plantation labourers will receive the Fairtrade premium. First tea and bananas from plantations were certified, and from 2001 flowers. Both Fairtrade tea and flowers are only sourced from plantations. Also, specific environmental criteria apply.

The standards are set in consultation rounds with representatives of the producers' associations and retailers. Bacon (2010), however, showed that smallholder coffee producers have little say in the important price-setting phase. The first flowers from Ecuador were Fairtrade certified in 2002. In 2016 a total of 12 flower companies had Fairtrade certification according to Valeria Bedón of the Ecuadorian Fairtrade

promotion association CJEC (personal communication, 11 May, 2016). Similar numbers are also reported for earlier years by Lyall (2014) and TransFair (2010).

There are mixed results from Fairtrade certification in Ecuador. Raynolds (2014) found that overall workers of flower companies in Ecuador were satisfied with the working conditions and that labour relations were more stable in Fairtrade Fairtrade-certified flower companies. However, she also found that labourers were not allowed to join worker unions. Grosse (2016) showed that Fairtrade certification in flower companies in Ecuador did not give sufficient attention to the needs of female labourers with children:

> *Women described generally good working conditions, but highlighted their job's long hours, low pay, and inadequate childcare. Their job necessitated that they organised private 'gendered economic strategies' (…) for securing childcare – —strategies which allowed them to provide financial support for their children, but which strained their ability to fulfil gendered expectations about care. Despite its benefits (…) fair trade provides insufficient support for care in its standards and production structures. In this case, it falls short of facilitating care arrangements that would further development* (Grosse 2016, 30).

Furthermore, most consumers of Fairtrade flowers expect to be helping smallholders[35]: "*Sales are being driven by consumer's belief that organics are healthier, more nutritious, better tasting, better for the environment and better for smallholder producers*" (Tamaki 2013:183, emphasis added). However, contrary to what most consumers expect, the 12 Fairtrade Fairtrade-certified flower companies in Ecuador are big companies, and the many small flower producers in Ecuador do not have, and cannot obtain, a Fairtrade certification. Small flower producers cannot obtain a certificate because no specific Fairtrade standard for small flower producers exists. Small flower producers mostly employ one or two permanent workers. That disqualifies them as 'small producers' as defined by Fairtrade regulations (see Standard for Social Producer Organisations on www.fairtrade.net).

[35] In a research about fair trade coffee in France, De Ferran and Grunert (2007) found that 25 out of 44 respondents mentioned "'small producers organisations'" as a reason to buy fair trade coffee.

In Cayambe-Tabacundo some 170 small flower producers organised themselves in a producer association named AsoAgriPedro, which will be described in more detail below. According to the spirit of fair trade, one would expect them to be able to get a certificate. However, this is not possible: small flower producers cannot get Fairtrade certificated as big companies do, which disempowers the former. Simultaneously this shows the hidden power of the certification as fair-trade flower consumers think they buy from small producer associations but can only buy Fairtrade flowers from big companies.

5.4.6 Other standards

Besides the above-mentioned standards, other standards exist. For example, the Dutch MPS offers a variety of standards (MPS-ABC, MPS-SQ, MPS-GAP) with a varying degree of strictness. To our knowledge, only one producer, the large flower company Princess Roses, a Dutch company exporting to the Netherlands, had the MPS-QS and MPS-GAP labels in 2018. Another standard is the Business Alliance for Secure Commerce (BASC) standard that guarantees against trafficking of drugs (BASC 2018). Many large companies have this label, but it does not include social or environmental criteria.

5.5 Auditing practices

Inspections are done by private auditing companies. In Ecuador several national and international private auditing companies provide such services: CyD Certified, ECOCERT, FLOCERT, SCS Global Service, Bureau Veritas, Control Union, Ceres Certified, and Kiwa BCS ÖKO-GARANTIE. The inspection costs are paid by the flower companies. Auditing of the flower companies usually takes place once a year. Normally the audit visits are announced beforehand. During the audit experts will visit the producing premises. If any findings result from the audit the flower companies have the opportunity to improve their practices. The audit company usually gives 4 to 12 weeks to show proof of such changes to comply with the standard (manager of a 20-ha flower company, personal communication, 10 April, 2013).

The competition between audit companies results in their becoming more permissive. A company that applies the environmental and social regulations strictly will soon face a declining number of companies that contract them for audits. This is

a second 'race to the bottom' besides the setting of the standards themselves (explained above). Auld et al. (2008) reported that in the case of corrective action required in forest management for FSC certification, most requested improvements related to documentation and reporting practices, not to actual changes required on the ground.

Several reports (Auld et al. 2008; Albersmeier et al. 2009; Gulbrandsen 2009; Klooster 2010; Jaffee 2012) suggest that field audits by private audit companies face many problems, such as multiple interpretations of criteria and susceptibility to fraud, thus making auditing much less effective than is claimed. Auditing is also vulnerable to pressure from the audited companies as they are paying for the audits and could switch to a competitor.

Flower certification is buyer-driven: the flower companies, unlike most organic producers, are only interested in fulfilling the standards to gain access to the market. As only a relatively small part of the market requires labels, only those producers with relatively good practices bother to get a certification, while the other companies sell to less demanding markets like Russia. This implies that for the flower sector in Ecuador overall, certification does not improve practices. This effect has been described for forest management by Auld et al. (2008) and Klooster (2010), and for the fishing sector by Gulbrandsen (2009). This was also experienced while doing the field research in Cayambe-Tabacundo, during a visit to BellaRosa, a seemingly perfect flower farm one would like to work at, with air-sucking devices to kill insects and all workers in protective clothing, but it was only one of the very few farms willing to be interviewed. Two other big companies were visited; their greenhouses were very different from BellaRosa's: green and purple substances were dripping, and the air was stingy. For individual companies it is hard to tell if practices improved because of compliance to standards, or that other factors like internal motivation of the owner or managers, competition over labour force with small flower producers, or if pressure from government agencies, farmer communities, or NGOs induced the improvements.

Another limitation of the inspections is that the auditors only inspect the company itself and disregard the social embeddedness and environmental surroundings of the flower company. An employee of the NGO AVSF in Ecuador explained (Sylvian Bleuze, personal communication, 21 March, 2017):

> *Certification schemes often just look at one company and how they, for example, manage their water. They don't study what kind of impact the company and its water managing practices have on a bigger scale, the community or the entire water shed. They barely look at the bigger picture*.

What inspectors also disregard is that part of the exported flowers is produced by the many un-certified smallholders and sold to the certified big companies.

As big flower companies do not depend on private third-party certification to sell flowers, they have quite some power over the auditing companies. The system of third third-party auditing by competing private companies is set globally in a 'closed space'. This norm is a form of invisible power, empowering the big flower companies.

5.6 Government regulation in the flower sector

The Ecuadorian government has four types of government regulations with potential to reduce the negative effects of flower production: environmental licences, municipal spatial planning, national environmental and social standards, and Agrocalidad.

5.6.1 The environmental licence

The first one regulation is the environmental licence. This is obtained by presenting a detailed Environmental Impact Assessment (EIA) to the regional environmental authority (Autoridad Ambiental de Aplicación Responsable, AAAr), this being most of the time the provincial government. These EIA reports are conducted by specialised companies. An example is the case of the EIA of Fiorentina Flowers (MoyaGest 2016). The EIA report is lengthy (300 pages) but provides hardly any critical information on environmental or social impacts of the flower company. This monitoring instrument seems to be mainly a 'paper exercise'. Thus, the EIA studies of the big flower companies are a form of 'hidden power': they are presented and accepted as an instrument to regulate the flower sector, but detailed study of the reports reveal that potential environmental impacts and risks, like water contamination or competition with smallholders over water, are not addressed.

5.6.2 Municipal spatial planning

The second type is the municipal spatial planning. The municipality grants permission for the building of a flower greenhouse. They It checks against the local regulations and land use planning policies. An example of such regulation is that in Pedro Moncayo greenhouses should not be built within 50 metres from of houses. However, regulations differ per municipality and monitoring is permissive in most municipalities. For example, in Pedro Moncayo many greenhouses have been built very close to houses.

5.6.3 Environmental and social national standards

Thirdly, the national government has several standards that prohibit the use of certain pesticides, standards for water quality, work conditions, and minimum wage. The constitutionally- ordered annual rise in the minimum wage over the last decade has been a significant advance in government regulation of the flower sector. In 2007, when President Rafael Correa came to power, it was US$170 a month. Ten years later it has risen to US$375, one of the highest in Latin America and covering all basic basket goods. Since the wages paid in other flower exporting countries are lower, competition has become tougher for the Ecuadorian flower producers. However, it has meant an improved socio-economic situation for the flower workers in the highlands who all get paid at least the minimum wage.

In terms of regulating for compliance, prohibition of toxic pesticides seems effective (Breilh 2007), the salaries paid have kept pace with the rise of the official minimum wage, and work conditions have improved (Soper 2013).

5.6.4 Agrocalidad

The fourth is the monitoring system done maintained by a special government agency called Agrocalidad. Respondents from flower companies report that Agrocalidad is the only government agency that carries out inspections for compliance. They very actively monitor the quality of export products and big flower businesses all reported to be controlled by Agrocalidad. They mainly control the number of aphids and thrips on flowers. As all imports of flowers into a country from Ecuador might be blocked completely if aphids are encountered in a cargo, it is in the interest of all flower exporters to be very meticulous in control. The national government has taken upon itself to do this monitoring. Agrocalidad inspects big

farms weekly; when there is a problem with the flowers, they come twice a week. Smaller farms are also checked, around once a month, but there are more small farms than Agrocalidad has registered and thus not all are checked. They also keep an eye on the use of forbidden chemicals in the farms. A former inspector for the FLP said that although the most toxic agrochemicals-chemical are prohibited, some workers of the big flower companies used the 'strong' chemicals to attain higher quality roses, demanded by the export market, even without their managers knowing. The sale of agrochemicals-chemicals is not well monitored by the government (Orlando Felicita, personal communication, 2 April, 2018). Thus, Agrocalidad sets the agenda by only monitoring pests, and not environmental or social problems: this is a form of 'agenda setting' or 'hidden power' exercised by the national government.

5.7 Local struggles for improvements

From the perspective of certification programmes, it seemed the reduction in toxic pesticide use and improvement in labour conditions were the result of the certification programmes. From the perspective of the government it looked like it had firm control over big flower companies and enforced the improvements.

Studying the reality of the changes in Cayambe-Tabacundo we have learned that local struggles for improvements have also been crucial. Three such local struggles are described in this section: (1) the fight over the Tabacundo irrigation system; (2) the fight over labourers and labour conditions between the big and small flower producers; and (3) the launch of AsoAgriPedro, a small flower producers' organisation.

5.7.1 Fight over irrigation water control

Water for the big flower companies in the area is mainly provided by the Tabacundo irrigation system. It was built some hundred years ago and managed by the municipality until 2006. The about approximately 90 big companies with 1,045 ha share the irrigation canal with some 2,500 smallholders, with a total of 2,400 ha. The allocation of water has been very unequal: annually big flower companies receive eight million cubic metres, while the many smallholders only receive two million cubic meters metres (Mena-Vásconez et al., 2017).

In February 2006 the smallholders organised a protest march and took control of the canal. From that time onwards, the water users' association of the smallholders, CODEMIA, managed the irrigation system. They still allocate water to the big flower companies, because many family members of the smallholders work in those companies, but slowly the water has been reallocated to the smallholder sector. The big flower companies have built rainwater storage reservoirs and drilled deep wells. More strict control over water distribution has resulted in improved water availability for the small-scale food producers in the tail-end sector of the canal (Mena-Vásconez et al., 2017). The increased access to irrigation water resulting from the struggle of the smallholders over the control of the irrigation system helped many smallholders to start their own small flower greenhouse. However, in two out of five irrigation sectors the board of the water users' organisation forbids the establishment of flower greenhouses (see also Mena-Vásconez et al. 2017). These local struggles are forms of 'claimed spaces' in water governance. The local water users' organisation applied visible power when they marched to take over the control of the canal.

5.7.2 Competitive labour market

Small flower producers compete with big flower companies over labourers. This forces big flower companies to treat their labourers better than before, for example spray less insecticides in the presence of the workers and pay higher wages. The head engineer at the company 'BellaRosa' (53 ha) spoke of his view on the smaller businesses:

> *The competition with smaller flower producers is quite tough. It is quite unfair because there are a lot of illegal small flower farms which do not pay royalties or do not comply with working condition standards. These small farms should work together to reach the standards and comply with all the rules. If they do, you won't be hearing me, because then it will be fair competition* (personal communication 20 March 2017).

The advancement of small flower producers empowers the labourers as they have a better position to negotiate labour conditions (thus claiming a space for decision - making according to the power-cube conceptual framework). Many workers prefer to start their own small greenhouse because it allows for flexibility in working hours and might reward entrepreneurship. Others prefer the stable income from working

with a large company, with the tighter labour market giving them a better negotiate negotiating position.

5.7.3 The launch of AsoAgriPedro

Since early 2017, after two years of preparation, there is an organisation of small flower cultivators, AsoAgriPedro, has been established, with 169 proprietors, altogether owning 300 ha. Head administrator Isabel Sánchez talked about the process so far. She had a relatively big farm and she was independently selling to clients. Some neighbours asked if she could help them do this too, and thus she started the initiative with ten other small (flower) producers. The municipality of Pedro Moncayo supported them and gave them land where they located their headquarters and post-harvest facilities. Since April 2017, the governmental body of the Pichincha province showed their interest and offered to help increase their technical capabilities.

Once per month all members come to the assembly. Absences are paid with a five-dollar fine. During the meeting they discuss problems and design strategies for the future. They share a post-harvest facility and manage the export of flowers together. There is an appointed sales commission. It contacts clients and designs commercial strategies. Furthermore, there is a board of 27 members, a 7-people administration unit of seven, and 30 post-harvest workers.

There are no requirements to be a member of the association, only to be registered by Agrocalidad and have all the legal papers. There is no member fee, but per sold flower, a couple of cents are paid to the association. A lot of the farmers spoken to had never heard of the association before nor were interested. According to one man "*You are better off alone than with one bad partner*" (Raúl Moreno, personal communication, 10 May 2017). Others, who had also never heard of the association, wished they knew of one, because they did see advantages. Marcos Gualavisí, a small greenhouse owner: "*There is no help, but there is a will. We need help*" (personal communication, 8 May 2017). Ana Farinango with her farm, "*where work is 24/7*": "*I don't have the time to associate with other small businesses*" (Ana Farinango, personal communication, 4 March 2017). For her, her flowers are "*like her children*" and thus she is also afraid to share her flowers with others in an association. Nevertheless, she did comment on being interested in an association (see below).

On the question where change must come from, she answers:

> *Change needs to come up from below. We need to realise we are not* 'pequeños productores' *(small producers). Thinking that is a big mistake. As an association we are the biggest flower business of Ecuador, which makes it even more important for us that we focus on the social side of things and we take care with, for example, the chemicals we use.*

Isabel Sánchez did admit that working conditions might not have been as depicted by law, as, for example, children did help their parents in the greenhouses. Certifying these farms might be difficult, but the association was not looking for that: "*Big companies need to keep their glamour, that is why certifications like Fairtrade may appeal to them, but for us that is not important right now…*"

This associativity might be becoming a trend, but it is too early to say. Ana Farinango (personal communication, 10 March 2018), having just surmounted her initial fears of associating, is now leading a group of six floriculturist women in her community. Her goal is to eventually establish a formal association yet for now she is happy with all of them contributing, in typical *minga* fashion to build their own post-harvest facility; she is investing there the small surplus she managed to accumulate after a relatively successful Valentine's season as she is not able to get more official credit from the national bank. There she will have cold storage facilities to collect and process her roses and those of the rest of the group and beyond. Besides forging ahead, she wants her neighbours to avoid the high risks and hassle of depending on flower traders that she has been suffering for years.

AsoAgriPedro and other, smaller, flower producer associations could be understood as claimed space opening room for manoeuvre and financial gain for smallholders, albeit being disempowered because they cannot get Fairtrade certificated. If they can export directly, without big flower companies or traders, the smallholders gain economically. However, the precarious success of the small flower producers could also be analysed as contributing to the invisible power of economic discourses that value money over food sovereignty, and private entrepreneurship over identity as collective food producers. This discourse empowers big and small flower entrepreneurs over the small food-producing farmers who need access to irrigation water for their food crops.

5.8 Struggles for water, norms and the power of decision

Mena et al. (2016, 2017) and Hidalgo et al. (2017) show how the desire to modernise the agrarian structure through large commercial flower export companies and the development of transnational agribusiness chains is part of a neoliberal utopia. Rose production concentrates most of the irrigation water available in terms of quantity and safety of service and is used by agribusiness and small rose producers to the detriment of traditional short-cycle crops (Boelens and Vos, 2012; Vos and Boelens, 2018). Export companies can offer higher payments for access to water and maintenance of infrastructure, which, being part of this neoliberal dream in which market forces 'decide' what is best for all, has led to inequitable water allocation practices. The increasing use of water for flower export agriculture in the Cayambe-Tabacundo area has profoundly affected local ecosystems and the socio-cultural fabric of indigenous communities. As a consequence, it leads to the transformation of indigenous societies not only in terms of their modes of access and water management but also in relation to the change of their subjective realities to those of 'modern' and individualised rational producers.

Fundamentally, as Hidalgo et al. (2017) describe, local water security is threatened by the capture of water, now with 'virtual' – but very real and material – water flows in a context dominated by export companies. They control water through a) material and technological forces that alter water flows, b) economic power, c) the influence on national policies and d) the prerogatives to establish production standards applied at the international level. There is also the need for the local population to sell their strength of work. Therefore, 'water' has become a prominent issue in social protests that respond against economic marginalization, ethnic discrimination, and undemocratic governance. To counter the usurpation of their means of subsistence, territories, and water sources, indigenous communities participate in low-profile struggles and, occasionally, in open conflicts. The continued application and proliferation of 'indigenous water rights frameworks' in the daily control of water is a powerful way to challenge dominant power structures and promote their claims on water resources and legitimacy. These struggles question the invasion of the collective water rights of indigenous users and, therefore, go beyond the 'struggles for resources. Indigenous peoples demand the recognition of territorial rights, the equitable distribution of water and the legitimization of authorities and local

regulatory frameworks, creating 'reclaimed spaces' (Hoogesteger 2012, Mena et al. 2016, Hidalgo et al. 2017).

However, these reclaimed spaces are in themselves heterogeneous and even some conflict arises inside them. Territorial rights are claimed by an assemblage of people that could be seen as solid and homogeneous from afar, but that show diversity and at times divergent viewpoints if analysed more closely and from the inside. The equitable distribution of water has been supported by a discourse that puts water and food security at odds with industrial uses for the production of non-edible goods, but some of the local people are now increasingly using water for producing roses and not corn or at least grass for dairy cattle. Could the water and food security discourse accommodate itself to cover also these new tendencies? Part of the facts is that most local rose producers have not completely abandoned traditional crops, which grow next to the greenhouses. They are partly forced by sheer economic necessity - partly autonomous decision to diversify, and thus roses could be deemed not (yet) a total and definitive change of produce but rather a chosen option that may or may not succeed in totally replacing traditional crops.

The paradigmatic case of Ana Farinango (the details of which can be read in section 4.3.2) can be an example here too. She was a 'normal' member of her community. After having worked with cows for all her life, struggling to have a minimal quality of life, she decided to work for one of the many large floricultural farms that had arisen. She did so for years and gathered enough expertise and knowledge to be able, apparently, to start her own micro flower farm. She did that and has been on a roller coaster, the last descent of which has been her small greenhouse being partly devastated by a bizarre tornado. To some degree she was a pioneer who was able to apply her power of decision as to what she wanted to do to escape poverty and desperation. She has even become a leader among local women in similar situations and still has hope of developing their own post-harvest facilities to become even more autonomous and finally sustainably prosperous. But, at the same time, she has had to deal with not-too-transparent traders, harsh credits, she has had gruelling clashes with her kindred and the very community of which she was part before her independence-seeking choices, and, in general, her situation cannot be said to have improved significantly. She has reclaimed much: she is indeed making her own decisions without having left her inherited land, and she still thinks that, even in the ominous situation she is facing now, there is hope for her and the women she

leads. Someday the rollercoaster will stop, and she will be finally in a better, higher position. But she has lost a lot too: her health has been compromised more than once, her community is shunning her, her family has ostracised her too, and even if at times some members have followed her example, when bad times arrive they blame her for leading them on, and turn against her all over again.

How do certifications enter this picture? In terms of local people in general, communities have benefitted from a cleaner water coming out of the farms, and this is due, at least partially, to certification standards. For workers at larger farms with certifications, the standards have meant better working conditions related, for example, to health and timetables. Yet for the people represented by Ana things are different. Ana is aware of certifications and standards but does not see them as an interesting alternative. Even if she wanted them, she might not be eligible for she cannot comply with many of the usual requirements. One would think that at least some of these labels would be perfect for her, but there lies a paradox: Fair Trade, for example, was supposedly established for people like Ana, but there are no small rose growers with a Fair-Trade like certification that would assure them at least good market prices. For Ana, now in a sort of limbo between community and agribusiness, the power and promise of local struggles seem also an unsteady terrain. Perhaps there will be a development in which communities will internally reach a dynamic balance and accommodate within their autonomy and water-security discourse the existence of rose farms. It is possible to think that a large, stable association (or a small group of associations) of micro rose farms would be quite powerful, in a similar way to communities that have become prosperous with cattle. Even if the deep consequences of this phenomenon are unforeseeable, a middle ground can be imagined: associations will be better equipped to meet the standards not only of Fair Trade, and the labels themselves will see these associations as potential important members and may even amend some of their stipulations and procedures. It will depend, basically, on the capacity of local groups to establish these associations, something that has proven quite difficult so far. Trickier to imagine is the impact of these development on the local discourses about autonomy and food/water security.

5.9 Discussion and conclusion

Many drivers exist for changes in social and environmental impacts of export production. CSR policies adopted by private companies often include environmental and social standards that should guarantee a certain limit to negative social and health impacts for the workers involved in the production process and minimal environmental impact for the production locations. However, the actual contribution of those standards to improvements in social and environmental impacts seems limited, not only in themselves, but in relation to other important dynamics that influence the social and environmental impacts of export agriculture.

The case study of large-scale export flower production in the North of Ecuador shows that five factors, besides the private certification, have contributed to the improvement of the practices of the flower industry in Ecuador: (1) the increased minimum wage set by the national government, (2) the competition between the big and small flower producers, (3) the struggle of the peasant communities and irrigation users' organisations over the re-allocation of irrigation water, (4) the pressure of local environmental NGOs, and (5) environmental regulations of the national, provincial, and municipal governments.

Examining the practices of flower certification with help of Gaventa's power-cube provided insight into the ways the practices of flower production evolved, influenced by different stakeholders. Private standards like Veriflora, Flower Label Programme, Rainforest Alliance, FlorEcuador, and Fairtrade had relatively little effect on the practices of the flower industry, because the standards and their auditing systems show signs of a 'race to the bottom' induced by competition between the standards and the auditing companies, leading to permissive standards and auditing practices. The demand for certified flowers is limited to Northern Europe and certain buyers in the US, while a large proportion of the flowers is exported to other regions, like Russia, that do not (yet) demand certification. The standards, however, do empower the certified companies as they gain market access and legitimate water use by large-scale flower producers. The private-regulation discourse behind the standards is a form of invisible power: a neoliberal-type governmentality. The standards, and the EIA regulations of the national government, represent closed spaces within our power-cube analysis, where norms are set without participation of the producers and affected stakeholders. The

internalised norms (like 'efficiency is good') act like invisible forms of power, empowering the big flower companies that have licences and certificates.

A large contradiction was encountered regarding the Fairtrade certified flower businesses. In Ecuador about ten large companies are Fairtrade certified. Contrary to the expectations of Fairtrade consumers, small producers cannot be Fairtrade certified. In this way Fairtrade certification leads to hidden power of the big Fairtrade- certified companies and traders. Since April 2017, a small flower producer association, AsoAgriPedro, has been established with some 170 members. Although they operated in the spirit of fair trade, the Fairtrade requirements did not allow them to be certified. This association trend might still be solidifying, and it may, in the future, be able to benefit from certification, but this would most likely require changes in the required standards.

CHAPTER 6
GENERAL DISCUSSION AND CONCLUSIONS



How long will it take for greenhouses to arrive?

6.1 Introduction

In this last chapter I draw general conclusions based on the research questions and their development in the different chapters, and I also try to link all the different but related topics after the presentation of said chapters. To recapitulate, the four guiding questions were:

1. How have socio-environmental conflicts related to irrigation water developed throughout Pisque basin´s history and shaped the contemporary flower-dominated hydrosocial territory?
2. How have the discursive framings used by two main current irrigation stakeholders – i.e. flower agribusinesses and local peasant and indigenous inhabitants – to defend and foster their values and practices on water allocation developed in the Pisque watershed?
3. How can the recent appearance of small local floriculturists be explained and how does it fit into the food/water security-self-determination vs modernity-efficiency controversy in discursive, legal, and factual terms?
4. How have agricultural certification schemes influenced the socio-environmental conditions in Pisque floricultural practices, and how do small local floriculturists perceive the changes triggered by certification schemes?

6.2 The historical backbone of inequity and the origin of a cluster of discourses

The first question is crucial: the present situation with floriculture as the newest powerful stakeholder in the conflicting politico-ecological scenario of Pisque irrigation is a corollary of a history in which local inhabitants have struggled against and challenged powerful external actors, and they have also adapted to the new circumstances with varied success. The Incas were only a couple of decades in the area. At the one hand, they brought in new hydraulic and governance techniques, at the other, they forcibly introduced peoples from afar and caused a decline in the number of original inhabitants. All this brought about an impact that was deep but difficult to assess in detail; however, but an important upshot of these early germinal events in present-day Pisque is that, as posits the second question, two discursive

framings have arisen and developed: that of local inhabitants claiming basically self-determination and resource sovereignty and defending ancestral territories, versus that of a diverse succession of foreigners that propose mostly modernity, prosperity, and efficiency. These discourses have evolved through times in the face of material, legal, and institutional changes related to new products becoming the centre of agricultural practices, market-related developments, political changes, climatic disturbances, social and environmental conquests, etc. Nonetheless, the backbone of an unequal distribution and the need to contest and struggle seem to persist fundamentally unchanged.

Yet this dichotomy is a sort of generalisation of a complex set of intermingling discursive frames that started when wheat and cows entered the ancestral agricultural landscape of Pisque, and perhaps earlier, and which has become even more entangled with the advent of floricultural agribusinesses and its recent uptake by local farmers. Contemporary water conflicts in the region come from two fronts: an intrusion of external actors that impinge on local rights and beliefs – the latest of which are large flower agribusinesses –, and intra-community clashes, nowadays mainly related to the application of export-oriented floriculture by local families. Thus, a clear-cut division between 'local' and 'foreign' does not render an accurate picture of the situation. On the one hand, there is a local inhabitants' increasing interest on developing flower farms, related in this thesis to the mimetic desire to gain a 'western' lifestyle. On the other, large flower farms have somehow mellowed their unconstrained neoliberal efficiency promotion with a more socially and environmentally conscious position derived from the application of pressure from several fronts. As is shown in the chapters of this thesis, the struggle about water management can only be understood when looking at the four echelons of water rights: the actual distribution, the rules, the authority and the discourse. At a daily basis social struggles are manifest in the water users communities in the Pisque watershed.

6.3 Why did local people adopt international flowers?

This is where the third question becomes relevant. A part of this complex discursive landscape is based on the recent application of floriculture by local farmers. Why would local inhabitants – part and parcel in a struggle to maintain sovereignty and foster self-determination – enter an activity that, firstly, goes against their discourse

and, secondly, is very unpredictable and even dangerous? I have tried to explain this through the desire of persons in ominous circumstances to overcome their situation and "imitate" people they live close to, and many times work for, who are deemed successful and prosperous. Why not be like them doing what they do after having learned the craft while working for them? This is one of the plausible explanations for this uptake, but, again, this is not an easy dichotomy of to-be-or-not-to-be like the successful ones. Local farmers do not gain the supposed prosperity just by deciding to do what the prosperous ones have done. The opportunities, the incentives, the connections are not just there waiting to be used or, at least, it is not as easy to do so as it is for big businesspeople. If Ana's case has taught us anything (beyond her relentless resilience, as that of other peasant men and women) is that life can at times become even harder after the decision of mimicking a desired, supposedly better way of life. This mimetic desire, on the other hand, does not necessarily entail a mimicking *exactness*, either for it is plainly impossible, or perhaps more because people under appalling circumstances still cling to as much as possible of their traditional way of life. This clinging could even foster their autonomy, comfort, and security if there is a societal element that considers their circumstances when entering the world market. This seems to be precisely the case with local flower farms.

6.4 The partial and ambiguous promises of certifications

This societal element is certification. Hailed as the factor behind the improvement of the harsh conditions faced by flower labourers during the first decade of the flowering power era in Pisque (and elsewhere), it has at least two shortcomings against this claim.

Firstly, although it has had some impact, it is not the only nor the strongest force improving rose agribusiness' practices. As has been explained, social movements, official norms, and labour market forces have been at play as well. The main event as per social movements in this scenario comes from the 2006 community-based mobilisation to gain a better control of irrigation water against powerful official and private interests. Regarding official norms at the national and regional governmental levels, sometimes these are even more rigorous than those required by most certification schemes, and their enforcement protocols more stringent. In terms of market forces, the competition of small producers with big companies over

labourers has impelled the former to improve labourers' working conditions. Small flower production empowers the labourers as they have a better position to negotiate these conditions.

Secondly, at least one of the certifications schemes holds that it is meant to help disadvantaged actors to gain a better stand in the agribusiness scenario. Yet, two things are happening: on the one hand, this certification is paradoxically very difficult to acquire by small flower farmers due to their failure to fulfil some standards. On the other hand, some small flower farmers are not very, or at all, interested in certifying their roses. This is either because their flowers are sold to intermediaries that might or might not have certification (thus at least some of the smallholders' flowers becoming certified in a covert way), or because their flowers go anyway to countries that simply do not care about these types of standards. The situation might change if small floricultural farmers overcome the many difficulties faced by the prospect of organising themselves. This could lead to potentially very powerful associations in a similar way to what happened to cattle ranching communities, showing that, adjusting to the new contexts, history does tend, at least partially, to repeat itself. Whatever the future holds in the uncertain economic history of the country, the local people in Pisque will continue to struggle and adapt in a seemingly forever war in which the power of flowers will write one more chapter.

6.5 A political ecology coda

As stated in the introductory paragraphs of this thesis, there are some core issues that make political-ecological studies consistent in their inherent diversity and that explain the coherence of the whole text of the thesis. Yacoub et al. (2015: 23-24; see also Perreault et al. 2015; Escobar 2010; Durand and Sundberg 2019; Swyngedouw 2009; Boelens et al. 2018; Büscher and Fletcher 2018) point at the following aspects:

First, they start from the premise that the *social and economic costs related to environmental change, as well as the benefits, are unevenly distributed*, which accelerates and deepens inequality in terms of *socio-economic, cultural and political injustice*. Second, they coincide in the importance they give to the *analysis of the present based on the analysis of their historical roots and structuring*. Third, they agree on the importance of *inter- and trans-disciplinarity*. Fourth, they seek to *deconstruct the strict dichotomy between nature and society*, to encourage reconstruction of alternatives. Fifth, they *criticise the positivist position that strictly*

separates the scientific knowledge of the environment with power structures based in scientific 'truths', seeking to unveil the political in environmental sciences. Sixth, they favour the *analysis of multiple scales* and their geographic, social and political interrelationships. Seventh, they try to *contextualise political explanations and ecological human behaviour around the environment*. And eighth, they keep a focus on *empirical practices and the problematization of policies and discourses* that affect the environmental reality in specific cases.

Such elements are key to political ecological studies, binding together the great diversity of academic disciplines, thematic domains, regional and case study areas, different scale levels, etc., and covering also the "three academic generations" of political ecology research/action.

So, there is a core coherence in political ecology. In what way is such conceptual coherence manifested in this thesis? Each of the chapters can be analysed against this set of aspects, noting the main elements:

Chapter 2 traces the history of the Pisque watershed by applying the Echelons of Rights Analysis (ERA) framework and the concept of the hydrosocial territory to examine the conflicts over the resources, norms, authorities, and discourses related to the scarce irrigation water. The centuries-old saga of water battles in Pisque is the background and provides contextual understanding of the recent onset of rose agribusiness that inherited the privileges of colonial *haciendas*. The most recent boom of locally managed, small export-rose greenhouses adds complexity to the "food vs. flowers" dichotomy and renders unpredictable the perspectives of the local population of regaining and retaining food and water justice, security, and sovereignty. In terms of the political ecology core issues, in this chapter I have *scrutinised the present based on the analysis the watershed´s historical roots and structuring*. It is precisely this conflict-laden history that has ended up in *social and economic costs related to environmental change, as well as the benefits, being unevenly distributed*, accelerating inequality in terms of political-economic injustice.

Chapter 3 is centred on the framing of values to construct discourses. Communal water management is commonly analysed from an institutional perspective, where collective action rules are studied to explain the performance of shared control over water resources. Often these studies overlook the diversity within the community, the different values and practices of stakeholders within communities, and the strategic framing to legitimise claims and actions. I have used a value-based political

ecology approach to examine the tensions and struggles regarding the Tabacundo irrigation system in the Northern Andean highlands of Ecuador. Thereby it elaborates on the three social justice principles proposed by Nancy Fraser: recognition, representation and redistribution, to analyse communal irrigation system control. Irrigation water in this system is mainly used by large flower producing companies and indigenous smallholders. The stakeholders use different framings to legitimise their claims over water allocation. Framings become effective when they resonate with the value and ideas of other stakeholders. This approach is used to explain some unexpected findings of the fieldwork in Tabacundo: big flower companies that use the lion's share of the canal's water were allowed to continue using the communities' water after the latter took over organisational control in 2006; the large diversity of rules regarding water use among sectors within a single system; and the recent emergence of small community export-flower producers. In this case, my politico-ecological focus highlights and is deployed as a critique of *the positivist position that strictly separates the scientific knowledge of the environment from power structures based in scientific 'truths'*, seeking to unveil the political in environmental sciences, so the conceptual focus does not only critically scrutinise scientific truths but also truths derived from other non-native institutions that have invaded local worldviews, ontologies, as well as forms of production, reproduction, and governance.

Chapter 4 goes deeper into the recent inception of small locally managed export flower agribusinesses and tries to collaborate in the explanation of its origin and consequences. This new boom has intensified physical water scarcity and material / discursive conflicts over water use priorities: water to defend local-national food sovereignty versus water to prop up an export-oriented, non-edible produce. I have examined how the inclusion of peasant flower farms in the capitalist dream – driven by a 'mimetic desire' and copying large-scale capitalist flower-farm practices and technologies – generates new intra-community conflicts over collective water rights, extending traditional class-based water conflicts. I analyse how legal prescriptions will not be effective to deal with this new political arena and interrelational human and socio-natural drama. New allocation principles in Ecuador's progressive 2008 Constitution and 2014 Water Law prioritising food production over flowers' industrial water use are unlikely to respond to smallholder communities' new water scarcities. Instead, decision-making power for peasant communities and their water users' associations on water use priority would enable water user prioritization

according to the smallholders' own preferences. In this chapter, therefore, my empirical-conceptual contribution relates to the *contextualization of political explanations and ecological human behaviour around the environment* as well as accentuating and furthering the understanding of interdisciplinarity *and transdisciplinarity* in political ecology studies.

Finally, Chapter 5 expands the scale of the analysis and focuses on the concepts of Corporate Social Responsibility (CSR) and certifications, analysing both the scope of some of the main global certification schemes and the consequences of these mechanisms for the new small-scale flower producers. Private environmental certifications are increasingly used to set and monitor environmental and social standards for flower export companies worldwide. The corresponding chapter looks at the power relations that shape the different stakeholders' practices in the case of flower production in the Northern Andean highlands of Ecuador. Flower companies have used toxic agrochemicals that affected workers health and contaminated water, which affected ecosystems and human health. The growing flower export production has led to conflicts over water and contamination of the resource. Large rose producers have environmental, fair-trade and CSR certifications required by some flower traders and supermarket chains. However, most standards are permissive, and inspections and compliance were found to be flawed. Strong protests and campaigning by local environmental organisations and water users' organisations have been indispensable to enforce environmental standards and practices. I show how private certification itself was not enough to reduce water contamination; only after pressure by governmental agencies, local NGOs, and water users' organisations started the flower companies to comply to governmental and private certification standards. Moreover, members of the recent boom of local flower producers, on the one hand, generally cannot comply with the standards and, on the other, do not get the right information to fully understand the scope of these schemes or are simply unconcerned. Here, the core issues that I have addressed relate to the need in political ecology studies of an *analysis of multiple scales* and their geographic, social and political interrelationships, keeping a focus on *empirical practices and the problematization of policies and discourses* that affect the environmental reality in specific cases.

One core element that, albeit being transversal is less explicit in my case studies, concerns the need to *deconstruct the strict dichotomy between nature and society* in

order to encourage a (re)construction of alternatives. On the one hand, water – the nuclear element in these discussions – comes from natural fragile ecosystems, mostly within protected areas, around the plantation zone and is 'humanised' through the collective labour and struggles of Andean peasant indigenous communities. On the other hand, local people are constantly in communion with nature. The entwining of nature and society in socionatures is expressed dynamically, for instance, in irrigation networks and hydrosocial territories composed of irrigators' organizations, water rights frameworks, crop and flower production patterns, pastures, lined canals, and greenhouses. Furthermore, most water users' groups resist the full commoditisation and industrialisation of their water and keep a core of cultural and spiritual links to Pacha Mama and other primordial principles, manifested in practices such as *mingas*. From another point of view, this work does aim at deconstructing another type of dichotomy: that between local and external discourses about how to carefully use irrigation water and about respecting and building locally rooted socio-environments. This is how this work might be seen as belonging, still in a budding condition, to the third, post-humanist era of political ecology.

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ANNEX 1
MAIN INTERVIEW FORMAT

0. Cuestionario # | | | |

1. Introducción (uso interno)

1.1 **Nombre de la persona entrevistada:**

1.2 **Función de quien responde en la empresa:** Dueño / Gerente / Otro:

1.3 **Nombre de la empresa o compañía:**

1.4 **Localidad:**

Visita

1.5 Fecha: _____

1.6 Nombre del encuestador:_____

Supervisión

1.7 Fecha: _____

1.8 Nombre del supervisor: _____

1.9 Control de calidad: Está lista □ Rehacer
□ Descartar□

Tabulación

1.10 Fecha: _____

1.11 Nombre del tabulador: _____

2. Dueño/gerente

Nacionalidad, edad y género	Residencia y antecedentes	Contexto
2.1 **Su(s) nacionalidad(es):** 1. 2. 2.2 **Año de nacimiento** 2.3 **Sexo:** • Hombre • Mujer	2.4 **Vive en el país desde:** 2.5 **Sus antecedentes educativos son:**	2.6 **Su trayectoria profesional es:** 2.7 **La razón principal para fundar esta empresa en el Ecuador fue:**

3. Características de la empresa (Parte I)

Productos y Servicios	Sector	Cadena de valor
3.1 **¿Qué tipos de rosas produce y cómo adquiere las variedades?** 3.2 **Aparte de las rosas, ¿qué más produce en esta empresa?** Por favor especifique en orden de importancia: 1. 2. 3. 3.3 **¿Qué otros tipos de servicio presta?** • Otros:	3.4 **¿Es la empresa parte de Expoflores u otra asociación similar? ¿Cuál?** 3.5 **¿Es la empresa parte de una asociación o junta de regantes o consejo de cuenca? ¿Cuál?** 3.6 **¿Qué papel tiene y qué actividades realiza dentro de estas instituciones?**	3.7 **¿En qué punto(s) de la cadena de valor está involucrada la empresa?** • Obtención • Propagación • Provisión de insumos • Producción • Transporte interno • Transporte externo • Distribución local • Distribución externa • Venta local • Venta en el exterior • Otro:

4. Características de la empresa (Parte II)

Estatus	Dueños
4.1 **El estatus de la compañía con respecto a otras es:** • Establecimiento único • Compañía madre • Establecimiento filial de una compañía madre • Asocio • Otro 4.1.1 **Explique**: _____ _____ _____	4.2 **Las acciones de la empresa están repartidas entre los accionistas así:** **Procedencia accionario** **%** *Local (Pisque)* *Nacional* (especifique): _____ *Extranjero* (especifique): _____

5. Dinámica de la empresa

Inicio	Desarrollo en el pasado	Desarrollo en el futuro
5.1 **La firma fue fundada en:** Año:	5.3 **La empresa se ha expandido (+), ha permanecido constante (0) o ha declinado (-) en los últimos 5 años en términos de:** Volumen de ventas + 0 – No. de trabajadores + 0 –	5.4 **Espera que la empresa se expanda (+), permanezca constante (0) o decline (-) en los siguientes 5 años en términos de:** Volumen de ventas + 0 – No. de trabajadores + 0 –

5.2 **La firma inició operaciones en el país en:** Año:	No. de sitios + 0 – No. de clientes + 0 – Costos de mano de obra + 0 – Nuevos productos + 0 – 5.3.1 **Sus razones:**	No. de sitios + 0 – No. de clientes + 0 – Costos de mano de obra + 0 – Nuevos productos + 0 – 5.4.1 **Sus razones:**

6. Situación financiera

Inversión	**Volumen de ventas**
6.1 **¿Cómo se consiguió y cuánto fue el capital inicial para arrancar la empresa?** 6.2 **¿Qué tipo de subsidio o incentivo financiero estatal ha recibido la empresa?** 6.3 **¿Ha tramitado la empresa algún tipo de préstamo? ¿Cuál y de qué características?** • Banco privado • Financiera privada • Cooperativa • CFN • BNF • Otro :_____	6.4 **El volumen de ventas anual en el año pasado fue de:** • Menos de $5000 • $5000 – 19 999 • $20 000 – 49 999 • $50 000 – 99 999 • $100 000 – 249 999 • $500.000 – 999.999 • $1 000 000 – 1 999 999 • $2 000 000 – 5 000 000 • Más de $5 000 000

7. Uso de los recursos locales (Parte I)

Mano de obra	
7.1 **El número total de empleados en esta compañía es de:** # de trabajadores permanentes: # de trabajadores temporales: # de trabajadores casuales: 7.2 **La división en género del personal es (porcentaje):** • Hombres: • Mujeres: 7.3 **División de género entre hombres y mujeres en cuanto a los rangos en los puestos de trabajo:** ***Rango % Hombres % Mujeres*** Puestos altos	7.6 **Comparación del pago de los trabajadores frente al promedio en el área (un porcentaje aproximado: 100% significa igual que el promedio, 50% la mitad que el promedio, 200% el doble que el promedio)):** 7.7 **Las horas normales de trabajo diario son:** 7.8 **Número y porcentaje de empleados que son parte de un sindicato:**

Puestos medios Puestos básicos 7.4 **Porcentaje de personal local o de otros sitios:** • Local (Pisque) % • Otro nacional: % • Extranjero: % 7.4.1 **Localidad más abundantemente representada**: 7.4.2 **Nacionalidad más abundantemente representada:** 7.5 **Detalles de personal extranjero:** **País** **Función** 1. 2. 3. 4.	7.8.1 **¿Ha habido cambios al respecto en los últimos años?** 7.9 **¿Hay alguna perspectiva de aumentar la automatización de los procesos en la empresa?** 7.9.1 **Explique las razones de su respuesta anterior**: 7.10 **¿Ha enfrentado conflictos laborales graves durante la existencia de la empresa? Por favor explique:**

Relaciones laborales					
7.11 **Especifique las iniciativas de la empresa para mejorar el bienestar de los empleados:**					
7.12 **Especifique lo que hace la firma para promover la capacitación y la educación de sus empleados:**					
7.13 **Indique el punto en que está Ud. de acuerdo con las siguientes aseveraciones** *1 = no 2 = casi nada 3 = no se decide 4 = parcialmente 5 = mucho*					
	1	**2**	**3**	**4**	**5**
a. Las regulaciones de salud y seguridad en el lugar de trabajo siempre se hacen cumplir					
b. Existe un procedimiento para vigilar el cumplimiento de las leyes laborales y reglamentos pertinentes					
c. Existe un procedimiento para asegurar que no se tolere ninguna forma de hostigamiento, intimidación o discriminación					
d. Existe un procedimiento para asegurar una comunicación abierta con los trabajadores (manejo de quejas, derechos de los trabajadores)					

8. Uso de los recursos locales (Parte II)

Tierra, agua, energía y contaminación	
8.1 **¿Qué número de hectáreas en total tiene la empresa? ¿Cuánto para rosas?**	8.12 **¿Utiliza fertirriego?** Sí No
8.2 **Antes de poner flores, ¿para que se usaba esta tierra?**	8.13 **¿Posee reservorios y pozos, y de qué características?** (capacidad, revestimiento, profundidad, objetivo)
8.3 **¿Qué se hace con la tierra que no tiene floricultura?**	
8.4 **La tenencia de la tierra está así:** • propiedad privada ha: • propiedad estatal ha: • arrendada ha: años: • comunitaria ha:	8.14 **¿Cuánta agua tiene concesionada y desde cuándo? ¿Ha solicitado/obtenido concesiones recientemente?**
8.5 **La tierra se adquirió:** • tenencia antigua (hacienda) • otra propiedad previa • por compra o arrendamiento • por medio del gobierno • por medio del socio local • Otro: _____	8.15 **Si la compañía comparte este recurso con las comunidades aledañas, explique:** 8.16 **La compañía usa este número de meses al año el agua para riego y tiene estas épocas pico:**
8.6 **El principal uso del agua es:** • riego • procesamiento de la producción • consumo de hogares y oficinas	8.17 **Si la empresa tiene algún procedimiento para disminuir la producción de contaminación o emisiones, explique:**
8.7 **En caso de riego, la cantidad usada de agua es:**	
8.8 **Son parte del sistema de riego o canal de riego:**	8.18 **La empresa mantiene un registro de uso de pesticidas y productos químicos:**
8.9 **La principal fuente de agua es:** • Lluvia • Cosecha de lluvia (reservorio) • Agua superficial (*acequias, canales, ríos y arroyos, lagunas y lagos*) • Agua subterránea (*pozos, vertientes*) • Agua potable • Otro:	8.19 **¿Cuáles pesticidas utiliza, incluyendo controles biológicos?** 8.20 **La empresa usa lo siguiente de fertilizante en kilos por hectárea** (nombre, k/ha/mes)**:**
8.10 **¿En qué porcentaje se usan estas fuentes?**	8.21 **Si la empresa tiene un sistema de manejo de desechos y prevención de contaminación, explique:**
8.11 **El riego se hace por:** • Gravedad % • aspersión % • goteo %	8.22 **La empresa usa tierra de los páramos** (cantidad):

	8.23 **Si hay alguna compensación negociada con la comunidad aledaña por el uso de infraestructura y recursos, explique:**

Ambiente
8.24 **En la empresa se llevaron a cabo las siguientes evaluaciones antes de entrar en operación:** • impacto ambiental • impacto social • impacto en el suelo y la fertilidad
8.25 **Especifique lo que hace la empresa para minimizar sus impactos negativos en lo social y ambiental:**
8.26 **Indique el punto en que está de acuerdo con las siguientes aseveraciones sobre las actividades de la empresa:** *1 = no 2 = casi nada 3 = no se decide 4 = parcialmente 5 = mucho*

	1	2	3	4	5
a. La empresa usa cuidadosamente la tierra					
b. La empresa está aumentando su eficiencia en el uso del agua					
c. La empresa está aumentando su eficiencia en el uso de la energía					
d. La empresa tiene iniciativas para disminuir sus emisiones de gases de efecto invernadero					
e. Hay un seguimiento del cumplimiento de las reglas ambientales					
f. Hay un procedimiento dentro de la cadena de valor para promover el uso y desecho responsables de los productos					

9. Relaciones comunitarias

9.1 **Indique cómo está involucrada la empresa con las comunidades aledañas:**
9.2 **Indique el punto en que está Ud. de acuerdo con las siguientes aseveraciones sobre las actividades de la empresa:** *1 = no 2 = casi nada 3 = no se decide 4 = parcialmente 5 = mucho*

	1	2	3	4	5
a. La firma activamente promueve y apoya proyectos y actividades comunitarios					
b. La firma está colaborando en el mejoramiento de la infraestructura en el área					
c. Si hay actividades con un potencial impacto significativo sobre la comunidad, la empresa tiene procedimientos para minimizar el impacto negativo					
d. La empresa mantiene un diálogo significativo con la comunidad cuando hay preocupación sobre sus productos, sus servicios o sus operaciones					
e. La empresa se involucra en el desarrollo local porque esto tiene un efecto positivo en las ganancias					

10. Responsabilidad social de le empresa

Influencia de los interesados

10.1 **Los interesados más importantes en determinar el grado de responsabilidad social de la empresa son:**

1=Extremadamente negativo 2=Algo negativo 3=Ninguno 4=Algo positivo 5= Extremadamente positivo

	1	2	3	4	5
Inversionistas/financistas					
Gobierno central					
Gobiernos seccionales					
Grupos y organizaciones locales					
Clientes y usuarios					
Comunidad					
Empleados					
Proveedores					
Cambios ambientales					

Responsabilidad, estándares	
10.2 **La empresa implementa algún estándar o certificación nacional o internacional:** • No • Sí: (tipo, nombre)_____ _____ 10.3 **Si está pensando obtener una certificación o aumentar el número de las que ya tiene, ¿cuál?** 10.4 **¿Qué ventaja o desventaja ve en tener alguna certificación?** 10.5 **¿Hay algún interesado en la cadena de valor que presiona de alguna forma para que su empresa tenga una certificación?** Obtentores Acopiadores Transportistas Otros productores Compradores Otro: _____ 10.6 **La empresa implementa los siguientes lineamientos o directrices del gobierno** (tipo, nivel de gobierno)**:**	10.7 **Los principales problemas o cuellos de botella que su empresa enfrenta son:** 10.8 **Qué hace o puede hacer para resolverlos:** 10.9 **Su empresa es responsable en este grado: (10 es lo más alto):** 1 2 3 4 5 6 7 8 9 10 **10.9.1 Por favor, explique:** 10.10 **Los cambios que se han implementado en términos de negocios responsables son:**

	10.11 **Comente sobre sus planes y perspectivas con relación a la Responsabilidad Social Corporativa:**

11. Comentarios:

11.1 Ingrese aquí comentarios extra de quien fue entrevistado:

11.2 Ingrese aquí comentarios de la persona que entrevistó:

ANNEX 2

SUMMARY AND ANALYSIS OF FIELD OBSERVATIONS AND INTERVIEWS AT THE PISQUE WATERSHED´S ROSE FARMS

Introduction

Direct observations and 53 interviews were carried out at rose farms and surrounding areas located in the Pisque watershed as part of the PhD-thesis field work. The interviews were done through a prepared set of questions and to as-much-as-possible rose farms during the month of May 2013. The process was done by three persons, the PhD candidate and two agronomic engineers with experience in field interviewing activities. The visits were done by door-knocking strategies and also, especially for large farms, through scheduled appointments. The visits were performed throughout the entire watershed. In general, smaller farms are quite open, while larger ones are more inaccessible. Although it is not possible to claim a statistical significance nor a high representativeness, it is believed that the data gathered and the observations made structure a valid general picture of the situation of rose floriculture in the area, especially regarding water access and control, corporate social and environmental responsibility, certifications, and the various points of view differently-sized farms have regarding these issues. These findings will be complemented with other available or newly gathered information. Some data obtained through these interviews should prove useful for other investigations. The information from other interviews will be used to round out the analysis.

The following report does not follow strictly the order of the interview questions. In several cases, two or more related questions are analysed jointly.

Location and size of farms

All farms are located within the watershed and/or the command area of its main irrigation systems, which get their water from the Pisque River or its tributaries (one of the systems serves farms outside but very close to the watershed southern boundary). Farms were divided in four size ranges: 0 to 1 hectare, 1.1 hectare to 5 hectares, 5.1 hectares to 20 hectares, and 20.1 or more hectares. Not all of them produce only roses: the larger ones generally include a variety of other flowers such as *Gypsophila* and carnations (*Dianthus*). In one case (the largest one, located outside the watershed) no roses are produced because the temperature seems to be too warm.

In terms of the total cultivation area of farms (which might or not be only roses), the interviews were carried out in holdings ranging from 0.06 hectares (600 sq. metres) to 70 hectares, with a mean of ca. 11 hectares (SD ca. 16) and a mode of 1 hectare. Of 48 interviews, the numbers for the size ranges are 16 (33%), 13 (27%), 9 (19%) and 10 (21%).

If only the extension of rose cultivation areas in each farm is taken into consideration the numbers are the following: 51 answers with areas between 0.06 hectares and 29.2 hectares (mean: ca.6, SD: ca. 8; mode: 0.2). The size ranges count is 26 (51%), 8 (16%), 13 (25%) and 4 (8%).

Exact, updated statistics do not seem to exist, so it is difficult to assess how far this distribution reflects the Pisque rose-farm universe. It is obvious that larger farms are scarcer. A recent event (of the last three years, approximately) is the appearance of an undetermined though seemingly large quantity of micro-farms (up to 1 hectare) and to a lesser extent of small farms (up to 5 hectares). The first ones seem to have sprouted liberally even within urban areas in all the sectors; some people speak of several hundreds of them within the Pisque scenario. This would mean that the sample is not reflecting this circumstance clearly, beyond the fact that micro-farms are indeed more numerous (more than half the sample in the case of rose-producing areas and a third in that of total flower production areas).

Function and expertise of people interviewed in the farms
Of the 53 interviewees, almost half (47.1%) were the owners themselves, followed by "others", i.e. miscellaneous functions including workers, ISO leaders, accountants, production managers, etc. (26.42%), general managers (13.21%) and technical managers (11.32%). This distribution shows two interesting points: first, the abundance of owners indicates the profusion of smaller businesses. Large businesses tend to be managed by specialised hired personnel while 'owners' are either persons who do not work at the farm or are larger companies, while in smaller farms the owner, sometimes with his/her family, is the one taking care of the whole business. This relates both to the seeming abundance of micro- and small farms, and to the fact that the smaller ones open their doors much more easily.

Second, ideally a general manager or a technical manager (besides the owners in smaller enterprises) would be the most apt persons to answer the interview. They tend to have a better general idea of technical and administrative information as well as of historical and even anecdotal data. They also generally have the authority to decide by themselves what information is available for disclosure. The fact that other personnel – perhaps with a better information on certain specific aspects – has answered a large percentage of the interviews could mean a limited data availability, both by direct unfamiliarity with them and by lack of power to make decisions relating disclosure.

All of the owners of small family enterprises (almost all male) had been working for large flower farms for a relatively long period of time and felt that they could start their own farms, based mainly on the accumulated expertise and also on contacts made during that period.

Sex of the interviewees
Of the 53 interviews, almost 80% are men. The smallness of the sample does not allow a deeper analysis relating gender roles and related themes, but this result might reflect a general societal tendency where men tend to hold higher entrepreneurial posts than women, and a particular feature in flower agribusinesses where women are traditionally seen as better suited (e.g. they have niftier hands and tend to be more careful) for manual work related to harvest and post-harvest tasks.

Status of the companies related to others
A vast majority (more than 81%) of the companies were identified as independent enterprises. Some 10% are considered daughter companies of larger holdings and less than 4% mother companies of smaller ones. The relationship to the size of the farms is clear: all the mother or daughter companies are larger farms (although there are many of them that are independent ones too), while all the small ones have independent ownerships. This sounds logical since the smaller farms belong generally to families that do not (yet?) have associations with other farms. It was commented that a way to foster the consolidation of these farms would be to establish associations or cooperatives, hopefully with local or central governments´ involvement through loans or infrastructural facilitation.

Year of establishment and start of operations
The years of establishment and start of operation generally coincide so only one consolidated set of figures will be used. The earliest year is 1985 and the latest 2013, which nicely covers the span of the development of floriculture in the area. There is a noticeable concentration of firms in the years after 2003, with peaks in 2010 and 2012. A second group of (lesser) high years is between 1990 and 1998, with a peak in 1998. Between 1998 and 2003 there is a deep valley (related conceivably to the dollarization and other politico-

economic processes of the years around 2000). Again, the low representativeness of the sample invites careful use of these data, but a single fact is obvious: the last three years have seemingly seen a boom of farms, and all these farms are micro-scaled ones. This fact has to be more deeply established and analysed but can certainly have interesting, perhaps transcendental, implications related to water access and control issues.

Tendencies and prospects of farms relating various aspects

Famer representatives were asked in terms of past tendencies and future prospects (5 years) relating six aspects. The sixth aspect ("new products") has been omitted because the answers referred to different things (varieties, flowers, fertilisers…) that proved non-analysable. The somewhat surprising appearance of many new farms during the last three years made the first part of the question (tendencies during the last 5 years) a bit tricky and the interviewees were asked to make as far as possible an extrapolation.

Sales volume

A bit more than half the interviews show a tendency towards growth, while 28% manifest stability and 17% a tendency towards decrease. The prospects are similar for growth (almost 53%), while only a bit less than 6% think that volumes will decrease, making stability grow to almost 40%). This numbers indicate that in general the interviewed firms seem to be in good shape relating sales, which goes along with the national flower farms association Expoflores´ statistics.

Number of workers and possible increase of automation

The balance between growth and stability is almost perfect relating tendencies (almost 50% each), while a decreasing tendency appears only in less than 4 %. Prospects are more or less similar, but stability grows (58%) and growth decreases (39%), while the probable decrease figure is again less than 4%. This result has to be contrasted with the entrepreneurial discourse about salaries being too high (and growing), which would predict a notable decrease in labour hiring and a magnification of automation processes. The fact is that future stability figures do grow in this sample while the growth figure decreases, which would go along with said discourse: it is not that people are being necessarily fired, but that no new places are being created or refilled. Another fact that refers to this issue is that automation in roses is not as immediately feasible as in other more "standardisable" crops such as gerberas.

The concept of automation itself varied among interviewees since for some, especially in the smaller farms, it involves mostly the use of simple machines such as saws to cut the stem to a standardised length (and in which direct human intervention is needed), while larger farms tend to mean more electronically controlled robot-type devices (which, as said, are still quite limited for rose cultivation). All things considered, almost exactly 50% said that they were thinking of improving automation, while the other half rejected the possibility mainly on cost-related grounds.

Number of sites

In both cases (5-year tendencies and prospects) the numbers coincide: most farms consider that stability is the correct answer (close to 60% in both). The past trend to grow is larger than its prospects (40% and 34% respectively), while diminishing the number of sites seem to be a very low possibility (less than 2% in both). This might bear relation to the fact that, at least through a bird´s view, most of the floriculture-prone land seems to have been used already. The at times astonishing amount of plastic one can see from neighbouring hills as well as the very small farms that have sprouted (and are generally not distinguishable at this landscape scale) bar witness to the last assertion. Nevertheless, it is also true that

there are relatively vast expanses of land that one could imagine is very good for roses but keeps being used for cattle grazing or other traditional agricultural activities. Some new micro sites are quiet far away in the higher parts of the watershed, where the weather is cold, which makes larger roses but with a longer cultivation time. Is it possible that if these farms prove to be sustainable, more local farmers will dare enter rose cultivation in their own plots? There are many interrogations as to why do people still not use certain seemingly "roseable" land. The answers could relate to traditions and food sovereignty, lack of security, lack of training, lack of water, lack of funds, etc.

Number of clients

Relating growth and stability, there is a reversal in figures between tendencies and prospects: the major tendency had been towards stability (53%) while growth shows a 43%, with decrease only less than 4%. prospect-wise, it is 54% for growth, 42% for stability and about 4% again for decrease. This relative optimism might reflect the present boom of certain economies (e.g. Russia, Ukraine and Brazil, perhaps China) and the fact that, even amidst an economic crisis for many developed countries, flowers do not seem to be much affected by it.

Labour costs

Here in both cases the majority of answers point at an elevation (ca. 75% in the past 5 years, ca. 58% prospect-wise). The main reason is always the yearly salary increase decreed by the central government. Flower producers cannot increase the price of their products to counterbalance this fact; this element is always critical, since flowers use around 11 workers per hectare (around ten times what is used for traditional agriculture) so labour costs amount to a high percentage of the expenditures. The relative optimism for the near future might come from a hope that the government will implement some kind of incentive or any other mechanism. It can also from the fact that the newly established micro-farms might not have as much pressure because the number of workers is less and there is a direct participation of family members. As will be seen this type of informality, which can be a pro in certain aspects, can also be a hindrance in others.

Sales

Only 46 interviews answered this question, which is interesting in its own. Those who did not answer were larger farms. Many large farms did not open their doors; in some cases, the interview was possible after a formal appointment. Even with such a procedure, at times they were really adamant to divulge economic information. At least in one case the appointment only served for the manager to ask a formal letter by the rector of the university before any further communication. The figures were put into ten categories of annual revenue (in US$), with their respective percentages according to the answers:

It is prominent that ca. 70% of the farms interviewed belong to the lowest four categories (up to US$ 100,000 per year). However, is also conspicuous that ca. 25% belong to the four highest ones (from US$ 500,000 to above 5 million). One of the middle ranges is even totally absent. This could mean that you have to be either big or small to be successful in rose floriculture, but that would be simplistic and not only in sample-related statistical terms. All the small-scale farms are very new and have at best a two-year sales history, so their success might or not be sustainable beyond the current boom, while all the larger ones have a much longer record. Almost half of the sample reported revenues below 20,000 US$.

A good way to better assess this data is to compare revenues vs. number of hectares for each of the 46 cases. This poses some difficulties. The main one is that not all the extension in all cases is used for roses. Moreover, in the case of large estates the rest of the land is

anyway used for other export flowers or forested areas, while in the small cases it is used for traditional crops (mainly maize, potatoes, wheat, alfalfa and cattle grasses). Therefore, if only roses are used, there would be one type of bias, while if the whole area of production is used, there would be another type of bias. To partially overcome this issue only the total area in plantations of any size which have at least 50% of their land dedicated to roses were used, and the result is a high correlation coefficient of 0.825 between sales range and cultivation area. The following is the corresponding graphic:

Workers unions and labour conflicts

A main concern, at least during the early years, was that of the lack of unionisation of rose farms´ workers. Flower farms, of which ca. 75% are rose farms, contract relatively vast amounts of workers compared to traditional crops. The present Ecuadorian labour law states that following a protocol and with a minimum of 30 members of at least 14 years of age, the workers of any company can freely establish and abolish unions. This means that only larger farms have to deal with this issue. All the relevant respondents answered that there was no workers´ union although the freedom and opportunity to do so were legally there. Some representatives elaborated saying that a union is created to counteract the power and negative actions of employers against employees; if there is no reason to go through the hassle of establishing a union, they just do not do it. In other words, no interviewee stated that there had been serious labour problems in their companies in the last 5 years. Workers do organise themselves in associations that do not constitute a proper union in order to manage loans, sell home or health products at discount prices, etc.

Origin of land property

The main way of obtaining land for the rose farms of the sample is through purchase from former owners that did not have agribusinesses in place (almost 78%). Only one case was of a former rose farm that sold the land to a new one. The more or less widespread idea that many *hacienda* owners decided to change their traditional agricultural practices to agribusinesses is not supported by a high number of answers (9.5%). What seems to have happened mostly is that *haciendas* apportioned their large estates and some of the plots were sold to flower enterprises (or in a few cases stayed as companies owned independently by the same *hacienda* families). Non-*hacienda* landowners transformed their lands to rose farms in ca. 6% of the cases. A relatively large percentage of the "others" category (ca. 13%) is inheritance (ca. 10%). This is a common case among smaller farms where it has been observed that part of the original holding is still used for traditional farming while the rest (at least half) has been transformed into a rose greenhouse.

Water

Water is at the core of the investigation and its analysis within this process has several edges:

Main type of water use

As was expected, 100% of the water is used for irrigation purposes. Potable water is sometimes used for cleaning purposes.

Main source and storing of irrigation water

Almost 70% of the interviewees state that irrigation water comes from surface water (canals, rivers, creeks and lakes). Of these, although there is no specific response, one can assume via direct observation that almost all comes from irrigation systems, especially the two main ones. Some other minor systems were reported too (e.g. Cochasquí in Tabacundo and Razuchupa in Cayambe). Most irrigation comes through secondary or tertiary canals that originate in the main canals. The percentages reported go from 10 to 100, with a mean

of 68 (SD=29.8) and a mode of 90. The relationships established among users around these canals will be analysed later.

The second main source of irrigation water reported is rain and rain harvest (together ca. 18%). Many times, both sources are reported jointly (actually, no direct rain is used for roses). In one peculiar case, a small-medium sized farm (9 ha in the semi-arid area of Tocachi), there is palpably no irrigation system available and the owner says he relies exclusively on rainfall (60%) and runoff water (40%) collected in a relatively large reservoir (which at the time of the visit, during a quite dry spell, was less than half full). With the upcoming inauguration of the large new canal, he might be able to get system water and thus consolidate and expand his plantation; other owners of the zone might be waiting for that water and to see what this person accomplishes to develop their own rose farms. Seven responses provided percentage of use of this source, ranging from 1 to 60.

A main issue here is the reported low usage of sub-surface water (basically deep wells with pumping devices, in very few cases "*vertientes*", natural springs). Some large farms did say they had them as main sources (amounting to 10% of the answers) and jointly with canal water. The percentage of usage of this source was answered eight times, with answers from 1 to 100%. The main question stems from the fact that roses are a thirsty crop that needs water along the year with no interruption. All the interviews report that they need water 12 months per year, different from traditional crops—harvested normally once or twice a year—with irrigation peeks during the months of growth. It would seem at first sight that the irrigation water concessions granted in the past to haciendas and other properties is not enough for roses, so especially large farms would need an extra source, the best and maybe sole one being underground water. The low representation of this use can be explained within this sample from different angles. First, the small representation of large farms also induces the presence of this small percentage. There is also the possibility that some farms do not want to disclose this information. To tackle this problem and others related to water figures, a separate study is being carried out to analyse databases on concessions, flows, sources and other relevant information.

Second, the question refers to the MAIN source, so more specific information needed to be gathered relating to wells. A question was posed relating infrastructure, specifically reservoirs and wells. Relating the latter, some improved information could be gathered. Seven interviewees (ca. 13%) answered positively to the question of existence of wells. The depth was reported between 2 and 200 metres but no specific data on flows could be assembled. All the wells belong to large farms.

Reservoirs exist in all of the interviewed farms. Of 38 valid answers for the main reservoir, the maximum capacity reported is 24,000 cubic metres and the smallest 20 cubic metres. The mean capacity is ca. 3,800 cubic metres. Some larger farms have a second smaller reservoir with a mean of ca. 3100, a minimum of 20 and a maximum of 10,000 cubic metres. A small number report a third and even a fourth reservoir. The reservoirs have varied types of linings. Larger farms tend to have them lined with geo-membranes (particularly impervious polymers) or cement, while smaller ones do so with more common polymers (plastic sheets) or do not have any coating (earthen).

The main purpose of the reservoirs (not only the main one) is water storage for irrigation. The large capacity of some of them is most certainly related to the continuous need of water pointed at in previous paragraphs. It seems that, besides the actual quantity of water reaching them (see below) the general practice is to let as much water as possible flow in in order to keep the reservoirs as full as possible. In none of the interviews was there an overt

concern or anxiety about water not being sufficient. A second use (not widely reported) is oxygenation of water in order to rid it of chemicals: in some cases, water used in the farm is re-stored in the smaller reservoirs to be cleaned and recycled. Some farm representatives assert that no water leaves their premises.

Irrigation method and use of chemical products

All of the interviews report the use of drip ferti-irrigation, in the larger farms with electronic controls. In some cases, showers are used to help clean the plants. It would seem at first that smaller farms would not be able to cope with the very high costs of more sophisticated methods and materials, but at least regarding drip irrigation this does not seem to hold true; perhaps they use material of less quality or have some other forms of diminishing the expenses (besides the small area itself), but this was not obvious through the interviews and observations. Some very small "low tech" farms seemed to have sophisticated underground piping systems, though not electronically controlled. Nevertheless, they do tend to use economical building materials (e.g. frames made of local eucalyptus wood versus much more expensive aluminium frames) and to have unlined reservoirs and limited wind-breaking fences.

Seventy-six per cent of the interviewees stated that they maintain a registry of pesticides and other chemical products. The fact that one quarter dos not do so seems to reflect the size of the venture: large farms have to comply with regulations coming from the central government (especially the Ministries of Agriculture and Environment) and local governments (the municipalities of Pedro Moncayo, Cayambe and to a lesser extent Quito, and the provincial government of Pichincha), the lack of which renders both the official functioning permits and the socio-environmental certifications undeliverable (see below). As far as can be witnessed, smaller farms do not tend to fulfil these procedures and have not yet had (significant) problems with these authorities. This in turn might be a result of the quite sudden appearance of these micro- and small farms, which has made its cataloguing and control a difficult undertaking. A planned inquiry into these issues with the authorities involved will shed more light on the topic, besides what is stated here regarding permits (see below).

Most used for fertilising is a combination of nitrates (calcium, potassium and ammonium), as well as compost made with the remnants of the rose plantations themselves and/or with other vegetal material. Smaller farms also rely on *gallinaza* (chicken dung). Pesticide-wise, they are officially categorised according to colour labels: from red (extremely or very dangerous to human health) to green (organic) passing through yellow (medium) and blue (light). Red-label pesticides are forbidden and no longer available, and there seems to be a tendency to use as much friendlier pesticides as possible. Some large farms use *Trichoderma* fungi as fungus control agents and aphid-eating aphids. Especially smaller farms use other alternative means of pest control such as molasses. A common method in larger farms is the use of sticky plastic ribbons laid out around the rose flowerbeds where insects are caught. It also serves as a way to catalogue the insects present. In some small farms birds—(mainly great thrushes, *Turdus fuscater*)—were eating rose buds (thus ruining the flowering process); they were chased off with scarecrows or lured away with ripe fruit inside the greenhouses. Birds do not seem a concern in larger farms. In some larger farms, water that has been used to ferti-irrigate is collected in small reservoirs where it is treated and reused. As said, some of them claim that no water leaves their locales.

Treatment of solid waste and flower refuse
Solid waste seems to consist mainly of old greenhouse plastic and bags and bottles of chemical products. It has been seen that old plastic is used in the farm or in households around them for miscellaneous purposes. Plastic and bottles are also gathered by two enterprises active in the watershed, one municipal and one private, after having been cleaned inside the flower farms. This process has not been witnessed. A short visit to the municipal enterprise (a permit is needed to enter) showed that indeed thousands of chemical containers and bags had been gathered and were in the process of being used as part of the material for a landfill. A planned visit to the large private enterprise was not fulfilled since there was no answer to get the needed permit.

Flowers have to meet very stringent criteria to be exported. All the material that does not do so either is sold in local markets at a fraction of the international price or is used as compost material (plus the leftover stalks after cutting to standard lengths). Large farm owners concurred in stating that smallholders are extremely meticulous in taking care of their plants and flowers since they cannot afford to lose any produce. At least one large farm uses non-prime material to make small multi-flower bouquets to be sold abroad.

Official evaluations and permits
Throughout the ca 30 years of existence of rose floriculture in Ecuador it seems regulations have been improving in relation to official authorities´ evaluations and permits. These permits range from environmental- to fire-related issues, and include also working conditions, employees´ insurance and health situation, municipal ordinances relating buildings, pest control, fiscal performance, etc. The competences relating these permits seem to be a hot topic, especially concerning the relationship between the municipal government and the provincial government. In the two municipalities, Pedro Moncayo and Cayambe, the related authorities complained that the new regulations (COOTAD) are clear in that irrigation matters are under provincial jurisdiction while potable water issues are under municipal jurisdiction. In practice, however, the irrigation control activities are carried out by municipal personnel, who act only as inspectors and messengers, while after an impeachment only provincial personnel are able to enforce the law (which they seemingly very seldom do).

The most mentioned evaluations (and related permits if applicable) mentioned by the interviewees are environmental impact (ca 80% of the interviews), followed by soil and fertility impact (ca 44% of the interviews) and social impact (ca 23% of the interviews). Environment-related evaluations include two types: one related to Agrocalidad, the official agency in charge of agricultural quality (basically interested in pest control) and one related to the environment per se, mainly by the Ministry in charge of water, air and soil pollution.

Social and environmental responsibility (SER)
This is another multi-edged topic that will be dealt with in separate sub-headings. Here SER is understood broadly as the theory and practices of entities (organisations) that believe that they should self-regulate themselves in order to benefit society and the environment at large beyond the mere economic role of business. In general, large farms have a clear SER discourse that can be witnessed, among others, in the manner of speaking of the interviewees, the search for social and/or environmental certifications, the presence of SER-related signs throughout the premises, and the published advertising. Smaller farms do not tend to show any of these Indicators except at times via some verbal expressions and in-farm practices.

Actors that determine the degree of SER

The answer goes from 1 to 5, being 5 "extremely positive" and 1 "extremely negative". According to 46 responses, the trade-chain actor most interested in determining the SER degree of the enterprise is the owners themselves, with a mean of 3.95. This is close to 4, which means "rather positive". None of the actors has a negative impact on this degree. Owners are followed by financers, central and local governments and the community. The interview does not produce information that is more specific.

These 46 answers include farms of all sizes. As stated, small ones do not have specific actions related to SER but in general their representatives indicate verbally that they are interested in the topic but do not have the means nor the qualifications (see next) to implement more formalised SER practices.

Specific environmental practices

Using the same 1-5 system, with 5 meaning "high" and 1 "none", the following is the analysis of 50 statements about the farms' general environmental performance:

Regarding **soil erosion and pollution**, the mean is 4.66, indicating a high interest in taking care of this resource. Asked about the use of *páramo´*s (very fragile high Andean) black spoil—reputedly brought down to flower farms in truckloads—the answer was always "no". Some interviewees stated that only some breeders use soil from the nearby Cayambe-Coca national park´s *páramos* (a statement that has not been confirmed, although dump trucks carrying black soil have been seen coming down from the *páramos*, although not during the time of the interviews).

Regarding **efficiency in the use of water**, the mean is also high: 4.62. This relates to the use of drip and recycling technology.

Concerning the **fulfilment of environmental norms**, the mean decreases a bit to 4.48 (4 meaning "partially"). Several small farms recognise that they are lagging behind certain procedures such as solid waste treatment and are still in the process of getting all the legal permits.

More or less the same happens with the **existence of a procedure to promote the responsible use and discharge of products**: the mean is 4.14.

Specific social practices

Five questions were posed regarding overall socially oriented practices. The 48 received answers went from 1 to 5, being 1 = no, and 5 = much (2 = almost nothing, 3 = undecided and 4 = partially). The figures represent the mean of these values in the responses.

Relating the **active promotion and support of community projects and activities,** the result is 3.71. It is important to mention that this practice is quite different for small farmers than for large enterprises. Small farmers belong, and say they belong, to the community itself so they have been traditionally part of these projects and activities. It might be that after the introduction of micro-farms these members are beginning to gain some kind of intermediate status: they still belong to the community but are also seen as suppliers of certain societal services that are typical of the larger ones, which are generally seen as external to the community. These societal services are, among others, gratis or low-cost provision of flowers for festivities or funerals, and money for improving public services (roads, canals). Larger farms do participate in *mingas* (traditional participation in

communal works), but habitually indirectly through local representatives of owners and managers.

Regarding **participation in infrastructure maintenance of the area**, the mean of the responses was 3.64. Again, smaller farms do so more as a traditional practice than as a special contribution of the farm, while large ones do contribute to road maintenance, both to better integration with local neighbours and to improve the road infrastructure for their transportation and promotional activities. As said larger farms participate in canal-maintenance *mingas*, but at least one large farmer (outside the watershed) said that before the arrival of his farm these *mingas* were common, while now locals count on the big farm as the only canal-maintenance actor: the agribusiness, located at the tail of the system, simply has to maintain the whole canal to get its water continuously and seemingly local farmers have become free-riders. It remains to be seen if this is a repeated phenomenon.

The question about the **existence of mechanisms to minimise potential negative impacts on the community** the mean of the responses was 3.67. People were vague about what these mechanisms were, and their answers tended to go more towards the existence of mechanism to avoid the production of these impacts from the beginning instead of minimising their impacts.

In relation to the question on the **maintenance of a good communication process regarding community concerns about the company´s products, services and operations**, the mean of responses is a high 4.35. Small flower farmers are considered still part of their communities and several of them held public posts such as local canal authorities at the time of the interview, so the communication process seems to be smooth. Larger farms largely coincide in that they have not had critical conflicts with the local community and that they have solved less significant ones by talking and compromising.

Certifications

As stated, this is a main component of the SER discourse of larger farms. Although all of them farms belong to or have acquired at least one of these schemes, the perception about them seems to be mixed. On the negative side, a large farm owner stated that they are more than anything just a way of making easy money through the selling of decals for the flower bunches. This person stated that the infrequent visits to certify compliance to the certification schemes are pre-scheduled and so they do not necessarily reflect the "real" situation in the farm facilities. He stated that he had a social and environmental commitment anyway and that these certificates somehow served to prove it, although he also stated that sales and prices did not improve because of them. It is still difficult to say how far this opinion is shared by other similar farmers. The most common answer seems to be that certifications do improve sales and prices because of a high conscience from the part of buyers (who supposedly prefer "green" roses), but this has not yet been proved. Another common answer is that this certification is a proof of their social and environmental responsibility beyond just better profits. Some people think that the official specifications and controls from the ministries and local governments go further than those of private certifications, so it is somewhat easy to fulfil the latter; but there is no very visible way to show that fulfilment (which does exist with the private ones through the (quite noticeable) signs (in sites) and labels (on flower bunches and boxes).

In terms of the certifications most used, the national label Flor Ecuador is by far the most common (more the 63% of the 19 responses), followed by BASC (ca. 53%) and Veriflora (ca. 21%). BASC (Business Alliance for Secure Commerce) is somewhat different from the rest since its mission is "to secure and facilitate international trade by the establishment and

administration of global security standards and procedures applied to the supply chain of international trade". In other words, it is different from the others in that social and environmental issues are not (a major?) part of their interest, so it will not be considered in this analysis. Several other labels are also mentioned: Rainforest Alliance, Fairtrade and Walmart. Agrocalidad, the governmental agency related to agricultural sound practices, is also mentioned as a certification scheme. Some that were considered important like FLP and MSP were not mentioned at all.

From conversations with local rose cultivators and representatives of the international label MSP (through an interview done in the Netherlands prior to the interviewing process), and through revising the check lists of several labels, it seems clear that water is a major part of most of them, but only in terms of quality, i.e., related to pollution with pesticides and the like. Although social issues such as child labour, unionisation possibilities and fair salaries do enter their considerations, social water-related issues (mainly accumulation and overexploitation by powerful actors) do not. The high representatives of MSP in the Netherlands stated that they did not consider them, but that the matter sounded indeed very important and that they would consider it for future amendments to their checklist, but they also stated that such criteria might prove quite difficult to implement in the field.

The low number of valid answers to this question (19 of a total of 53) reflects the fact that mainly or only the big farms are interested in and capable of obtaining such labels. Some smaller farms stated that they were indeed looking forward to getting a label and that they were in the process. The fulfilment of official and private labelling criteria might prove very difficult to the smaller ones. From the visits it seemed obvious that the larger, older farms showed a careful appearance (sometimes even strikingly beautiful) compared to the smaller ones. Some of the latter seemed to be careful in relation to waste treatment but others appeared quite unclean. Regarding child labour, it is difficult to assess it from the interviews and visits, but it seems some families that own very small rose farms do use children to help in the maintenance of the plantation, but this work seems to be done outside school hours and without ill-treatment.

At any rate, beyond our observations, it is obvious that these issues are very important for the labelling process. This has at least two consequences: on the one hand, it seems that the official control of the smaller farms is not yet quite effective, since these farms seem to be noncompliant with ministerial and local-government norms (such as waste and chemical disposal and distance from urban settlements). If this control catches up, these farms might be in trouble. On the other hand, the flowers produced by these unlabelled farms might enter the labelled market via large farms, which buy these flowers and put them under their labelling umbrella. This is something that has to be investigated.

Finally, regarding the question of who in the chain is most interested in fostering the labelling of roses, most of the answers (almost 48%) stated that it was the buyers. It is somewhat surprising that the second place is held by breeders (10%). Other high answer is owners. Some answered that it was the municipalities and the central government, which seems to indicate that the question was not well understood. However, it also indicated that the official controls are quite stringent regarding some issues that, at any rate, do not consider social water themes.

Overall Social and Environmental Responsibility grading of the plantations

The last question asked for an overall (over 10) grading of the SER of their plantation. Although some were quite auto-critical (especially the smaller ones), the most common

answer within the 49 valid interviews was 8 (almost 50%). It was followed by 10 (14%) and 7 (10%). These high marks are difficult to analyse without further investigation. It seems obvious that larger farms tend to be quite proud of their facilities, which, as stated, sometimes are not only seemingly clean but quite scenic (taking good advantage of at times striking old farm buildings) and with employees that look glad and well equipped. A complementary study on the perceptions of workers and officials will shed more light on the issue. Smaller farmers are also quite proud about having been able to establish their plantations against all odds. Although this is of course not a guarantee of good SER practices, it might mean that the efforts and expenses incurred, and the personal sacrifice done will help them in establishing continuously better conditions to try to make their fragile enterprises sustainable.

SUMMARY

The thesis research on flower production, power relations and water use in Ecuador aims at gaining comprehension about the situation of irrigation development, particularly about the competition and conflicts regarding the highly unequal access to water, rights of water control, and forms of water governance in the Pisque watershed of the Andes of Ecuador. During the last two decades Ecuador has become the third exporting country of roses worldwide. The Cayambe region in the Pisque watershed is the main production zone of the country. The high altitude, climate, relatively low wages, and proximity to the international airport of Quito make the zone perfect for export rose production. Flower business creates local jobs, but intense usage of pesticides contaminates the environment and poses health risks to workers. Water has become an increasingly contested resource in this semi-arid region. Most of the scarce irrigation water is used by the about one hundred large flower producers. The remainder is used for subsistence agriculture, feeding thousands of families, and cattle breeding by indigenous communities. Recently, hundreds of smallholders have taken up export-flower production in small greenhouses. This has led to increased water use, and tensions within communities and families over the authorized uses of water: "for food or flowers?"

The research applied both contemporary and historical analyses. The latter lays the grounds to grasp the current situation in which the arrival of flower agribusinesses and its recent uptake by local inhabitants has added complexity to a longstanding dynamic social struggle.

Through a series of focuses linked by a politico-ecological thread, several social dynamics and struggles related to Pisque's water governance are addressed to answer the following main research question: What is the current situation and what are the perspectives of water management in the Pisque watershed, as part of a history of local inhabitants historically facing encroachment by and struggling against powerful external actors, the latest of which are flower agribusinesses?

The four sub-questions arising from this main question are tackled in Chapters 2 to 5, which were published (3-5) or submitted (2) as articles in specialised scientific journals. Chapter 1 offers a general introduction where political ecology is explained as the backbone of the research. This is followed by an overview of the research sites within the Pisque River Watershed, which is given in greater detail in each of the following four chapters. In a similar manner, the research methodology used is presented, to finish with an analysis of the conceptual frameworks used in this thesis

in relation to the political ecology approach, specifically regarding this four theoretical notions: (1) the relationships between nature and society, (2) power relationships, (3) materiality (geography, water, technology), (4) scale issues (time, geography) and (5) discourses and narratives. Five conceptual frameworks related to the political ecology approach are applied in the thesis: (1) The echelons of rights analysis (ERA), (2) Fraser's three Locations of Struggle (3 Rs), (3) Valuation languages and framings, (4) Mimetic desire, and (5) Gaventa's Power Cube.

In relation to the ERA approach, the contestations at the four levels (struggles of resources, rules, authority and discourses) are not mere skirmishes over natural resources: they are confrontations over meaning, norms, knowledge, identity, authority and discourses. Pisque irrigation-water issues develop in different echelons over which actors struggle. The ERA approach helps unravelling the specificities of these echelons and their interrelations.

The three locations of social struggle (representation, recognition and redistribution) proposed by Nancy Fraser are used to analyse three main events: the management takeover from a municipality by local water organised irrigators; the tensions around water for large flower agribusinesses or for traditional food crops in one of the main acequia's irrigation sectors, and the emergence of small locally-managed export-oriented flower farms.

In terms of recognition of valuation languages, the dominant ones do not recognise Andean communities' land and water values as valid legitimation of their rights systems, nor their practices of management. However, the valuation division is not dichotomous; rather, existing practices create hybrid valuation languages.

As concerns mimetic desire, in the case of Pisque the use of mimesis as a factor to explain the uptake of floriculture by local families is of added value to those political ecology approaches that consider structural positions and related interests of stakeholders. Using mimetic desire as a key concept puts the focus on the normalizing and moral-psychological reasons why a smallholder would want to change the mode of farming.

Finally, assessing practices of flower certification in Pisque via the three power dimensions of Gaventa´s cube (levels, spaces and forms of power) aids in scrutinising the ways, the sites, and the reasons of the development and application of socio-environmental regulations.

Chapter 2 aims at answering how socio-environmental conflicts related to irrigation water have developed throughout Pisque basin´s history and shaped the contemporary flower-dominated hydrosocial territory. The history of Pisque in the Ecuadorian Andes is one of local livelihoods and resources being usurped by external actors: Incas in Pre-Columbian times, Spaniards during Conquest and Colony, and white-mestizo elites, and later international businesses, during the Republican era. Local communities have suffered from, rebelled against, and adapted to adverse, ever-changing socioeconomic, environmental and political conditions. This chapter traces this chronicle from a politico-ecological standpoint, applying the Echelons of Rights Analysis framework and the hydrosocial territory concept to examine conflicts over resources, norms, authorities, and discourses related to irrigation water. The background of the centuries-old saga of water battles in Pisque provides contextual understanding of the latest episode: the onset of rose agribusiness, inheritors of the privileges of colonial haciendas. The most recent boom of locally managed, small greenhouses adds complexity to the "food vs. flowers" dichotomy and renders unpredictable the local population's perspectives of regaining food security, water justice, and sovereignty.

Chapter 3 faces the issue of how the recent appearance of small local floriculturists can be explained and how it fits into the food/water security-self-determination vs modernity-efficiency controversy in discursive, legal, and factual terms. Water management studies often overlook community diversity, different stakeholders´ values, and frames to claim water rights. Using a political ecology approach this chapter examines an irrigation system in Pisque, in Ecuador's highlands via Fraser's locations of justice struggle (recognition, representation, redistribution). Large flower companies and indigenous smallholders frame their arguments differently to legitimise water allocation claims. Framing is effective when it resonates with other stakeholders' values. The chapter presents some unexpected findings: most of the water is still used by large companies after communities took over control of the irrigation system; rules regarding water use differ greatly among sectors within the system, and the recent appearance of small flower producers.

Chapter 4 tackles the question of how the discursive framings used by two main current irrigation stakeholders – i.e. flower agribusinesses and local peasant and indigenous inhabitants – to defend and foster their values and practices on water allocation have developed in the Pisque watershed. During the past three decades,

the Pisque watershed in Ecuador's Northern Andes has become the country´s principal export-roses producing area. The recent boom of local smallholders established tiny rose greenhouses and joined this sector of the population to the flower-export business. This has intensified water scarcity and material/discursive conflicts over water use priorities: water to defend local-national food sovereignty or production for export. This chapter examines how including peasant flower farms in the capitalist dream – driven by a 'mimetic desire' and copying large-scale capitalist flower-farm practices and technologies – generates new intra-community conflicts over collective water rights, extending traditional class-based water conflicts. The new allocation principles in Ecuador's progressive 2008 Constitution and 2014 Water Law prioritising food production over flowers' industrial water use are unlikely to benefit smallholder communities. Instead, decision-making power for peasant communities and their water users' associations on water use priority would enable water user prioritization according to smallholders' own preferences.

Chapter 5 analyses how agricultural certification schemes have influenced the socio-environmental conditions in Pisque floricultural practices. Private environmental standards certifications are increasingly used to set and monitor environmental and social standards for flower export companies worldwide. This chapter looks at the power relations that shape the different stakeholders' practices in the case of flower production in Ecuador Flower companies have used toxic agrochemicals that affected workers health and contaminated water, which negatively altered ecosystems and human health. The growing flower export production has led to conflicts over water and contamination of the resource. Large rose producers have environmental, fair-trade and Corporate Social Responsibility certifications required by some flower traders and supermarket chains. However, most standards are permissive, and inspections and compliance were found to be flawed. Strong protests and campaigning by local environmental organizations and water users' associations were needed to enforce environmental standards and practices. In this case the private certification itself was not sufficient to reduce water contamination; only after pressure by governmental agencies, local NGOs, and water users' associations the flower companies started to comply to governmental and private certification standards.

The last chapter presents general conclusions based on the research questions and their development in the different chapters, and it also links the different but related

conceptual frameworks. The five conceptual frameworks regard power relationships in distinct ways. They have in common a focus on the unequal distribution of resources, the power relations in institutional dynamics, and the importance of the recognition of discourses. However, the conceptual frameworks each have their own focus, that deepen the political ecological analysis. An example is the 'mimetic desire' concept that adds a socio-psychological analysis to understand the motivations of actors.

The present situation with floriculture as the newest powerful stakeholder in the conflicting politico-ecological scenario of Pisque irrigation is a corollary of a history in which local inhabitants have struggled against and challenged powerful external actors, and they have also adapted to the new circumstances with varied success. Two discursive framings have arisen and developed: that of local inhabitants claiming basically self-determination and resource sovereignty and defending ancestral territories, versus that of a diverse succession of foreigners that propose mostly modernity, prosperity, and efficiency. While the backbone of an unequal distribution and the need to contest and struggle seem to persist fundamentally unchanged, this dichotomy seems to be a generalisation of a complex set of intermingling discursive frames that started when wheat and cows entered the ancestral agricultural landscape, and which has become even more entangled with the advent of floricultural agribusinesses and the recent uptake of export flower production by local farmers. External actors have impinged on local rights and beliefs – the latest of which are large flower agribusinesses –, and intra-community clashes have developed, nowadays mainly related to the application of export-oriented floriculture by local families. Thus, a clear-cut division between 'local' and 'foreign' does not render an accurate picture of the situation. Local inhabitants show an increasing interest on developing flower farms and large flower farms have mellowed their unconstrained neoliberalism with a more socially and environmentally conscious position derived from the application of pressure from several fronts.

Curriculum Vitae

After finishing his secondary studies at the German College, Patricio Alfonso Mena Vásconez (Quito, 5 June 1959) went to study medicine at the Central University, but finally decided to make a career in the biological sciences. To that end, he enrolled in the Catholic University of Quito, where he obtained a bachelor's degree with a thesis on the phytosociology of the páramos plants and their relationship with equivalent African ecosystems. After working as a professor at the aforementioned university, he obtained a Fulbright LASPAU scholarship and went to New York City, where he studied botany in a joint initiative of the New York Botanical Garden and the City University of that city. There he achieved a master's degree with a taxonomic thesis on the genus *Arcytophylum*. His interest in communication and scientific dissemination led him, with a grant from the British Council, to Cardiff, Wales, where he obtained a master's degree in journalistic studies. His work as editor and translator allowed him to get in touch with the University of Wageningen, where he eventually finished his PhD studies in water political ecology. In 1989 he was one of the founders of the environmental NGO EcoCiencia, which for thirty years has conducted studies for the conservation of the biological diversity of Ecuador and the region. He has published both academic and popular articles, has edited many books related to these topics, and has taught in several universities. He is married and has a son.

Completed Training and Supervision Plan

Patricio A. Mena-Vásconez
Wageningen School of Social Sciences (WASS)

Name of the learning activity	Department/ Institute	Year	ECTS
A) Project related competences			
Capita Selecta Global Food Chains and Water, WRM 50403	WUR	2012	3
Land Governance for Development	Summer school, Utrecht University	2012	3
Writing Research Proposal	WUR	2012	6
Weekly Discussion Group: CSR, Agribusiness and Water Accumulation	WRM, WUR	2013	2
B) General research related competences			
Sustainable Land and Water Management "Spain Practical", IWE 33306	WRM, WUR	2012	6
WASS Introduction Course	WASS	2013	1
Critical Perspectives on Social Theory	WASS	2015	3.5
C) Career related competences/personal development			
Global GAP Tour on Food Security and Sustainable Agriculture	Global GAP, Cámara de Agricultura de la Primera Zona Ecuador, Quito	2013	2.5
The Essentials of Scientific Writing and Presenting	Wageningen in´to Languages	2015	1.2
'Acumulación de agua y floricultura en un mosaico de territorios de riego: el caso Pisque, Ecuador' (Water accumulation and floriculture in a mosaic of irrigation territories: the Pisque case in Ecuador	Water Justice International seminar, Arroyo	2013	1
'¿Rosas para Todos en el Pisque? Microflorícolas en un paisaje hídrico en los Andes ecuatorianos' (Flowers for everyone in Pisque? Micro flower farms in the waterscape of the Ecuadorian Andes). In Duarte-Abadía, B, Yacoub, C. and Hoogesteger, J. (eds.). Gobernanza del Agua.	Water Justice International Seminar, Duarte-Abadia	2016	1
'La expansión florícola y el riego en los Andes ecuatorianos. Un análisis introductorio para la cuenca del río Pisque' (Floricultural expansion and irrigation in the Ecuadorian Andes: an introductory analysis for the Pisque watershed).	Water Justice International Seminar, Lima	2018	1
Total			**31.2**

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