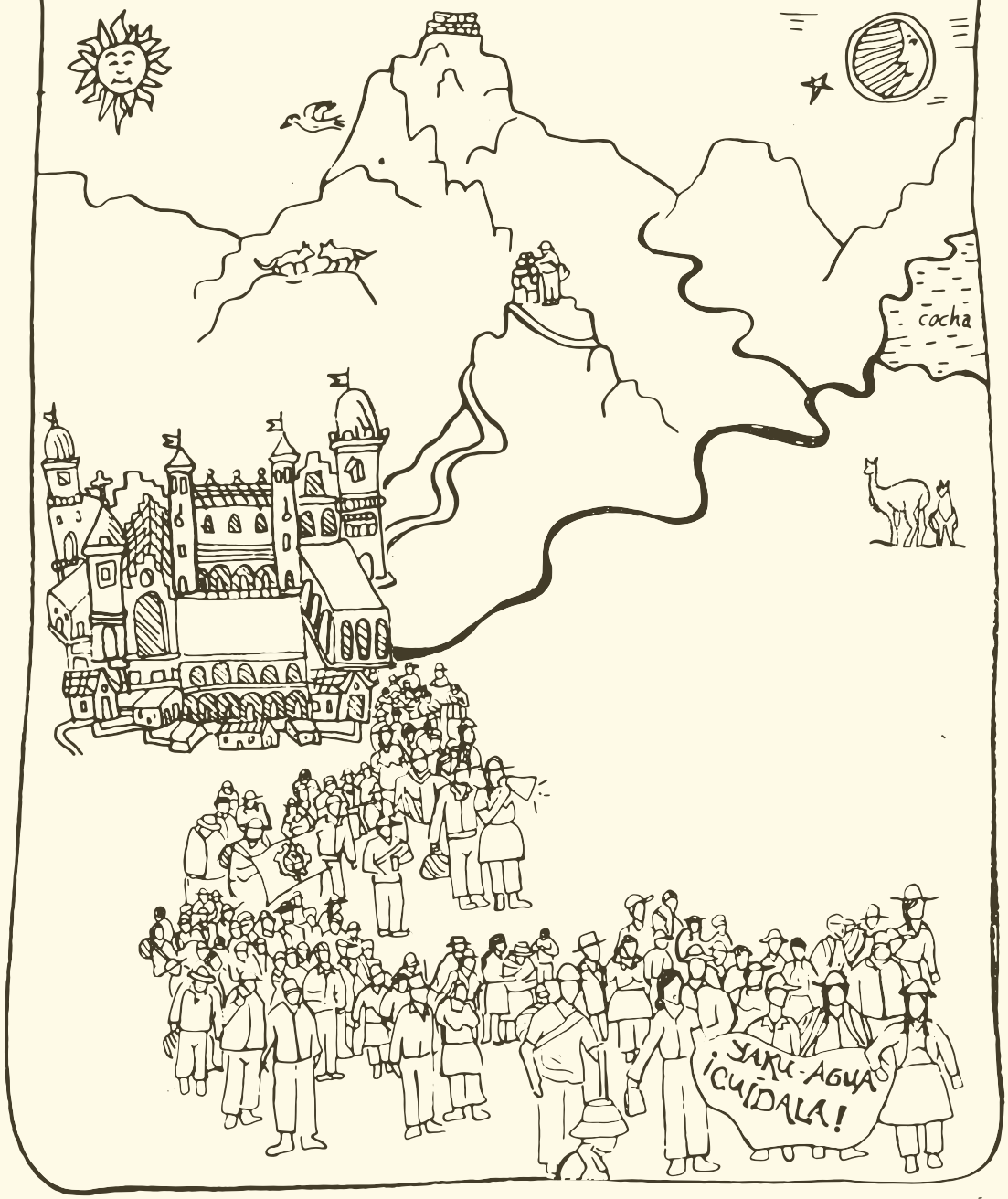
WATER • MOVEMENTS

Fluidity and visibility among Andean worlds



Andres Verzijl

Propositions

1. Andean communities tacitly design and realize multi-purpose hydraulic projects. (this thesis)

2. The assumption that water can be universally understood is one way of making sense of it among many.
   (this thesis)

3. To emphasize that people do not live off but together with their environments, scholars need to bring a language of care into their writing.

4. Actor-Network Theory is not a theory, but an attitude for practicing research.

5. Storytelling pastoralists are among the best teachers for explaining the agency of nonhumans.

6. The boundless impact of living with the coronavirus lends support to indigenous conceptualizations of worlds that are ending if not continuously (re-)enacted.

Propositions belonging to the thesis, entitled
Water movements: fluidity and visibility among Andean worlds

Andres Verzijl
Wageningen, 28 Augustus 2020

Water Movements

Fluidity and visibility among Andean worlds

Andres Verzijl

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Water Movements

Fluidity and visibility among Andean worlds

Andres Verzijl

Thesis

submitted in fulfillment of the requirements for the degree of doctor

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by the authority of the Rector Magnificus

Prof. Dr A. P. J. Mol,

in the presence of the

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Contents

Boxes, figures, images, maps and tables

Acronyms

ABA: *Asociación Bartolomé Aripaylla.* A Peruvian NGO with office in Ayacucho.

ALA: *Autoridad Local de Agua.* Local Water Authority (since 2009).

ANA: *Autoridad Nacional del Agua.* National Water Authority (since 2008).

ANT: Actor-Network Theory.

ATDR: *Administrador Técnico de Distrito de Riego.* Local Water Authority (until 2009).

CBC: *Centro Bartolomé de las Casas.* A Peruvian NGO with office in Cusco.

CCJUSS: *Comisión Central de Juntas de Usuarios Sierra Selva.* Central Commission of Water User Associations from Andes and Amazon regions – set up from Ayacucho with Oxfam funding.

CDA: *Coordinación de Actividades*. Coordination of Activities. An Ayacucho regional government agency created to take over the operation and maintenance of the PERC project after it was decommissioned in 2007.

CEPES: *Centro Peruano de Estudios Sociales.* A Peruvian NGO with offices in Lima and Huancavelica.

CONVEAGRO: *Convención Nacional del Agro Peruano.* Platform of different agricultural cooperatives, associations and unions.

CONACAMI: *Confederación Nacional de Comunidades del Perú Afectadas por la Minería.* National Confederation of Peruvian Communities Affected by Mining. Founded in 1999 as response to neoliberal policies of the Fujimori regime.

CORDE: *Corporación Departamental de Desarrollo*. Regional (Departmental) Development Corporation that operated during the 1970s en 1980s.

CORFA: *Corporación de Fomento y Desarrollo Económico y Social de Ayacucho.* Ayacucho Development Corporation (see CORDE); played a role in early designs (preceding PERC).

COTEM: *Comité Técnica Mixta.* Mixed technical committee of government and Quispillacta community professionals.

CRHC: *Consejos de Recursos Hídricos de Cuenca.* Watershed board. A dialogue platform of different stakeholders in the water sector to manage water resources; mandatory since the WRL.

DESCO: *Centro de Estudios y Promoción del Desarrollo.* A Peruvian NGO with offices in various regions, including Huancavelica.

EIA: *Estudio de Impacto Ambiental.* Environmental Impact Assessment.

EPSASA: *Empresa Prestadora de Servicios de Saneamiento Ayacucho.* Drinking water company of Ayacucho.

FADA: *Federación Agraria Departamental de Ayacucho.* Ayacucho Peasant Federation, since 1970s, part of a National Agrarian Confederation (CNA).

FEDEH: *Frente de Defensa de la Región Huancavelica.* Advocacy platform that targets social and environmental injustices.

FIP: *Fondo Italo-Peruano.* Part of Italian Development Cooperation and finances projects that target poverty, socioeconomic development, gender equality and environmental protection.

FTA: Free Trade Agreement.

GESAAM: *Gestión Social del Agua y el Ambiente.* Project to promote community participation in water matters in the watersheds of Cachi and Tambo- Santiago -Ica and the Pampas headwaters.

GIRH: Gestión Integrada de Recursos Hídricos. Integrated Water Resources Management.

GIZ: *Gesellschaft für Internationale Zusammenarbeit.* German Development Cooperation.

GTRAH: *Grupo Técnico Regional de Agua de Huancavelica.* Water advisory body of Huancavelica consisting of public institutions and actors.

GWL: General Water Law or (*Ley General de Agua*) implemented in 1969.

INADE: *Instituto Nacional de Desarrollo.* National Development Institute that oversaw large hydraulic projects in Peru until decentralization in the early 2000s.

IPROGA: *Instituto de Promoción para la Gestión de Agua.* A national platform that generates and disseminates water knowledge. It coordinated several training and capacity building programs for water professionals.

IUCN: International Union for Conservation of Nature.

JNUDRP: *Junta Nacional de Usuarios de Distritos de Riego del Peru.* National Water User Association.

JUDRA: *Junta de Usuarios del Distrito de Riego Ayacucho.* Ayacucho Water User Association.

LWA: Local Water Authority (see ALA).

MANRHI: *Mancomunidad Regional Huancavelica Ica.* Regional Association of Huancavelica and Ica.

MDDB: *Mesa de Dialogo y Desarrollo Birregional.* Bi-regional Dialogue and Development Platform

MEGAH: *Mesa Técnica de Gestión del Agua de Huancavelica.* Huancavelica platform to discuss matters of water rights, consisting of public and private actors.

MRLA: *Mancomunidad Regional Los Andes.* Regional Association Los Andes, including the regions of Apurimac, Ayacucho, Huancavelica, Ica and Junín.

ONDS: *Oficina Nacional de Dialogo y Sostenibilidad.* National office of Dialogue and Sustainability.

PAMA: *Programa de Adecuación de Manejo Ambiental.* Program meant to mediate the environmental consequences of development projects.

PCM: *Presidencia del Consejo de Ministros.* Prime Minister Office.

PDA: *Promoción y Desarrollo Agropecuario.* Agricultural Development and Promotion. An Ayacucho regional government agency created to take over capacity building and strengthening of the agricultural sector of the PERC project after it was decommissioned in 2007.

PERC: *Proyecto Especial Rio Cachi.*

PETACC: *Proyecto Especial Tambo Ccaracocha.*

PMGRH: *Proyecto de Modernización de Gestión de Recursos Hídricos.* World Bank project to modernize water resources management in Peru.

PHRP: *Proyecto Hidro-energético Rio Pampas.* On paper large-scale hydraulic project utilizing the water of the Pampas watershed.

PRIDER: *Programa Regional de Irrigación y Desarrollo Rural.* Regional Irrigation and Rural Development Program. An Ayacucho regional government agency created to take over the design and realization of the PERC project after it was decommissioned in 2007.

PRODERN: *Programa de Desarrollo Económico Sostenible y Gestión Estratégica de los Recursos Naturales.* Bilateral development program between Peru and Belgium, executed in the regions of Ayacucho, Apurímac, Huancavelica, Junín y Pasco.

PRONOMACHS: *Programa Nacional de Manejo de Cuencas Hidrográficas y Conservación de Suelos.*

SWAS: Struggling for Water Security. Integrated research program funded by the Dutch Science Organization.

TLA: *Tribunal Latinoamericano del Agua.* Latin-American water tribunal.

WRL: Water Resources Law (*Ley de Recursos Hídricos*) implemented in 2009.

Glossary of Andean words

Agrícolas: agricultural engineers.

Apu: most revered among mountain-beings.

Asambleas: assemblies, village meetings.

Ayllu: a group of interrelated (non)human actors within or among communities in the Andean region.

Ayni: concept and practice of reciprocity or mutuality among Andean communities, its people and nonhumans. It is often linked to (agricultural) cooperation but also refers to relations of revenge or recompense.

Bofedales: high altitude wetlands in Southern Peru, Boliva and Chile.

Cabecera de cuenca: headwaters (of a watershed or basin).

Cancha: puffed corn.

Casa comunal: community building.

Chacra: plot or field for small farmers.

Chicha: fermented maize drink, used often in agricultural festivities.

Cofradia: a church-approved association of catholic practitioners. It serves church purposes but in the study area is also used as strategy to defend community territory.

Colectivos: minivans used for public transport.

Comisión de Regantes: Irrigator Commissions.

Comunera(o)s or **comuneras/comuneros:** community members.

Costa: coastal region (lit. coast). In Peru it indicates, together with sierra and selva, the three geographical regions of the country and also represents a socio-economic categorization.

Crianza: concept and practice of care and nurturing among Andean communities that applies to all (non)human actors in a community and implies a relation of mutuality (to care for and be cared for).

Dirigentes: leaders, in this thesis, community leaders.

Echaderos: forage areas surrounding an estancia to which a family has grazing rights – though often not exclusively.

Empadronada(o)s: registered water users or community members.

Estancias: farmsteads or homesteads of pastoralist families of both camelids and cattle.

Faena: concept and practice of collective work among or within Andean communities. Many use faenas to uphold communal works like canals, roads, or church/chapel. Faenas are imbued with elements of both celebration of and reciprocity with the work at hand.

Gamonales: landholding elites, often abusive, often as patrons tied to particular communities.

Grifo: gas station.

Hacienda / hacendado: large estate / large private farmer.

Herranza: community celebration that involves the marking of cattle or camelids with the sign of the herder.

Hitos: boundary markers.

Huacas: revered and animated objects, both naturally-found and human-made, within and among Andean communities.

Maizales: cornfields.

Mancomunidad: commonwealth or association found in Peru often among different districts (municipalities) or regions.

Pago: payment (lit.) or offering to earth-beings and part of many agricultural celebrations.

Puna: ecological zone in Peru roughly above 4000 meters. Used in relation to other zones (suni, quechua) it refers to high plains that contain mountain lakes, grasslands and bofedales and camelids.

Quechua: ecological zone in Peru roughly between 2300-3500 meters. Used in relation to other zones (suni, puna) it refers to steeper valleys where irrigated fields and maizales are found.

It was also the official language of the Inca Empire, and is currently the first language of many Andean highland regions.

Regantes: irrigators.

Saywa: stone monuments, ranging from simple piles to stunning pillars.

Tierras eriazas: wastelands.

Tranqa: a flat stone used to block irrigation ditches in the Andean puna.

Trueque: exchange (nonmonetary) of products from different ecological zones (see puna, quechua, suni), linked to the barter expeditions of llama herders that travelled with their goods to areas where they could get tubers, maize and other products.

Selva: Amazon region (lit. jungle). In Peru it indicates, together with costa and sierra, the three geographical regions of the country and also represents a socio-economic categorization.

Sierra: Andean region (lit. highlands). In Peru it indicates, together with costa and sierra, the three geographical regions of the country and also represents a socio-economic categorization.

Suni: ecological zone in Peru roughly between 3500-4000 meters. Used in relation to other zones (suni, puna) it refers to rolling hills where tubers and other rainfed crops are found.

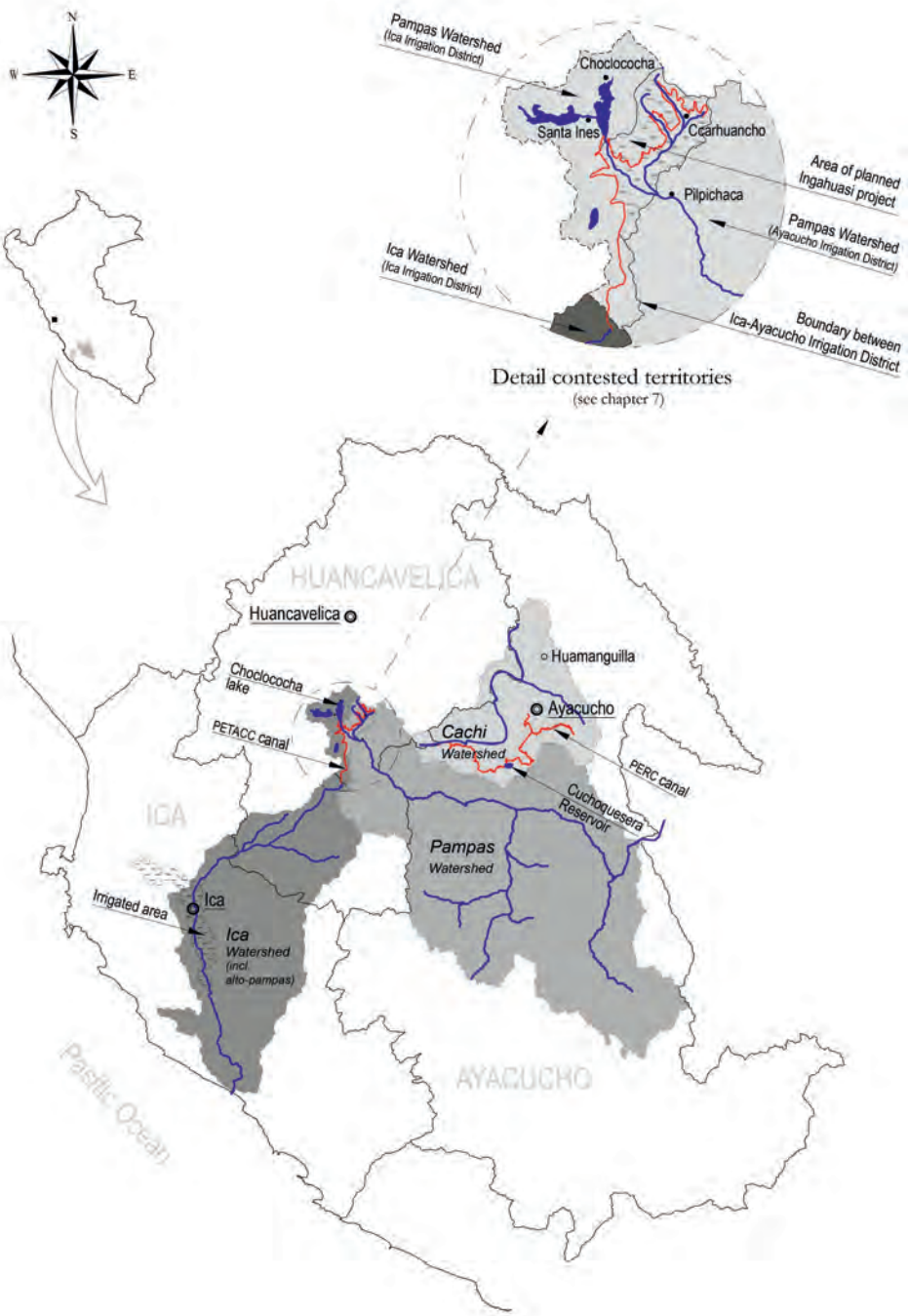
Varayocckuna: Andean indigenous leaders.

Wakas: see huacas.

Wamani: in the Pampas region today wamanis refer to supreme mountain-beings that reside over other (non)humans (see also Apu).

Yachaq: Andean healer or shaman.

Yaraq Aspiy: annual canal cleaning celebration practiced in the Southern Andes of Peru, around the months of August and September.



Map 1: Study area in Peru

1. Introduction.

"Tremor" in the Ica agricultural sector. The Latin-American Water Tribunal [...] in response to the demand of the community of Ccarhuancho (Huancavelica), recommended paralyzing the hydraulic works [...] that would bring large volumes of water to Ica [...] due to destruction of the [...] ecosystem, crucial for the subsistence of communities.

Excerpts from newspaper 'La Voz de Ica', 27-10-2007

Agricultural strike with rallies and roadblocks. The Ayacucho water user association [...] took to the streets to call attention to their national and regional protest demands. Among these were the finalization of major hydraulic works [...], install a program of irrigation modernization [...] and a project to strengthen water user organizations [...]. On the national front, they demanded the cancelation of the law 'Creation of the National System of Integrated Water Management'.

Excerpts from newspaper 'La Calle', 19-02-2008

These media excerpts (of local newspapers) are about the recourse to the Latin American Water Tribunal by Huancavelica communities and the National Agricultural Strike of water user organizations in Ayacucho. They are examples of social mobilization in which supra-community action was used to secure water access and water-related livelihoods. I consider these events, in which I was a participant-observer, to be the seeds of this research. 'Struggling for water security in the Andes' is the theme and research program from which this book and its chapters followed. These chapters explore the different ways and actors that Andean communities mobilize with the goal of defending their water, of retaining it at certain places and times, of procuring or obtaining a water share, or of fortifying their water-related position.

The Peruvian Regions of Ayacucho, Huancavelica and Ica are the thesis' geographical focus. More precisely, the research centers on a number of Andean communities, and water user groups, in the three adjacent watersheds of Cachi, Pampas and Ica, in the Central Andean *Sierra*

of Peru (see map 1).[1] Although not that vast – some 200 kilometers, as the condor flies - the study area is topographically, and ecologically extremely diverse. It ranges from flat coastal deserts and irrigated agro-export estates to steep terraced valleys, towards the high-altitude wetland areas and the last smidgeon of tropical glacier, down to hilly tuber fields, and finally the coca plantations. The latter eventually open up to a cloud-covered rain forest, which borders the study area in the north. Besides ecological variation, the area reveals a patchwork of different ethnicities and high degrees of socio-economic inequality. This diversity bolsters an array of competing visions or worldviews on water security and corresponding understandings of threats and opportunities, as well as allies and adversaries that can be mobilized (against). This thesis describes different Andean water worlds and proposes an actor-network theory (ANT) inspired approach that allows for single analysis of the diverse ways in which mobilization and movement secure water access, rights and water-related livelihoods.

1.1. Research issue.
A proliferation of conflicts and complexities

This thesis is part of an NWO-WOTRO integrated research program entitled "Struggling for water security: social mobilization for the defense of water rights in Peru and Ecuador" (or SWAS). The program signaled a growing number of water controversies in the Andes and corresponding grassroots responses, including social movements, to articulate local views and claims (cf. Hoogesteger, Manosalvas, Sosa Landeo, & Verzijl, 2013; Hoogesteger et al., 2014; Sosa Landeo, 2017).

I identified and followed two cases of supra-community action, tied to the abovementioned media excerpts: first, the rise and development of a Huancavelica advocacy group, called the *Mesa Técnica de Gestión del Agua de Huancavelica* (MEGAH), set up in order to defend water and wetlands of Huancavelica communities in the Pampas and Tambo-Santiago-Ica watersheds; and second, the foundation and consolidation of the regional water user association, called the *Junta de Usuarios del Distrito de Riego Ayacucho* (JUDRA), set up in order to (re)present the claims and rights of Ayacucho communities in the Cachi and Pampas watersheds.

Both cases were in great part triggered by the presence of two large-scale multi-purpose hydraulic projects: the *Proyecto Especial Tambo-Ccaracocha* (PETACC) and the *Proyecto Especial Rio Cachi* (PERC). These projects capture water in the Andean headwaters and transfer it to lower ecological zones and different water use sectors. Map 1 represents the research area, with political boundaries and the hydraulic projects, and the Andean communities that I have followed in their supra-community mobilizations and water securing practices.

[1] All maps, figures, tables and images are made or taken by the author, unless mentioned otherwise. Several appeared in previous articles as well: map 1 in Hoogesteger and Verzijl (2015); map 3 & figure 1 in Verzijl and Dominguez (2015); Maps 8-11 & images 4-6 in Verzijl, Boelens and Nuñez (2019); Map 12-14 & images 7-8 & tables 1-3 in Verzijl and Guerrero Quispe (2013); Map 15 in Guerrero Quispe, Verzijl and Vos (2017).

In the following chapters, 'Andean community' refers to a group of people linked to a locality of which territorial boundaries, forms of collaboration and modes of governance are both recognized and contested, and continuously enacted. Historic documents and modern land titles exist but, often, differ from local day-to-day practices and governance. Similar to Orlove (1977, p. 80), in this thesis the term 'community' refers to the interactions between and close interconnectedness of herders and animals, together with plant communities and abiotic factors (see also de la Cadena, 2015, p. 44). This interconnectedness means that boundaries, outer and inner, are most of the times not visible but fluid and constantly debated. I refer then to 'supra-community' when (groups within) these Andean communities mobilize, and/or ally with, other (external) actors to secure (defend, retain, procure or fortify) water or water-related livelihoods. The term *'comunidades andinas*' was suggested to me by community members as a preferred alternative to the more problematic notions of peasant or indigenous communities.

Indigenous social movements that, since the 1980s, have emerged in the Andes, and in Latin America more in general, are all supra-community initiatives; or in any case started as this (see also Edelman, 1998; Laurie, Andolina, & Radcliffe, 2005). They consist of indigenous groups and water user organizations that form alliances with (international) NGOs, civil society organizations and other communities (Bebbington et al., 2008; Yashar, 2005). But they also connect to, and mobilize, environmental discourses, international treaties, customary traditions and local ethnicities.

These movements, and advocacy platforms, have been extensively studied. They are intricately related to historical cultural misrecognition and economic oppression, as well as to local territories and to water (in)securities (Bebbington, 2007; see also Escobar, 1995). They are said to emerge in socio-political settings where certain conditions like indigenous self-identification, parish and informal networks, relative internal stability, and democratic openings favorably combine (Yashar, 2005). Many have noted that these conditions were not found as strongly in Peru (cf. Albó, 1991; see also García, 2005; Greene, 2006). Yet, in Peru also, people mobilize and mobilized in protection of territories and water – for example in anti-mining movements (see also Bebbington et al., 2008). There was less inclination, however, to rally behind a shared indigenous identity. Put differently, whereas in Ecuador and Bolivia social indigenous movements around water rights and indigenous issues of water security have been quite visible and (therefore claimed to be more) successful in influencing water projects, policy and legislation, they were deemed largely absent or only very localized in Peru (Boelens, Bustamante, & Perreault, 2010; Dávila & Olazával, 2006; Hoogesteger, 2013; Perreault, 2008). Or at the very least, they appear as less prominent and visible.

This is remarkable because on closer scrutiny also Peru displays and displayed the above noted-conditions that enable indigenous movements. Oral accounts, local histories, archival material and anthropological studies (cf. García & Lucero, 2004; Heilman, 2010; La Serna, 2008) document how comunidades andinas, also in Peru, have successfully engaged in maneuvers to change and protect their territories and livelihoods. Yet, these actions never materialized in the kind of movements that target national government institutions or transnational adversaries

(ABA, 2014; see also Starn, 1999). Movements were provincial and dispersed. Mirroring this to the observation made by Panfichi and Cornell (2011) that water conflicts in Peru, among Andean communities and external actors, are increasing, both in quantity and intensity (see also Bebbington & Williams, 2008; Boelens et al., 2010; Lynch, 2012), allows me to envision a research problem.

I propose to study how, in the 'absence' of visible indigenous movements or national platforms, the Peruvian Andean communities and water user groups that are entangled in longstanding water controversies have engaged in supra-community forms of mobilization in order to secure their water and preserve their water-related practices and cosmovisions. Studying this seems particularly relevant in view of the fast proliferation and fluctuation of external actors (like decentralized government bodies, state agencies, NGOs, new technologies, research parties, transnational companies, solidarity networks, international conventions and so on) who directly or indirectly interfere with their waters, territories and livelihoods. Indeed, also here, water conflicts are always complex and messy (cf. M. Zwarteveen, 2015), engaging an ever-widening range of partially connected actors. It made me wonder: How and with whom or what do these communities and groups ally or associate? And how, if so, does their mobilizing of human and nonhuman actors reshape and influence waterworks, policy and legislation in regional water governance settings and national water administration?

What grounds this research problem in social relevance are not only the natural resource struggles of communities to *defend* or *protect* their water worlds vis-a-vis encroachment of harmful and big external actors, like extractive industries, large hydraulic and hydropower projects, or urban sectors (Bebbington, 2009; Sosa and Zwarteveen, 2012; Duarte-Abadia, Boelens and Roa-Avendaño, 2015; Hommes and Boelens, 2017). These are the conflicts, particularly when social movements or advocacy groups get involved, which often attract or create most public attention. Most critical analyses of such conflicts expose how these harmful or big actors (ab)use their powers in pursuit of profits, and document strategies of communities to withstand or resist such powers. While useful in laying bare the larger generic patterns of resource appropriation characteristic of globalizing forms of neoliberalism as well as identifying effective forms of resistance, it is important to also scrutinize how motives and behaviors of different user groups engaged in conflicts are often diverse, multiple and contradictory (Baud, 2007; Baud, Boelens, & Damonte, 2019; Degregori, 1998; see also Escobar & Alvarez, 1992a; Stensrud, 2019). Rather than just opposing and resisting, many of these groups engage in and maintain relations with big, noncommunity, actors that are characterized by friction rather than opposition (Tsing, 2005).

Apart from these big or antagonistic actors, there are also forms of intra and intercommunity water competition as well as struggles not against but to *procure* or *obtain* water from hydraulic projects (of which communities or water user groups might be excluded). This also involves social or supra-community mobilization and alliance building (Horowitz, 2012; Vera Delgado & Vincent, 2013) and center on water security (see also Hoogesteger et al., 2013). Perhaps because such forms of mobilization are not around a 'public' (concern) or against an identifiable 'big' adversary, they tend to generate less media and scholarly interest and attention (Domínguez

Guzmán, 2019; Long, 2001; Marres, 2005b; Rasch & Köhne, 2016). Yet, while these conflicts are less emblematic and remain out of public sight, they are more numerous and are likely to be as influential in (re-)shaping regional water governance configurations by establishing and *fortifying* their water-related positions. Because of climate change, and climate adaptation discourses, attention to these intra and intercommunity struggles, and interest in the ways in which communities (historically) cope with and attempt to *retain* (or *care for*) water is increasing. Here too, community members actively seek out potential allies and contest adversaries (ABA, 2014; Carey, Huggel, Bury, Portocarrero, & Haeberli, 2012; cf. Llosa, Pajares, & Toro, 2009; Stensrud, 2016). Such examples may well reveal water movements long enacted, but for which the adequate societal approaches and appropriate conceptual lenses to see and understand them were missing.

This hypothesis and hope are what underlies this thesis. It wants to contribute to diversifying and improving the understandings of (supra)community actions and mobilizations to secure their water, focusing on the role that Andean communities and water user groups have in altering, bending and reshaping large hydraulic projects and water governance configurations (Cleaver & De Koning, 2015; Hommes, Boelens, Harris, & Veldwisch, 2019; Hoogesteger, 2012; M. Zwarteveen, 2015). To do so, I build on and engage with political ecology and critical sociology scholars – a group I counted myself as part of when starting the thesis. However, I am also critical of the need to refrain from analytical frames that may mobilize, reify and re-enact binary oppositions in the analysis of Andean communities and external water actors. Perhaps, social, political and scholarly identification with Andean actors, next to an empathy with the experiences, lives and choices of these people, may often be grounded in a desire for the existence of an 'external' or 'alternative' to exploitative forms of capitalism. This would explain why many scholars and activists, at least in my assessment, settle too quickly for "explanations in terms of factors above, below or beyond [the] actors" they follow (Michael, 2017, p. 157). Through my fieldwork, and by learning about the resourcefulness of Andean communities in securing and enacting water-based livelihoods, places and belonging (see also Boelens, Hoogesteger, Swyngedouw, Vos, & Wester, 2016), my own position changed. In the course of collecting data, I have come to aspire understanding communities as more than either affirming or resisting 'external' hydraulic projects or water policy prescriptions, appreciating instead how they continuously refine, tinker and change their own situation by interacting with and mobilizing other actors.

To grasp this, I use a characterization of water security struggles in this thesis as consisting of practices of defending, procuring, fortifying and retaining (or caring for) water. Indeed, as I learned more about different water and water-related practices – that is when community members told and showed me how they realized water infrastructure or created wetlands – I started to see how their infrastructures and wetlands are not commensurate with how these appear in accounts by project engineers or governance professionals. The different water practices that communities engaged in are difficult to express and explain in the terms of powerful projects or national policies. Rather than seeing this incommensurability as a sign of mal- or

under-development, as something to be cured, I used it as my analytical point of departure: as a useful entry point to accept the parallel and overlapping existence of different realities or worlds.

Put differently, detailed ethnographic attention to supra-community struggles for water security may reveal clashes of or frictions between water worlds; ontological differences over what water is, and how it should be dealt with, cared for or managed, and indeed studied (Babidge & Bolados, 2018; Dominguez Guzmán, Verzijl, & Zwarteveen, 2017; Lavau, 2013; Li, 2015; Paerregaard, 2018). To appreciate this better, I needed to tinker with my own, and perhaps other political ecology and sociology students' conceptualization of social mobilization; do a turnaround by focusing not only on who is mobilizing or why, but foremost on *what* is being mobilized to secure water – like geographical arrangements and earth beings, institutions and advocacy platforms, hydraulic designs and ecological discourses, legal decrees and ritual practices, and more. With this, then, the main research question can be adequately read; and is formulated as follows.

1.2. Questions

The main research and guiding sub-questions

> How do Andean indigenous communities and water user groups organize and mobilize supra-community actors and allies in struggles to secure their water worlds and water-based livelihoods in the Regions of Ayacucho and Huancavelica, Peru?

This question overarches the chapters of this thesis. The different chapters are connected by a general focus on Andean communities (Gelles, 2000; cf. B. J. Isbell, 1978; W. P. Mitchell, 1991; Vera Delgado, 2011) and their engagements with external actors (see also Callon, 1986a; Horowitz, 2012; Routledge, 2008); while resting loosely on an actor-network theory (ANT) philosophy and methodology (Gad & Jensen, 2010; Latour, 2005; cf. Law, 2004; Mol, 2010). It is further informed by a methodological stance that – for lack of a better collective term – could be called a focus on actors' 'situated astuteness' (de Bono, 1971; Detienne & Vernant, 1978; Latour, 1999b; Levi-Strauss, 1966; Scott, 2012). With this, I mean, in brief: opening oneself up and making a genuine effort to understand how actors skillfully and cleverly respond to emerging situations while smartly transforming their environments. To answer the main research question, I will trace, recount and analyze several stories of communities and water user groups in the regions of Ayacucho and Huancavelica. Through these stories, I set out to explore how – what actors – they *mobilize to secure water*. I do this, as far as possible for a 'visiting-researcher', through (describing) the (world)views and actor-worlds (Callon, 1986b) of the communities (their members and spokespersons) themselves, showing how they understand water movements and advocacy platforms or experience technology, legislation and environmental changes. It is important to note that I do not claim an 'insider's view' in the sense that I would fully know how community members and spokespersons think and do. Instead, I make the analytical move to

position myself as if looking over their shoulders – like a community vantage point – at how things and events unfold. In the chapters, I try answering three guiding sub-questions.

In chapters two and three, I review, discuss and revise the main concepts from which this research started: social mobilization and water security – and elaborate on how these may help understand Andean water realities. Since I chose to follow Andean community actors and spokespersons, focusing on how they know and do water, the chapters draw on a number of vignettes to inform this conceptual re-vision. These serve to illustrate my own musings and wonderings around what I have come to understand as ways to decenter and flatten the social world. Decentering and flattening are political-ontological attempts that question social relations and categories as existing before the analysis. Put differently social relations and categories are not explained by factors or processes that are somehow 'higher' or 'deeper' or 'beyond' the actors involved (like neoliberalism or technological autonomy might be). Instead it studies how people make sense of and manipulate the(ir) world as it unfolds (Michael, 2017). The two chapters engage with the following sub-question:

How can social mobilization and water security be conceptualized in a way that helps to make visible different Andean water realities and their entanglements?

In chapters four and seven, I describe the processes by which Andean communities secure (procure or protect) water sources vis-à-vis a multi-purpose hydraulic project. These are, respectively, the communities of the Socos District from the PERC project and the community of Ccarhuancho and its headwater-neighbors from the PETACC project. Where Ccarhuancho is defending its waters, community members from Socos struggle to obtain a water share. In both cases, this is done through similarly mobilizing, and allying with, a wide array of actors and by redefining project boundaries and scales. The two chapters respond to the following sub-question:

How do Andean communities and water user groups shape large scale hydraulic infrastructure (plans) to secure (either procure or protect) a water source and what are the impacts hereof?

To start appreciating and understanding Andean community lifeworlds and water-based livelihoods, I explore in chapters five and six the ontological status of wetlands in Andean headwaters by describing community and engineering practices to secure (retain and care for) watery environments. Chapter five focuses on a place called Cuchoquesera in the Cachi Watershed, which was a wetland area with a small lake. Today, it is a site landmarked by a large reservoir. Chapter six centers on the wetlands in the community of Ccarhuancho in the Pampas Watershed, a site earmarked for a large catchwater drain. In both cases, I mirror an engineering with community practices of management and care to answer the following sub-question:

What are the irrigation and water practices and conceptualizations that help Andean communities to their secure wetlands and water worlds?

To answer these research questions, I traced the actions of a number of actors from several Andean communities and their spokespersons. For me, spokespersons are the actors who are positioned within a community(network) in a way that makes them able to speak on behalf of other related actors (Michael, 2017) with some legitimacy (for example, through appointment by a community assembly).

The core chapters (4-7) of the thesis describe the indigenous communities of Ccarhuancho and Quispillacta and several communities of the Socos district. For all three, colonial records exist, detailing past community attempts to secure their land and water long before *La República del Perú* was declared in 1821. Territorially and administratively, these communities are now part of the Regions of Ayacucho and Huancavelica. I learned from both academic texts and from taxi-drivers throughout Peru that these were among the most impoverished communities in the country. It is here that the violence of the Shining Path rebels and the counterinsurgency forces during the 1980s and 1990s had been most severe. The trauma of that period is still vividly present in the stories that were shared with me. They were also actively remembered. One of the co-researchers I worked with, for instance, recently published testimonies of victims from his community, Quispillacta (Salvatierra, Mendez, & Nuñez, 2015). Leaders from Socos explained how they had to go into hiding in communities far away, while leaders from Ccarhuancho still receive threatening letters bearing Sendero symbols. I asked about these episodes whenever community actors brought them up, but did not pursue this as a line of inquiry.

The Socos district is located closely to Ayacucho city, but the journey from Ccarhuancho or Quispillacta to their regional capital takes over 4 hours. The latter two, therefore, have associations of community members living in the capital cities of Huancavelica and Ayacucho, which are mobilized to defend community stakes vis-à-vis government institutions. According to their own development plans or by word of their spokespersons, Ccarhuancho counts with 390 *empadronados* (registered community members), while Quispillacta has over 4000 inhabitants and the Socos district has a population of 7400. In terms of spatial territory, Ccarhuancho is the biggest community, followed by Quispillacta. Both are at least twice the size of the entire Socos district (which is 8,200 hectares). Community territory and the number of people living in it are often contested by others.

What is particular about Ccarhuancho is that the entire area is above 4000 meters, in what is called a *puna* (or highland grazing) environment. It is strictly a community of pastoralists. In the other two cases, areas known as *maizales*, or maize cultivation areas, can also be found. In this lower and steep-valley *quechua* environment, irrigated corn is grown and serves as a staple crop and for many communal rituals. The ecological zone between quechua and puna – roughly between 3500-4000 meters – is known as *suni* and is the niche (of rolling hills) where rain-fed tubers are predominantly cultivated. Out of the three, Quispillacta is known more for its cattle and dairy farming, Ccarhuancho for its wool economy and Socos for the production of ecological corn.

I selected these three communities because of their position and role in two regional advocacy platforms and because of their notoriously strenuous relation with the two multi-purpose hydraulic projects, PETACC and PERC, that this thesis investigated. Ccarhuancho and Quispillacta are the sites of the project headworks, while Socos has challenged PERC project logic to obtain a share of the water.

1.3. Method

On researching water realities

Although the two advocacy or stakeholder platforms MEGAH and JUDRA, which arose in response to the multi-purpose hydraulic projects PETACC and PERC, were selected independently, the regions of Ayacucho, Huancavelica and Ica can be considered a single research area. In this area, I kept track of all community cases through the different fieldwork periods, which totaled over 24 months between 2008 and 2013. Short missions in 2014, 2016 and 2017 were made to complement the material. It was strategic to be stationed in the regional capital city of Ayacucho, and coordinate field research from there. I would travel to Huancavelica or Ica for particular meetings, field visits and forums and stay with friends or colleagues while gathering material. In this section, I briefly elaborate on the philosophy or approach of doing research that underlies the entire study.

The principal methods chosen are qualitative, based on case study research in Andean water governance, and include ethnographies, (participant) observation, and open and semi-structured interviews (see also Hoogesteger, 2013; Rodriguez de Francisco, 2013; Sosa Landeo, 2017). Yet, each research(er) also has a certain chosen style, philosophy and position towards those actors he or she engages with, one that feels comfortable and feeds confidence. It turned out that my preferred style of research is to follow members of several Andean communities, often developing ties of friendship and personal affection with them. Through often informal conversations, I would trace and get to know (often partially connected) histories and controversies from different realities and world-makings

I agree with Bruno Latour, and quote him at length, that these key informants and other community members, "know what they do [and] we have to learn from them not only what they do, but how and why they do it [in this case, securing water and water-related livelihoods]. It is *us*, the social scientists, who lack knowledge of what they do, and not *they* who are missing the explanation of why they are unwittingly manipulated by forces exterior to themselves and known to the social scientist's powerful gaze and methods." (1999a, p. 19). These 'forces', let's call them large-scale multi-purpose hydraulic projects, social movements and stakeholder platforms or (inter)national laws and discourses, are actually brought into being - practiced, performed and made sense of - by the communities and other actors that relate to them: they do not somehow exist outside of or without these communities.

I am interested in understandings of stakeholder platforms or hydraulic megaprojects as seen and done by Andean communities, for two reasons. First, contrary to considering how social movements mobilize masses, technology influences society and peoples are at the mercy of laws, this thesis hopes to show that communities are not just shaped by external actors, but also importantly manipulate, interrupt and reshape them (Cleaver, 2012; Van der Kooij, Zwarteveen, & Kuper, 2015; M. Zwarteveen, 2015). Put otherwise, communities mobilize these actors in attempts to achieve their own goals of securing water - and by doing so, perform or enact their version of these actors (de Laet & Mol, 2000; Zegwaard, Petersen, & Wester, 2015). Different ways of practicing an object or actor bring forth different versions or ontologies of it. Second, Andean communities in Huancavelica and Ayacucho – although subjected to internal friction, strive and change – are in many ways the more durable, long-lasting and knowledgeable cornerstones in lived regional water governance histories. It thus makes sense to position them as the empirical anchor of an analytical understanding, rather than any 'outside' event, project, policy or theoretical framing.

Such an approach of doing research hints towards a shift in focus from epistemology to ontology; from ways of knowing to ways of practicing; from a transcendent position of the academic to one of co-researching. This is an approach whereby the focus lies on how communities (members) define, build and make sense of their worlds (Escobar, 2007; Green, 2013; Law, 2004; Mol, 2014). It is not just about finding facts, but about ways of seeing and doing. The task of a researcher, then, is to facilitate the mediation of different world-makings or actor-worlds, "instead of the sacralization of only one way of understanding" (Soudien, 2013, p. xii). Studying supra-community associations and mobilizations as the coming together and collaboration of different (water) realities requires a particular sensitivity to how seemingly similar entities, events and environments might be differently seen and enacted.

I mobilize a form of ethnography to nurture such sensitivity. Broadly, this form is about discovering how people interpret their way of life, in relation to their surroundings, histories and power differences (cf. Brunt, 1999, p. 503; Punch, 2005, p. 149). Here, I look particularly at water practices. One thing about ethnography is that it is both method and result, something that Clifford Geertz also noted when introducing the notion of thick description (1973). Thick descriptions are detailed (interpretative) accounts of group practices and performances. In Geertz's time these were, conventionally, nonmodern communities or groups. Many interesting and valuable ethnographies of communities in the research area exist (cf. Flannery, Marcus, & Reynolds, 2016; B. J. Isbell, 1978; W. P. Mitchell, 1991). However, 'thick descriptions' can also be given for, among others, organizations (cf. Law, 1994) technologies (cf. Bolding, 2004) or events (cf. Rap, 2007). I tried adhering to the 'thick description' approach when observing collective workdays (*faenas*), village assemblies (*asambleas*), protests, irrigator meetings, public hearings and roundtable negotiations.

In an attempt to understand their worlds, I traveled and worked with key members, often spokespersons, from communities, water user organizations, NGOs and state development

agencies and projects. Often, I became involved in their everyday contacts and practices. What is worth noting is that most actors had complex, multiple roles and positions; they were on the board of a water user organization *and* an NGO employee, or belonged to a community *and* worked for the state. Many of them move around diverse sites, from alpaca farmsteads to ministerial offices (see also Cleaver, 2002; Jensen, 2007). Through them I became involved, as participant-observer, in facilitating elections of water user organizations, attending meetings of state agencies, and assisting in focus groups of NGOs. I partook in conflict mediations, witnessed festivities and rituals, and learned from the daily operation of local water systems. Close observation helped me gain insight in different understandings of a seemingly single phenomenon: a rock formation, a patch of wetlands, regulating infrastructure, the water law or a water user organization (de la Cadena, 2010; Dominguez Guzmán et al., 2017; see also Verran, 1998).

Besides the following of actors, participant observations and thick descriptions, a great part of tracing histories and controversies of supra-community mobilization involved, obviously, the (finding and) interviewing of community water users, past and current community leaders, and external professionals and stakeholders. I usually met these interviewees two or three times. The first time was to get acquainted, scan the situation and establish a rapport (see also Punch, 2005). The second time (or sometimes the first), I conducted a more semi-structured interview that I normally was allowed to record. Often (copies of) old documents were mentioned during the interview for which I came back a third time, usually a week or two later, that also served to ask additional questions that had arisen.

Each interview revealed new, hitherto invisible people, entities, viewpoints and processes. Exploring new, and often surprising connections, was one of the ways to dig deeper into community stories and learn and uncover different ways of seeing beyond, what I figured was, the conventional understanding. Tracing a network is itself the method of exploring connections among entities (Latour, 2005). This also led me to several community, municipal, regional and megaproject archives, which I could delve into. Additionally, I had the good fortune to interview actors who kept their own, case-specific, archives that they generously shared with me.

Some of the key actors I worked with became co-researchers of this study. The idea of co-researching extends the ethnographic method (see also de la Cadena, 2015; Mol, 2008: 9-10). It is both a method and an approach to doing research where collaboration and co-learning with community actors and leaders is based on solidarity and the working on reciprocated goals (cf. Gianotten & de Wit, 1983; see also Sundberg, 2007). I collaborated with co-researchers when I did not have the time (for example, to be in two places at once), access or qualification (for example, lacking Quechua language skills or local cultural repertoires) to observe events or practices. Some examples that are presented in this thesis include the visualization of wetlands irrigation (chapter 6) and the facilitation and observations of the electoral process of a water user association (chapter 3).

1.4. Outline

Reading guide and chapter overview

This dissertation consists of eight chapters. Most have been published in journals or books, but are substantially rewritten for the purpose of this book. Chapters 2 & 3 can be considered more conceptual, while chapters 4-7 are the empirical ones. However, the reader can expect conversations between the empirical and the conceptual in each chapter. In fact, each chapter opens with an ethnographic vignette that serves as an illustration for the upcoming case and analysis. The reason for this is in line with the approach I take in this thesis to flatten the social world and describe how worlds are made by different actors. Put differently, if I am to analyze mobilizations of Andean communities on par with actions of water professionals, including scholars, it makes sense to have their views and ideas inform academic concepts as much as the other way around. I do so to enhance awareness and sensitivity to other ways of thinking of and relating to water. It is good to realize that a scientific community is but one actor-world among many (Callon, 1986b) and there are ways of being that exceed, and possibly inform, scientific or academic ways of knowing.

Following this introduction, chapter two begins with a description and analysis of an agricultural strike in the city of Ayacucho that turns out to be complex and multifaceted. I critically engage with and discuss the binaries that social scientists often muster to explain social mobilizations like this one, showing how these attribute power, legitimacy and visibility to different actors. I do so to reflect on 'whose strike' is analyzed and use this reflection to bring about new views, appreciations and understandings of Andean community mobilization and attempts to secure water.

In chapter three I extend the conceptual exploration of flattened and multiple worlds as I try to understand the durability of the JUDRA water user association. A vignette of a meeting of water users (*asamblea*) held in a village bullring serves to show a convergence of different identities and interests, or actor-worlds. These worlds are constituted by the ways that water is enacted in networks of, for example, national water administration or community customs. I show that there is merit in understanding the JUDRA as consisting of different, overlapping, enactments – and point to the roles that spokespersons have in creating connections between the different sites where the JUDRA is practiced at. These connections make the JUDRA appear durable, but at the same time keep it a fluid institution.

The fourth chapter looks, not at a strike or a water institution, but (as I will elaborate) at an irrigation canal as an 'object of multiplication'. It is the story of the *comuneras and comuneros* of the district of Socos who for long aspired to have irrigation water for their *chacras,* or highland plots. When the canal finally materialized as part of the larger PERC hydraulic project, outsiders disapproved of their course of action and inclusion. Yet, the canal is also part of a different, longer, story about how Andean public groups shape largescale technology. This story is not about whether the Socos communities are included or not in PERC's water allocation scheme,

but about how the communities mobilize PERC engineers and resources to realize a longstanding communal project; and so democratize water infrastructure.

In chapter five, I look at how PERC engineers and community members of Quispillacta differently enact a parch of wetlands through practices related to identifying water sources, surveying the environment, building structures and responding to seeping water. This exploration reveals two water worlds being brought into existence in a single place: a multipurpose dam linked to a techno-scientific project on the one hand, and a sacred space connected to an older revered scheme on the other. The ontological interference between the two resulted in (material) grief for the community. Still, the entanglements also created opportunities when, in times of water scarcity and climate change, engineers looked to community practices of water care for answers.

Chapter six looks at wetland care and upkeep in the community of Ccarhuancho. Here water, wetlands and mountain tops are deeply connected to herders and livestock, forming part of a relational world. The chapter focuses on Carhuancho's wetland irrigation practices that are in some ways similar, in other ways different from the irrigation logic on the Peruvian coast in Ica. Of the two, the latter is more about control, quantification and administration of water flows, while the former is more about enabling water to flow 'freely' and mesh with the environment. The one is more about making things measurable or visible while the other is more fluid. The chapter shows the merit of this last one while revealing the ambivalent mutuality between what is fluid and visible.

The seventh chapter looks at the activities of the community of Ccarhuancho in a longstanding water conflict. Underpinning this conflict are historical asymmetries between sierra and *costa*, but also the ontological tension of different ways of relating to water described in previous chapters. Through repeated protesting and advocacy, and continuous alliance-building and scale making, Ccarhuancho and its neighboring communities have successfully defended their wetlands, to date. Their actions have defied existing asymmetries and reshaped thinking about water in these regions of Peru's central Andes.

In the chapter that concludes the thesis, I bring together the insights and queries that the various chapters and sub-questions incite. Empirical and conceptual findings and visions are combined to reflect on the thesis' main question of how Andean indigenous communities organize and mobilize to secure their water worlds. I again present two media excerpts – one about the solution to the water conflict between actors in Huancavelica and Ica and one about the adaptation of *siembra (*or *crianza*) *de agua* in these regions. The conclusions that might be drawn from these excerpts are other to the findings of this thesis. This is because of the situatedness of the different writings and different actor-worlds that are centered in them. Facing challenges of climate change, population pressure and sectoral competition over water that are found in the Andes, I believe what is needed is to carefully reveal new centers, new water worlds, away from dominant versions and explanations of water.

2. Mobilizing movements, securing water:
Allies, actor-worlds and astuteness in the Andes

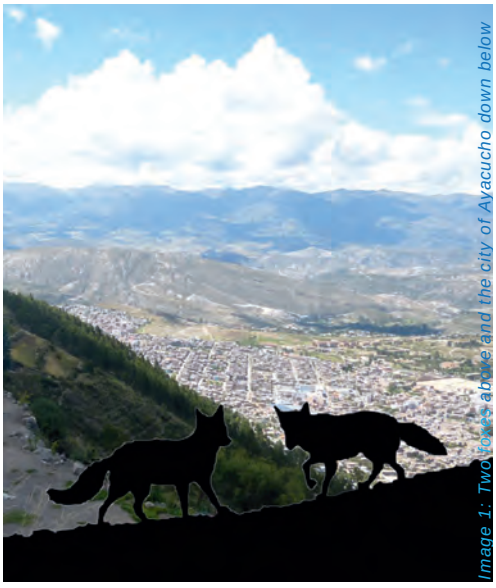
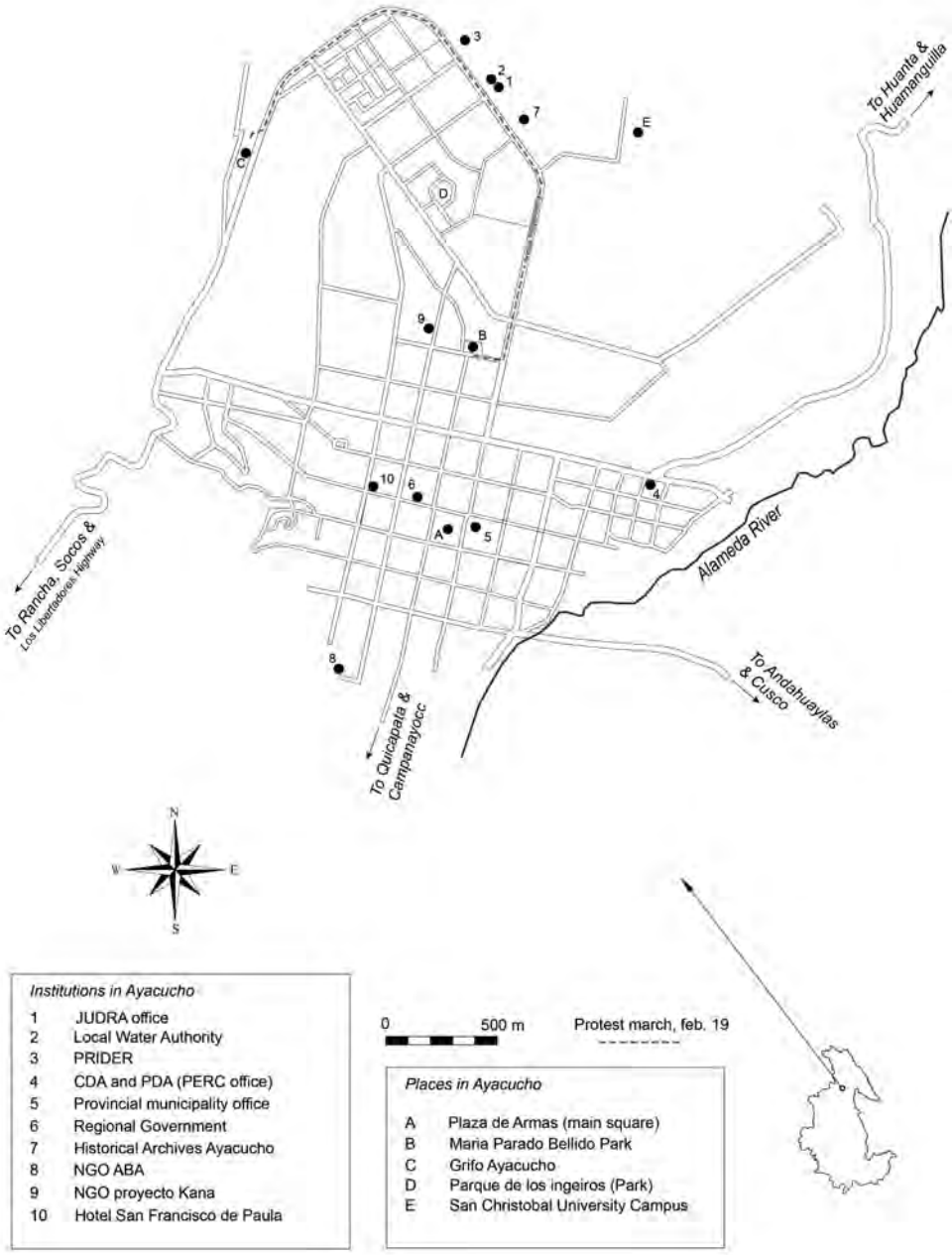


Image 1: Two foxes above and the city of Ayacucho down below



Map 2: The city of Ayacucho grid plan

This is the chapter in which I review and discuss the main concepts from which this research started: social mobilization and water security to develop and propose an approach to study water in Andean communities. I use a 'national agrarian protest' that I witnessed in the city of Ayacucho in 2008, to start reflecting on how groups mobilize, and what they mobilize. In addition to targeting a free trade agreement and national water policies, many more interests and objectives marched to the city's main square during this protest. These were brought in by the different participating groups, each with their own stories of water (in-)security. I dissect this phenomenon, along with some others, to propose four conceptual moves (section 2.1).

First, I upturn the notion of 'social mobilization' and social movements. The reversal stems from a realization that what is mobilized is not the population (often referred to with the word 'social') but first and foremost a range of nonhuman actors and attributes (images, technologies, documents and identities). I also show that, simultaneously, participating groups mobilize the protest in turn. I discuss ideas about contentious politics to substantiate this, before suggesting the notion of "sociology of translation" as useful for understanding what communities do to secure their waters and lifeworlds (2.2).

The second move centers the margin. Differently put, it dissolves the dualism of center-margin. To illustrate this, I draw on an account of the Tawantinsuyo indigenous movement in the 1920s to reveal that this movement was enacted, in and by communities, in different ways. Something which also holds for the 'national agrarian protest' and other phenomena. I revive the idea of the actor-world to emphasize the multiple ways in which seemingly similar entities or phenomena are differently perceived and performed. This second move does not only have scale implications, but also has consequences for thinking about resistance, subversive rationalization or subaltern action (2.3).

A third conceptual move questions the existence of dominant spaces as coherent and as something pre-established or originally stable, as well as the idea of (everyday) resistance acting in and against it. Instead, the ordering of spaces is far more fluid, more contingent and multiple. Resistance, and subversive rationalization are than recast as practices of situated (actor-world) astuteness in messy and complex entanglements of power. I suggest a symmetrical analysis of adversaries, without losing sight of the perpetuated inequalities in and the high costs of Andean struggles over water security (2.4).

Finally, I consider how to understand the histories of water (in)security from the vantage points of Andean communities. In analogy to how I reversed the notion of social mobilization, I alter the term by turning the passive into active, noun into a verb - or practice: securing water. A praxiographic departure, or thinking in practices (of defending, procuring, fortifying, retaining), takes away the exclusivity of a concept more attached to and enacted by water professionals and academics, turning it into something that everybody 'does'. 'Securing as doing' is a useful approach to build potential bridges between the different paradigms and relational water worlds found in the Andes (2.5).

This chapter informs the question: *how can social mobilization and water security be conceptualized in a way that helps to make visible different Andean water realities and their entanglements?*

2.1. On strike

Protest in Ayacucho[2]

Dozens of peasants came hastily walking in my direction. Some looked anxious, others were talking angrily among themselves, while many simply had a jaded expression on their face. Most of them ignored me, but a few signaled me to turn around and walk away from where I was heading. I was standing on the main road, *Avenida Independencia,* holding several daily newspapers under my arm, all dated 19 February 2008.

Earlier that morning, a large group of protesting water users had gathered at the *Maria Parado Bellido Park* to coordinate the setup of roadblocks to prevent the supply of city markets and transport of agricultural produce to the capital, Lima. I was on my way to one of these locations near *Grifo Ayacucho*. This was a gas station surrounded by small food stalls on the edge of town, along the road to Lima. But as I approached it, something seemed to have gone terribly wrong. "What is going on?", I asked, feeling the tension of those around creep into my body. "Where is César?", I inquired to the whereabouts of the president of the Ayacucho water user association, called JUDRA (*Junta de Usuarios del Distrito de Riego de Ayacucho*). Those I addressed directly did not respond. Someone else passed me from behind and said he did not know where César was, but that the police had opened fire on them and that it was safer for me to go away: people were killed. In disbelief and dumbfounded, I turned around and grabbed my phone in an attempt to reach my contacts.

The build-up

Half an hour earlier I had left the group of protesters marching to the Grifo in order to buy newspapers and see what was reported about the events of the previous day: the first day of the '*Paro Agrario Nacional Indefinido'*, a nationwide indefinite agrarian strike against new water reforms and the impacts of the Peru-US Free Trade Agreement (FTA). The agrarian sector in Peru was said to face a looming crisis. On the one hand, the FTA left Peruvian farmers vulnerable as they were to compete with those receiving unfair subsidies. On the other, a new water law, *SIGA* (*Sistema Integral de Gestión del Agua* or Integrated Water Management System), threatened to further exclude them from meaningful participation in water decision-making. Several unions, associations and social movement organizations (CONVEAGRO, JNUDRP, CONACAMI) formed a front in defense against these threats.

Next to a national agenda, the Ayacucho protesters put forth their own demands, which included the completion of large irrigation works and the implementation of the program to modernize irrigation technology. Two additional points referred to institutional strengthening of

[2] Image 1 (p. 15): Two foxes from above and the city of Ayacucho down below. The foxes can be seen to walk towards it, or from it. Source: background photo, author; silhouette of foxes from Arguedas (2015).

the JUDRA and to the fulfillment by the regional government of agreed-upon indemnity projects in the Andean community of Quispillacta.[3]

During the first day of the protest, on 18th of February, 2008, thousands of *regantes* (irrigation water users) marched to the city carrying banners of their *Comisiones de Regantes* (JUDRA subsidiaries) or their communities. Shops were closed and public transport was paralyzed. Those who did not respect the protesting regantes could expect a hail of stones. From all corners, Comisiones came pouring into the city. Through mobile phones they coordinated to meet at the *Maria Parado Bellido Park*. Here, at this park, César held a speech, in which he referred to the combined list of demands of the national water user association and the JUDRA. He spoke defiantly and with a rebellious rhetoric. Authorities had again thwarted them; outsiders had again made profits on the backs of community members. César mentioned the Alan García government that favored foreign companies, but he did not touch upon the FTA directly. The JUDRA demands were mostly targeting the regional president Ernesto Molina; they were getting ready to march to his office to deliver their petition and express their grievances.

All around the park small groups of people were standing, resting, waiting to rally to the main square. I spotted one with a banner of Quispillacta. Someone from the JUDRA staff explained quickly that the reservoir that provides water to the city and most of the irrigators is located on the territory of this community. After a few minutes, a large group entered the park from the West, walking in ranks. Their banner said Sub-Junta of Huanta. Without stopping, they turned South and walked on to the main square, forcing everyone, including César, to follow suit. Regional president Molina did not agree to receive the protest leaders, which is why it was decided to reconvene the next day to occupy the city's access roads.

The aftermath

Standing on Avenida Independencia, on the 19th of February, having just heard of possible assassinations and not able to reach César or JUDRA staff, I decided to walk back to the Maria Parado Bellido Park where protesters had met that morning and the day before. The atmosphere was far more hostile now. I positioned myself on the edge of the park against a shop wall, observed and was noticed. Angry regantes approached me. One person told me that the *cocaleros* from VRAE[4] were coming. Poking at my chest, others warned they would burn the city, like

[3] These issues of JUDRA strengthening and reservoir compensation mechanisms in Quispillacta, as well as the FTA and process of drafting a new water law are all longstanding struggles that date back more than a decade. See Maria Luisa Burneo de la Rocha (2009) for a description of the FTA since 1998; Laureano Del Castillo (2009) mentions early plans for a new water law that date back to 1993 (see also Rap & Oré, 2009). The JUDRA history is further explained in Chapter 3, the reservoir controversy in Chapter 5.

[4] *Cocaleros* are the coca leaf growers that occupy the Andean foothills (up to 1500 m.a.s.l.) that border the Amazon. A *cocalero* social movement against criminalization of coca cultivation was particularly active from 2003 onwards (cf. Dun, 2009). Close to Ayacucho city is one of the main coca growing areas: the lower valleys of the rivers Apurimac, Ene and Mantaro, called VRAE. This area, specifically near Vizcatan in the Ayacucho

government buildings and tourist hotels. "Just like with the teachers protest a few years back."[5] Feeling intimidated, I moved a few blocks away. When I finally succeeded in contacting the JUDRA staff, they told me to come to another park, *Parque de los Ingenieros*. It was oddly quiet here, and they looked very worried. Two regantes had died.

The next day (the 20th), the city center turned into a battlefield: taxis and public transport had halted and shops and restaurants kept their iron shutters down as protesters confronted the police street by street in an attempt to approach strategic buildings. Teargas, stones and rubber bullets left two more dead and over a hundred wounded. I could not identify any of the farmer groups from the previous days. César, the JUDRA president, had fled the city. The 21st of February was declared a day of regional mourning.

In the aftermath, I was indignant to hear that the national media denounced the president of JUDRA and the regantes as responsible for the violence: a video clip was shown of peasants wearing arms and nail-pierced sticks that forced the hand of the police. A dubious representation of what happened, at least I did not observe any arms.

After a month, the two murdered regantes were buried and César obtained legal support from the national water user association (*Junta Nacional de Usuarios de Distritos de Riego del Perú* – JNUDRP). The national agrarian strike seemed to have had little effect in relation to water reforms and the FTA. The *SIGA* law was symbolically retracted, but its content was implemented under different decrees (DS. 1081 and DS. 1083) in March of 2008. Some regional demands, however, were met. The regional government provided funds for the two – up to that moment – voluntary JUDRA staff members to continue the JUDRA's institutional strengthening, and it agreed to a public hearing in the community of Quispillacta to investigate the progress of the indemnity projects. Could these outcomes have been obtained because the mobilization had indeed ended in violence?

The 'national strike' raised more puzzling questions. For one: what was it about? The FTA hardly made an appearance in the enactment of the Ayacucho strike. It was about water, for sure. But was it about indemnity projects? Or job security? Probably. And what was national about it? Would there have been a strike without these additional objectives and interests, or was the FTA the ulterior motive for Ayacucho water users to mobilize?

In the next sections, I develop an approach to study and appreciate why Andean community members or *comunera(o)s*, do what they do – how and what they mobilize – in their attempts to secure their water. These sections present the reader with the conceptual puzzles that I engaged with to make sense of the empirical material. This chapter also reflects my own development during a multi-year research endeavor, which led me to interrogate many of the (scale-related)

Province of Huanta, was still fully controlled by Shining Path forces in 2008, who were involved in drug trafficking (cf. Jaskoski, 2013).

[5] Indeed, I found out later that during a teachers protest in June-July 2004, the regional government building, as well as the hotel I was staying at in February 2008, and other properties, were set on fire. The owner of the hotel was the city mayor at the time who ordered the police to vacate the buildings the teachers occupied. Reinforcements had to be flown in from Lima to pacify this protest and remove road blocks.

binaries that social and natural scientists often automatically assume and mobilize when describing and analyzing water security struggles. Or at least I did when I started studying and reading about social mobilization and resistance. These binaries, aside from the more commonly problematized nature-culture division, include human-nonhuman (section 2.2), center-margin (2.3) and domination-subordination (2.4). My critical reflection about these binaries takes inspiration from the principles of actor-network theory (ANT), in particular the sociology of translation and the notions of actor-worlds and situatedness. ANT implies a shift from – or an addition to – looking at 'struggles of who gets water' to attend to 'struggles over what water is'. The first concern, I feel, was deeply ingrained in the emancipatory attitude we shared in the SWAS program and the Water Resources Management (WRM) Group in Wageningen. The 'who' question was part of a wider action-research agenda towards water equity. The latter, I hope, contributes to improving the ontological sensitivity of water security research. It helps draw attention to the possibility that water is more than one (that there is more than one water or water world) and makes visible those water realities that tend to go unnoticed in both mainstream and critical accounts.

2.2. On translating mobilization

From mobilization of people to associations of allies

"Revolutions start in Arequipa, but when they reach Ayacucho, the matter is serious", or so goes a popular saying in Peru (Starn, 1995, p. 401). It refers, if I am to interpret this saying somewhat hastily, to the reputation of Arequipa as the region that has always aspired to remain relatively autonomous and independent from the colonial and later republican stronghold in Lima. It also refers to Ayacucho being known as the rebel region. After all, it is the place where the decisive battle for Latin American independence was decided (cf. Méndez, 2005); where Sendero Luminoso, a Maoist-Leninist revolutionary movement, rampaged the cities and countryside (cf. Mcclintock, 1984); where local chiefdoms were said to have almost conquered the Inca; where the Taki Onqoy movement targeted the Europeans colonizers (Millones, 1971). The list goes on (cf. Stern, 1987, 1998). I agree with Orin Starn (1995) that the aphorism also captures the Ayacucho area as more outcast and backward; as more 'Indian', *lejano* or remote. But above all, I think it refers to Ayacucho as a region with histories full of violent mobilization and contentious politics (against perceived injustices). Local contemporary inhabitants feel the pain of past struggles and victims, but also take a certain pride in their shared history of rebellion and resistance. This shows, for instance, in the speech César gave at Maria Parado Bellido Park, or in how protesters made me aware that their 'brothers-in-arms' (cocaleros) were approaching to jointly oppose the State.

These stories appear to make Ayacucho into an ideal place to study water, especially in the context of the SWAS program (see section 1.1), which explicitly conceptualizes water practices as incidences of contention and politics. In the SWAS program, and in line with recent political ecology of water writing, water is conceptualized as an "inherently political" and "intrinsically contested" resource or substance (cf. Linton & Budds, 2014; M. Z. Zwarteveen & Boelens, 2014).

Contentious politics

One of the most prominent thinkers on contentious political performances is Charles Tilly (2008). His early work "From mobilization to revolution" (1978) can be considered the fundament of the later contentious politics school that he developed with fellow scholars (see Mcadam, Tarrow, & Tilly, 1996; 2001). Proponents of this school focused on publicly visible, claim-making, practices and performances, such as strikes, social movements and insurgencies[6] (Tilly, 2004). The aim of Tilly, and co-authors/developers Sidney Tarrow and Doug McAdam, was to bring together these varied phenomena and other collective claim-making actions in a single research approach. Contentious politics can be characterized as direct, determined and episodic (see also Yashar, 2005) and target elite groups, state agencies or adversarial actors (which could be agribusiness or mining companies), over the control of resources (Tarrow, 1998, p. 2) or control of connected laws, authority or discourses (Boelens and Zwarteveen 2014, p. 150).

Practices of contentious politics can also be less intimidating, such as petition signing, peace marches and mass rallies. They are meant to attract the attention of the authorities or the media and the wider public. That is why vigils and hunger strikes (Tilly, 2008), and certainly roadblocks (Li, 2016; cf. Perreault, 2006), are also linked to contentious politics. In more general terms, contentious politics refers to organized dissent, including social mobilization and social movements. They are about visibility; about what can be seen. At first sight, the concept of contentious politics seems apt to also analyze struggles for water security.

In "From mobilization to revolution", Tilly (1978) attempts to link a mobilization model (based on a micro analysis of interests, individual reasoning and social action) and a polity model (based on a Marxist analysis of class conflict and revolution, structure and societal change). In other words, he tries relating 'what common people do' to 'how worlds change'. Yet, the two, says Jenkins (1980, p. 133) are "clearly incompatible", which is why he considers Tilly's integration effort as "not fully successful". Jenkins' conclusion about the incompatibility between what people do and how the social world they do it *in* operates, resonates with discussions about micro-macro tensions that are a recurring theme in social sciences (cf. Callon & Latour, 1981). These tensions especially arise when analysts relate actors that are assumed to be "large, connected to things powerful and important" such as the world economy, national bureaucracies or translational social movements, with other actors that are deemed small, "comparatively mundane and trivial in their 'micro' concerns" and interpersonal ties, such as a pastoralist selling

[6] See for social movements in Latin America, Escobar and Alvarez (1992b), especially chap. 1, 5 & 18. In the 1980s two approaches to social movement developed, focusing on strategy and identity resp. From the first, the political process approach, the later contentious politics program emerged; see for example Tilly (1978) and McAdam (1982). For the second approach, the so called New Social Movements, see for example: David Slater (1985); Laclau (1985). Later Deborah Yashar (2005), most notably, combined contentious politics with a focus on identity-based group struggle. Regardless of the approach, Charles Tilly is one of the prominent social movement scholars and often critiqued.

alpaca wool or an indigenous community seeking indemnity (Jensen, 2007, p. 834). Of course, what is important or trivial is never self-evident. Is the FTA agreement more important or trivial than Quispillacta wanting compensation promises to be honored? Tensions about macro and micro are also felt because of the different approaches and methods to analyze societal change or individual reasoning and action.

These tensions, I feel, are still present in Tilly's more recent (2006) classification of state operation and contentious politics in Peru during the tumultuous, often violent, period 1968-2003. A period that began with the agrarian (land) reform of the military regime of General Velasco, and lasted up to the installment of regional governments – the pinnacle of the longer regionalization process. In between, economic recession, Maoist-Leninist revolutionaries and Fujimori's *autogolpe* (a coup d'état of his own administration) crippled the country(side). In his analysis, Tilly looks at how regimes and contentious politics mutually influence each other to come up with a regime typology: he locates social movements in parliamentary democracies, revolutions in weakened despotic regimes and coups d'état (also a form of contentious politics) in regimes where military forces exercise autonomy (Tilly, 2006, p. 3). Exploring the rapid country-wide regime changes in Peru, he puts forth stories of half a dozen "major political actors" – statesmen and opposition leaders – mainly Alberto Fujimori and his intelligence advisor Vladimiro Montesinos. Here Tilly presents these persons as the embodiment of the prevailing political regimes. By thus foregrounding regimes and selected personal experiences, he makes certain actors "grow more vigorous" and renders countless other actions and "micro" concerns invisible (Callon & Latour, 1981, p. 280). Tilly's point of departure is that "democratic rule never reached the countryside" (2006, p. 1) in Peru while the masses in the countryside engage collectively, sometimes violently, in contentious action against the regime. His conclusion is that "nothing like the relatively peaceful politics of social movements had yet become routine in Peru" (2006, p. 210).

I will not further address Tilly's Peruvian case, where the interests, individual reasoning and social actions of those in the masses are made largely invisible. Instead, as I mentioned in the introduction, it is those interests, reasonings and actions that I look for in this research. I will say though, that to me, Tilly's integration effort of regimes and contentious politics is not fully successful in explaining Peruvian country-sites. Or I should say, is not complete. This does not mean, however, that the phenomena he mentioned – reform, recession, revolution and regionalization – are not, obviously and often crucially, related to the communities studied in this thesis. Rather, it means that his account is a partial version of contention and state doings in Peru.

To clarify this, I recall the '*Paro Agrario Nacional Indefinido'* of the previous section. When using, somewhat loosely, Tilly's approach and classification, the "major political actors" to follow would be found in Lima: people such as the minister of agriculture; the representatives of agrarian unions and federations (e.g. CONVEAGRO) as well as the president of the Junta Nacional de Usuarios de los Distritos de Riego de Perú (JNUDRP) (see also Burneo de la Rocha, 2009). The later ones are part of social movement organizations in a parliamentary democracy (Tilly, 2006), those who make 'collective claims' regarding the FTA and recent water legislation. They are

backed by protesting masses. In this representation, the Ayacucho shooting appears as a side issue of mass behavior.

I also recall that in the JUDRA documents and rhetoric during the protest in Ayacucho, the FTA appeared as a side issue. This is of course not so surprising. Contentious politics scholars, including Tilly, would readily acknowledge that there are alternate interests at stake in strikes or mobilizations (Burneo de la Rocha, 2009; McAdam et al., 2001; see for example Tarrow, 1998). But always alongside a main concern or claim. Such analyses make it difficult to understand why and how the different interest groups did what they did. What is their reasoning and why did they engage in this social action? What or who determines a side issue? And why did, for instance, the JUDRA staff or the community of Quispillacta join, co-enacting the '*Paro Agrario Nacional Indefinido*'? When looking at the events from their viewpoint, it can be said that *they* mobilized the FTA and social movement organizations in support of their cause. I will come back to this at the end of this section. First, however, I will continue building my approach to study and understand how Andean communities mobilize by briefly returning to Tilly's mobilization model (1978).

In his groundwork on social mobilization analysis, Tilly posits four steps (Tilly, 1978, pp. 54–55): actor or group interest, group organization, resource mobilization, and collective action. He then admits to a subjective decision to only focus on contentious collective action for the sake of conceptual elaboration. This decision he later seems to omit when he infers that a lack of contentious action is due to organizational weakness or lack of group (identity) strength. A similar point is also raised by those who study the absence of indigenous movements in Peru (see also Albó, 1991; van Cott, 2005; Yashar, 2005). Tilly and other movement scholars do this instead of considering alternate ways of organizing and mobilizing (actors) to secure one's interests. Indeed, many indigenous communities in the Andes do appear to actively and continuously seek these alternate ways.

Analytical protocols such as those put forth by Tilly need to be followed with some caution, as they can produce a false negative about indigenous supra-community mobilization and the politics of indigenous communities in Peru (García, 2005; cf. García & Lucero, 2004; Greene, 2006). Tilly uses his stories to substantiate and provide evidence of predefined types of government regimes. By doing this, his analysis a priori determines "how a [major political] actor should behave, and which associations are allowed" (Latour, 1996, p. 374). The effect of this in terms of understanding movements and social mobilization for water security, I think, is to pre-establish these social movements to guide the masses and to presume they are the response to a threat to one's interests, lifeworlds or worldviews. What I instead would like to know is what Andean actors and groups mobilize to secure and defend these.[7] Differently put, contentious community actions are among – and interwoven with – many other actors and practices geared

[7] Indeed, questions over the presence of social movements, indigenous and other wise, continue to be debated in Peru and elsewhere. And definitions of social movements differ conceptually and in their attentiveness to the masses. My point is that as a social movement or mobilization is performed or enacted at various sites, there is merit in also be studying it from various sites. I come back to this in section 2.3 on 'actor-worlds'.

to secure waters and worlds. To express and understand this, an approach is needed that does not need to refer to pre-given and identified overarching larger or more powerful structures or collectives to make sense of and interpret the actions of individuals or communities (Callon & Latour, 1981; Jensen, 2007).

Sociology of translation

Roadblocks or road maintenance. One would be hard-pressed to find Andean communities that are not periodically involved in both. I was on my way to observe one, on that second day of the "*Paro Agrario Nacional Indefinido*" and due to frequent traveling in the Andean region over the years, I kind of knew what to expect. Indeed, when the Ayacucho water-users decided to set up roadblocks during the strike, they knew where to go and what to do. This, Sidney Tarrow discusses (1998, pp. 20–21), as the repertoires of contention: the culturally inscribed and socially articulated skills based on a shared history and memory of a particular group. To make a roadblock 'happen', a particular community designates delegates, usually in an assembly. These travel to a predetermined stretch of road and, using a pick-ax, move rocks and debris downhill onto the road. Others, often women, are designated to prepare meals at a distance and bring it to those who are working on the road. Road maintenance pretty much uses the same sequence of practices; designating *faenantes* (participants in collective work parties) in *asambleas*, traveling with a pick-ax, moving rocks and sand to level the road, preparing meals.[8]

So, who or what is mobilized by those who incite roadblocks and maintenance? The social? Sure, but not in the sense of 'the masses' as a somewhat homogenous collection of people. Certainly too, the material world is mobilized: rocks, geographical slope, displacement technologies, food and the road system itself. The role of these material actors is not just a passive one: they are actively involved in performing an action. In a similar way, the strike in Ayacucho gathers people not passively, but each of them comes with their interests. A mass of material actors, allies and alterities, are mobilized too: roadblocks, mobile phones, legal decrees, other institutions and water user associations on strike at other sites, the FTA, Chileans, even *cocaleros* and many more (Horowitz, 2012; see also Routledge, 2008).

Thus, instead of talking of collective action or social mobilization as pre-given and more or less pre-scripted events, I suggest talking of *mobilizing* actors to allow drawing attention to the specificity of what is mobilized in and with every concrete action. Here, I use the word *mobilizing* in a broad sense to refer to how alliances and associations are made and (temporarily and ephemerally) maintained. To this end, I adopt Michel Callon's "Sociology of Translation" (Callon, 1986a, 1991), an approach that paved the ground for actor-network theory (ANT) scholars. Some of the principles and tenets of ANT are elaborated in box 1.

[8] Where movement scholar (previous subsection) debating a lack of contentious action might suggest organizational weakness or lack of group (identity) strength, the examples here suggests the presence of organizational capacity regardless of whether collective action is contentious.

Box 1: Introducing ANT

Actor-network theory is a material-semiotic approach (to doing research) that "describes the enactment of materially and discursively heterogeneous relations that produce and reshuffle all kinds of actors" (Law, 2009, p. 141). It offers "a sensibility to the messy practices of relationality and materiality of the world" (ibid., p. 142), and considers knowledge and understandings to be partial and situated (see also Haraway, 1988; Strathern, 2004).

ANT is thus not a theory, but a way of looking at and acknowledging different realities out there, through a radical undoing of binaries or "foundational divisions" (Law & Mol, 1995, p. 278) like nature-culture, human-nonhuman, modern-traditional and more (Latour, 1993, 2005).

Three tenets of ANT shape this way of looking. First is an *agnosticism* towards the points of view and interpretations (or world views and sense-makings) of the actors involved in controversy. Agnosticism suggests 'impartiality' of the researcher towards who or what actors are entangled in, for example, water security struggles – whether they are or adhere to engineer logic or comunera cosmology. The second tenet is that of *free association*. This implies that the researcher foregoes from analysis any "pre-established grid" made up of a-priori distinctions on what is social or natural or technological. Third is the principle of *generalized symmetry*, which advocates that all actors (human or nonhuman, micro or macro) and vantage points are analyzed in a similar way using the same methods (that is to translate them to a single vocabulary)– whether they are persons, or movements, watering cans or mega dams (Callon, 1986a, pp. 200–201; Michael, 2017, p. 34).

What then is an actor? In ANT, actors are considered as that what enables and shifts action or by which an action gets performed (Latour, 2005); and include humans, objects, animals, 'nature', ideas, organizations, geographical arrangements and others (Law, 2009). As such, agency is disentangled from intentionality (Law & Mol, 2008, p. 58), which offers a novel perspective to analyze the associations (power relations between actors) that make *networks* (Latour, 1986).

Yet, any actor is also a network (composed of other actors that constitute each-other and form an actor-network). Often the other actors are black-boxed and we talk, for example, about the State or 'the strike' for that matter (Latour, 2005). By opening black boxes, new associations are revealed and complexity is reproduced, regardless of viewpoint or scale (Strathern, 2004).

Translation involves associating heterogeneous entities to form and mobilize an actor-network (see also Murdoch, 1997, pp. 737–740). Alliances (or associated actors) are made of tenuous, fluctuating, even intermittent, relations – fluid and at risk of collapse. These associations need to be actively maintained, which is why many translations may not succeed. If they do, this is mostly fractional (Horowitz, 2012) because each actor, each part of a network – each thing or phenomenon – may also be part of something else (Strathern, 2004). Indeed an actor is unpredictable and a network unstable because "translation is constantly being undone" as well (Callon, 1991, p. 152). Differently put, if associated actors (human and nonhuman) are not preserved, they dissipate. The notion of power in ANT, as well as in this thesis, is thus considered relational and relies on an actor's ability to convince, coerce, encourage or entice (that is to mobilize) others. These others are, in turn, pursuing their own projects and exert their own power (Foucault, 1995; Latour, 1986).

The "Sociology of Translation" approach proposes following a so-called prime-mover in her/his/its mobilizing endeavors. A prime-mover is an actor that, in attempts to advance (translate) a project, phenomenon or situation, seeks to mobilize others and maneuvers her/his/it-self as indispensable for that (Callon, 1986a). In Callon's example of scallop fishers of the Saint Brieuc Bay in France, he follows three scientists (the prime-movers) in their attempt to conserve the bay's scallop population. For this, they need to assemble – convince and make alliances with – the fishermen, the scallops and fellow marine-biologists. In the research of this thesis, I mainly follow the leaders or spokespersons of indigenous Andean communities and their alliances or associations with other (non)human actors (Callon, 1986a). Their projects, in broad terms, are the attempts at securing water (rights, access, positions and worlds).

There are four phases of translation:[9] first is the act of *problematizing* a certain water security situation or cause, followed by the *interessement* (that is captivating, charming, luring, convincing or pressuring) of other actors to fulfill a certain role or take on a certain identity vis-a-vis that situation/cause. *Enrolling* and *mobilizing* refer to getting actors involved to perform their negotiated identities (alliances) to change, or 'translate', a situation; or to preserve certain associations that would otherwise cause undesired change (Callon, 1986a; see also Horowitz, 2012; Murdoch, 1997; Wanvoeke, Venot, Zwarteveen, & Fraiture, 2015).

To illustrate this translation process, I take the example of irrigation maintenance in the community of Quispillacta that I was fortunate enough to observe in 2009, during the annual *Yaraq Aspiy* celebration (see also Muñoz & Nuñez, 2007). Yaraq Aspiy is the time before the sowing of the cornfields, when all canals leading to the terraced fields are checked and cleaned. The dozen *varayocckuna,* the responsible village water authorities, might be considered as prime-movers. The concern – or problematization –is the community canals and water sources that are in need of upkeep and care. The varayocckuna turn to fellow community members whose labor and time are needed and enroll them in a faena, a collective work party. Although customary rules exist about participating, varayocckuna also carry around a kettle that contains alcohol mixed with herbal tea and ceremoniously form alliances with workers, ensuring their participation by inviting them for a drink and a break. Food and *chicha* (or corn-beer) are prepared and consumed collectively and festively after the work. By participating, hundreds of community members both clean the canals as well as perform their negotiated identity as faenantes.

Water sources are also lured into this process ('interessed') by varayocckuna*,* subtly pressurized to flow and follow a certain course. After the canals are prepared, the varayocckuna oversee that the water source is ritually paid tribute to with coca leaves, treating it as a nonhuman, yet animated, actor (ABA, 2014; cf. Arce Sotelo, 2007) or spirit-endowed earth-being (de la Cadena, 2015). When this is finished, they take water figuratively by the hand and lead it, through

[9] Though beyond this thesis, it appears both possible and interesting to mirror the four phases of translation, with the four steps of Tilly's mobilization model (1978, pp. 54–55) of the previous subsection: actor or group interest, group organization, resource mobilization, and collective action. The big difference as discussed and set out in the box-text "Introducing ANT" are a-priori and asymmetric assumptions about what needs to be explained that appear to underlie the latter.

canals to the fields, dancing with water all the way down. In this collective mobilization, materials - from kettle to coca leaves – are active and just as crucial as labor(ers) and rituals to secure water access and reaffirm the connection between water, the chacras and community members. Mobilizing canal maintenance, just like road maintenance, roadblocks or a strike, thus involves more than just people coming together. The material world or nonhuman actors are also enrolled and exert power (and enable other actors) in turn: the state of the canal and the water source depends on the actions of varayocckuna. Likewise, the position of the latter is shaped by how well the canal performs and how well water nurtures people.

Now consider the following. A significant number of people in Quispillacta is *evangelista*. They are present but do not drink from the kettle or partake in festivities. Also to them, water is crucial. Yet, they relate to water not as a spirit-endowed earth-being. For evangelista actors then, the phenomenon of canal maintenance appears as something different. Although this can seem obvious, explicitly noting it helps draw attention and create sensitivity to how the roles of actors (both human and nonhuman) are not fixed, but shaped by and depended on other entities in the networks in which they are constituted or enrolled (Law & Mol, 2008).

Something similar could be argued for the Paro Agrario Nacional Indefinido where different actors had a stake, like the anti-FTA lobbyists in Lima, the JUDRA board and staff in Ayacucho or the Quispillacta community members struggling for indemnity for a reservoir built on their land. These actors, more than (only) partaking in the strike, also actively enact it; they combine and define the materialities, allies and alterities of the strike in completely different ways to "construct a plurality of different and incommensurate worlds" (Callon, 1986b, p. 24) none of which can be shown to be any more "real" than the others. Acknowledging this raises questions about what is the center in this strike, or what is taken as the center and what as the margin. Are JNUDRP and also CONVEAGRO mobilizing masses, including comunera(o)s of Quispillacta, to target the FTA or the SIGA law? Or are Quispillacta leaders mobilizing the actions of CONVEAGRO against FTA to further their indemnity situation? Such questions serve to drive home the point that a strike or social movement is not an episode or social process 'above' the masses. It is practiced and performed by various groups of actors that are mobilizing movement, coming into being in the process by these movements of people and nonhuman actors.

In the research approach that I propose, I embrace this notion of flatness and of decentring. Instead of analyzing the actions of Andean communities and their spokespersons (or prime-movers) as a consequence of social processes above or beyond them, I propose studying how they practice or enact (and manipulate and shape) movements, markets or state projects. This brings me back to the question posed earlier in this section (2.2) whether the Paro Agrario Nacional Indefinido should be considered a single strike or a multiple one. In this thesis, I consider, argue and demonstrate the latter. The strike is one that is done in different heterogeneous and partially overlapping worlds by enrolling and mobilizing differently associated (non)humans as allies. Something similar can be argued for institutions, infrastructure and environments as well. Doing so is a choice of method that is itself political.

Indeed, for a researcher the deployment of any method means the mobilization of certain actors and not others. Thus, rather than being 'above' the networks that form the theme of the analysis, I am myself entangled in, part of, and translating these networks. In recognition of this, my explicit aim is to study water security in a way that does not depend on the macrosociological categories or grand social theorizing that often characterize the neo-Marxism influenced ("first generation")[10] political ecology studies of water (Domínguez Guzmán, 2019; Michael, 2017; Perreault, Bridge, & McCarthy, 2015; Seemann, 2016). I anticipate that new understandings of contemporary water controversies can be generated by avoiding generalizing social theoretical statements, forms of subject normalization or governance contexts to explain what actors do (Dupuits, 2019; see also Li, 2015; Turnhout, 2018). By instead empathetically looking at how actors interpret their own position, negotiate implementation and make contexts I expect to usefully pluralize scholarly thinking about water security.

In the next section, I will show how communities, not just mere masses, practice or enact a movement or a protest that furthers their own projects, and that without these projects a social movement cannot be mobilized. I will use Heilman's (2010) description of the Tawantinsuyo indigenous movement in the Cachi and Pampas watersheds to illustrate this. This description centers on Andean communities in Ayacucho and Huancavelica and the defense of their territory, resource-base and lifeworld. The historical conditions described partially connect to the case studies of this thesis.

2.3. Unscaling the Andes
Centring peripheral actor-worlds

"Ayacucho", in popular culture, is often translated from Quechua as "rincón de los muertos" (lit. "corner of the dead", see Ansión, 1987); a name, some say, given after the Incas bloodily suppressed the rebellious population groups in the Cachi and Pampas watersheds. Others refer to the independence battle and its many casualties in Quinua, in the Cachi watershed.[11] The phrase also frequently pops up in association with episodes of deadly violence, certainly, and most lately, in connection to the Shining Path insurgency in the region. Miguel de la Serna's thesis "Corner of the living" about two Andean communities, one in the Cachi and the other in the Pampas watershed, provides telling episodes of Shining Path related violence that are situated

[10] As, among others, Perreault et al. (2015), Seemann (2016) and Escobar (2008, 2010, 2018) elaborate, the second school or generation of political ecology studies was importantly influenced by post-structuralism, feminist studies and subaltern studies. The third, more recent political ecology currents include the "ontological turn", focusing on the more-than-human and pluriverse worlds. Or as Seemann observes for, among others, water security studies in the Andean region, it envisions "... expanding the epistemological debate to an ontological one and turned back to questions regarding 'the reality' in social theory". This last generation of political ecology also explicitly seeks to "...question universal notions of ecological causality and meaning" (see also Escobar, 2018; Seemann, 2016, p. 58).

[11] See Mitchel (1991) and Mendez (2005) about the independence battle in 1824 and local impacts; See Muñoz and Nuñez (2006) and Kellet (2010) for accounts on the war between Incas and Chanca Confederation in 1438.

"within a deeper, more complex history of indigenous peasant struggle and survival" - the struggle of the living to defend their lifeworld (La Serna, 2008, p. 2). Herein, De la Serna refers to contentious politics and the work of Tilly, and he discusses everyday forms of resistance to which I will turn later. However, for the conceptual approach that I try to build in this chapter it is worthwhile to look more closely at that other word: corner or "rincón".

First, *rincón* can refer to an unimportant place, a remote site: the political or economic backwater of an empire (Inca), colony or State (Peru), a relatively primitive and undeveloped place. It seems that Ayacucho, the study area (including Huancavelica), has long been considered such a place: marginal and with a history of revolt (see also Starn, 1995), contrasting it with commercial and political centers like Cusco (Inca), Lima and other prominent sites of modernity. Secondly, during fieldwork, I also came to understand rincón, mentioned by peasants and pastoralists, as denoting a place not readily visible and of some shelter; where a gentle sloping plain meets a steep rock formation. A rincón offers concealment in multiple ways: against rain and wind, but also against being easily spotted (in contrast to open terrain). Caves and cracks are found at, or referred to as, rincónes. Thus, these are shadowy places of cloak and cunning, places where boundaries become kind of fluid.

I come back to this second notion of rincón in the next section. What follows in this section is a reflection of the first notion of a rincón as peripheral to some center of importance elsewhere. In this sense, a rincón resonates and affirms the familiar center-margin binary that is often assumed and invoked to make sense of processes and movements of social mobilization, including strikes and movements. I will use Heilman's account of the Tawantinsuyo Movement to illustrate the analytical and political stakes of the use of such a binary, taking inspiration from the sociology of translation.

Tawantinsuyo Movement

Historian Jaymie Heilman (2010) describes how an indigenous movement materialized in different places in Ayacucho in the 1920s. Where others postulate the absence of indigenous movements in Peru (see introduction; Albó, 1991; Yashar, 2005), Heilman sets out to provide evidence of the presence of an indigenous rights movement. She discusses (2010, pp. 42–70) how the Tawantinsuyo Movement was perceived and performed in two districts, or municipalities, one in the Cachi watershed (in the Huanta Province) and the other in the Pampas watershed (in the Vilcashuaman Province).

This indigenous rights movement aimed to transform the Peruvian state and fought for equal citizenship. It was first formed in Lima and leaned on several important precedents of the previous decade: first, the Puno "messengers" – indigenous peasants that traveled from Puno to Lima to protest before national ministries; second, the Pro-Indian Association – founded by academics and professionals in Lima who were not themselves Indians but acted in a kind of 'solidarity network', and later participated in establishing the Tawantinsuyo Committee; but also,

thirdly, the archaeological discoveries, like Machu-Picchu that fueled the Indian cause; as well as fourthly, the new constitution of 1920 that officially recognized indigenous communities (Heilman, 2010).[12]

Contentious actions of the movement in the Central (and Southern) Andes included invading *haciendas*, but also filing complaints, petitioning and localized rebellions (in Huancavelica even a major rebellion). During Committee meetings, delegations from 145 sierra communities participated, who in turn brought the Tawantinsuyo movement into being in their home communities. There, community members or community assemblies, listening to the delegates, mobilized the Committee and its proposals in different ways to different ends (ibid.).

In the Cachi watershed, the movement was performed peacefully. There was support for President Leguia's national government and demands focused on education and on relief of economic obligations (like taxes on coca and salt). Frequent trips, by the four movement representatives from this district, were made to Lima with petitions and letters to the nation's president. A political play between *hacendados*, indigenous groups and the State about labor tributes to construct roads was also crucial (ibid.).

Instead, in the Pampas watershed the movement was practiced more violently. It targeted the State, embodied by disliked district, or municipal, governors, and, often abusive, community-tied, landholding elites or *gamonales*. The principal issues were intra-community land accumulation by elites and an inter-community land invasion conflict. In this case, the two movement representatives were captured by local government. In the uprising that followed, indigenous communities within the municipality attempted to ally with the "Morochucos", an ethnic group of cattle keepers from Spanish descent from outside their municipality and province. In the end, military forces were dispatched to repress the movement (which included killings and plundering). Oral histories mention that the rebels were in principle from one community that disputed the land of a second. Tensions between the two preceded the movement and are still felt today (ibid.).

Heilman's account provides some interesting pointers about how to study social movements and supra-community mobilization. Obviously, depending on which community is given the center stage, the materialities of the Tawantinsuyo movement are different (and each of them is also different from those in Lima headquarters), despite common elements in things like literacy, the nation's constitution, conscription, taxes and indigenous rights (see also Baud, 2010). When seen from the vantage point of this or that community, it becomes clear that their members and actors in general combine and mesh these elements (with others) in different ways to bring about a multitude of dissimilar, and in many ways incomparable, worlds. The movement elements fuse

[12] Almost a century later, similar processes and phenomena can be observed in the study area: peasants confront ministries (chapter 4 and 7); the archaeology of indigenous knowledges is rediscovered and revalued (chapter 5 and 6); academics and professionals from distant elsewheres act in solidarity networks (chapter 7) and new legislation stipulates recognition of indigenous practices (chapter 3).

with community projects and histories,[13] making it difficult or at least always somewhat arbitrary to make it appear as a single movement – or determine side and main issue.

What can be observed is that the Tawantinsuyo movement is used to advance claims that come up locally, and allies and adversaries may mirror longstanding conflicts, intra or inter communally.[14] In the end, the indigenous movement was harshly repressed and, says Heilman (2010, p. 69), its "language of indigenous rights remained absent" from national politics and social movements for the remainder of the century, while its aims of equality and recognition were not addressed. Interest from intellectuals in Lima withered as well. However, the movement was not without effects. The movement's semiotics and new constitution allowed resourceful communities to strengthen their claims and secure new land, from the 1930s and 1940s onwards. The communities I followed for this research obtained legal recognition by the state (Ccarhuancho and Quispillacta) and even started buying land from hacendados (Quispillacta and Socos) during that period. So, the movement did have an influence and enabled change for many communities. All this, however, was barely visible for academics and intellectuals that acted, and published, from Lima; or that fall back on a center-margin binary for their analysis.

Using the lens of the sociology of translation to look at the Tawantinsuyo movement in the municipality in the Cachi watershed (Huanta Province), the four movement representatives can be identified as the prime-movers or spokespersons. They problematized education and unfair labor tribute (taxes) in the area and interested their fellow indigenous comunera(o)s for these causes. They also mobilized the Tawantinsuyo manifesto and the Peruvian constitution, as well as the national officials whom they attempted to charm. They allied with the hacendados on certain points. It is likely that they also referred to 'all other communities' involved, like them, in the indigenous movement; for example, their fellow movement representatives from the Pampas watershed (Vilcashuaman Province). In turn, these two representatives in the Pampas watershed problematized land invasion and abusive local elites. They "interessed" community members, by

[13] This, in a way, also holds for 'academic communities' and how they make sense of it: some scholars consider Tawantinsuyo a millenarian movement and others see it as a nationalist project: The name Tawantinsuyo – used first by the Incas to indicate their empire, the 'union of the four quarters' – plus the focus on indigenous identity made scholars argue it was a millenarian movement, with violent and anti-state elements. Heilman (2010) and also Marisol de la Cadena (2000) emphasis that Tawantinsuyo was however more a nationalist political project seeking equality then it was an attempt towards a new Inkanic utopia, regardless of the fact that indigenous histories, symbols and traditions were invoked. In Andean communities Tawantinsuyo was mobilized as potential ally in local resource struggles.

[14] Such strategic associations, pragmatic or not, are also observed by La Serna (2008) regarding the Sendero Luminoso Revolutionary Movement in the communities of Quispillacta and Chuschi; also case studies in this research. In another case study community, Ccarhuancho, oral histories account that *Senderistas* that burned their community archive were from a neighbouring community with whom they had a territorial dispute. Beyond movements these types of alliances are also made with unions and federations since the 1950s (Degregori, 1993); and as Heilman herself describes, with political parties in the 1960s and 1930s (Heilman, 2006, 2010). In fact, Steve Stern (1982) and Michiel Baud (2010) show that indigenous communities engaged in alliance building since early colonial times, with colonial authorities, *encomenderos*, clergies and the Crown.

explaining the purpose and meaning of the Tawantinsuyo movement and indigenous rights. They mobilized similar actors (manifesto, constitution) and enrolled other allies as well (like the Morrochucos). However, translation, in terms of land redistribution and social justice, was not successful.

I presented this brief account of the Tawantinsuyo Indigenous movement to show how such a phenomenon materializes in different ways in different social worlds depending on which humans and nonhumans are enrolled and mobilized. Certain actors, like the constitution and manifesto, are present at all sites;[15] others appear connected to a specific actor-network, like the morochucos or hacendados or the non-Indian academics. Issues differ, but in all instances, the movement is continuously practiced. I thus contend there is no a-priori hierarchy in movements, but hierarchy might be enacted by the Committee in Lima (or by an outsider analyst). This is different from how the Tawantinsuyo movement is 'done' in the Cachi or Pampas watersheds. Hence, the movement's Committee might be considered a prime-mover or spokesperson, enrolling the delegates of 145 communities. However, these delegates, in turn, are spokespersons too (see Law, 2009). They speak on behalf of their community at Committee meetings and are representative of the movement back home. In other words, in my research approach there is no assumed macro-micro or center-margin division.

Analytically, sociology of translations allows the tracing of mobilizations. Whether this is done by following (a spokesperson of) a community or a district in Ayacucho or for the 'faraway' Tawantinsuyo Committee in Lima, is the analyst's choice. A political matter. And a partial one. It matters from where – or what situation – an analysis departs, for example, the community, the Committee or the constitution. It also matters from where or what situation an analyst departs. Differently put, the decision to follow a certain actor is crucial and should not be left implicit (Law 2004). In that regard, I want to emphasize that I too am involved in problematizing issues, and interessing and mobilizing actors (other scholars, theories, texts and community spokespersons) about phenomena like a movement, a national strike, or, for that matter, an approach to analyze water security struggles. With respect to the sociology of translation, researchers are on par with those they research (with).

Actor-worlds

There are obvious parallels between the Tawantinsuyo movement and the 'Paro Agrario Nacional Indefinido' discussed in the previous sections. Also, in the national strike there are different interest groups, like communities of Ayacucho and organizations based in Lima, that somehow mobilize similar actors (such as the constitution or the FTA respectively) differently. More so, in

[15] In actor-network theory there are at least two ways to indicate actors that appear at multiple sites similarly. First, immutable mobiles refer to actors that maintain relatively stability at different sites or social worlds but travel easily among them. Second, boundary objects are actors and entities that are stable (enough) and retain their identity among worlds but also fluid and adaptable enough to be understood and used in different ways (Latour, 2005; Leigh Star & Griesemer, 1989; Michael, 2017). For analysis in this thesis I mobilize the latter.

both cases, following (the viewpoint of) a community is not more or less complex or more or less marginal than that of, for example, CONVEAGRO or the Committee. In cases of supra-community mobilization (of strikes or movements), there is not just one prime-mover or spokesperson, but there are many (cf. Jensen, 2007; Law, 2009). Different actors, different interest groups, are simultaneously mobilizing the movement to further their own projects and interests; all have translated, or tried to translate, a similar phenomenon or object in relation to their viewpoint or *actor-world*.

The term actor-world is part of ANT vocabulary, but it is a term that never really caught on.[16] For this research, however, about Andean communities and water user groups – their worldviews and their relations and alliances with water, technologies, environments, legal arrangements or governments – the term is useful. An actor-world, says Callon (1986b, p. 24) "associates heterogeneous entities. It defines their identity, the roles they should play, the nature of the bonds [the narrative] that unite them, their respective sizes and the history in which they participate". These roles and identities are not fixed or stable but defined in relation to other entities and through the different practices which construct or enact (a multitude of) worlds (ibid; see also Carroll, 2012; Lavau, 2013; Zegwaard, 2016). The 'respective size' or scale of entities is another crucial, albeit a bit counter-intuitive aspect of actor-worlds. While social movements (or hydraulic infrastructure projects, social spaces, or legal regimes) might be practiced and represented, *here*, as national, hierarchal or macro-level, its 'size', *there* (in a second actor-world) might be minimal. Like Jensen (2007, p. 833), I trace "how actors engage in a constant deployment of their own scales. These scales are used to sort the important from the insignificant and to determine how to act, towards which goals, and in collaboration which other actors". Scales are then no longer considered as existing prior to the analysis, but as enacted or performed (ibid); also by the researcher.

In connection to the Agricultural strike, I choose to present, out of many, three actor-worlds: the community of Quispillacta; The JUDRA board and staff; the union contra the FTA, with seeming overlap among them. This idea of overlapping actor-worlds helps to reveal that objects and phenomena are always only partially connected. This in turn sheds a critical light on the permanence and 'real' existence of scale-related binaries, like local-global, micro-macro and also margin-center. Such scales are always also in the eye of the beholder, and their existence depends on perspective or situatedness.[17] Realities are always more complex than scalar categories suggest.

[16] Michel Callon introduced the notion of the actor-world in his second 1986 paper about the case of the electric vehicle (Callon, 1986b). He emphases that while a prime-mover problematizes a situation, so too do other actors; each related to their actor-world. In the paper about the electric vehicle, the prime-mover is the Electricite de France (a state-owned utility company) and the enrolled actors are the company Renault and fuel cells. Renault temporarily aligns/associates with Electricite de France, but is formed by its own network or actor-world. Callon never draws this conclusion directly, but John Law (2009) does it for him two decades later: there is no prime-mover, but many narrators and overlapping actor-worlds.

[17] Thinking about situatedness, says Donna Haraway (1988), challenges a singular understanding of the world and hierarchical thinking. She rejects the view from nowhere (god trick) associated with scientific knowledge

Marilyn Strathern notes, in her discussion of complexity in relation to scale, that the more closely you look at phenomena, that is the more you zoom in, the more detailed they become (Strathern, 2004, p. xiii). The complexity or messiness of a phenomenon importantly stems from the observer/researcher's ability to switch among scales and viewpoints (ibid.). For example, by switching between the JUDRA or the union contra the FTA, and subsequently zooming in on either one or the other, the agricultural strike becomes more multiple and muddled. If I then include the community of Quispillacta and how they 'do' the strike, complexity is added. The same is true for the Tawantinsuyo movement and the scales and viewpoints of the Committee and the communities in the Cachi and Pampas watersheds. In terms of actor-worlds, Strathern's observations also help in re-thinking the hierarchies that tend to come with the use of scales and scalar orders, often resulting in attaching more analytical weight or political power to the scale that is considered higher or more important. Yet, drafting and publishing a manifesto in the Committee office in Lima is not inherently more difficult or complicated than agreeing to an 'acta de asamblea' in one of the communities.

I mobilize these ideas here to explicitly align my research to an emerging attempt in social sciences to not view and make sense of the world through scalar structures and hierarchies that exist prior to the analysis, but to instead treat it as flat and assume self-organization (Escobar, 2007, 2010; Law, 2009; cf. Marston, Jones, & Woodward, 2005; Michael, 2017). This has important implications for understanding water security struggles and practices of resistance of Andean community members. Much resistance thinking is pervaded with another scale-related binary, that of dominance-subordination. Scholars tend to mobilize this binary as a pre-established categorization of actions and actors, who, in turn, are assumed to either be subaltern or powerful. Herein, says Doreen Massey (2000), it is long believed that dominance was associated with space, while resistance was momentary, transitory and temporal (cf. de Certeau, 1984; Scott, 1985, 1990). In other words, resistance suggests that "actors strategically subvert, appropriate, and contest hegemonic spaces" that are taken to be primary and remain stable (Rose, 2002, p. 383). According to Massey this is a conceptual departing point for a line of thinking that "preserves the structure of big binaries" (2000, p. 280) and "leads down particular and not particular helpful pathways" for understanding actors that are busy securing water.

My attempt at decentering makes it impossible to categorize actors as either the subaltern or the powerful, nor can community actions be straightforwardly constructed as a response to or consequence of more powerful or important actors or structural scales. I instead treat actors and their actions as emerging from their own projects and interests. This does not mean that actors or worlds do not impact community actor-worlds - they do. It is just that by following certain actors and their actor-worlds (and not others), the idea of resistance as consisting of the

and centralized schemes and holds knowledge to be situated in particular networks with always partial "views from somewhere" (1988, p. 590). Haraway discussed scientific knowledges, but comparisons to other knowledge traditions, both situated and messy, have been made (Turnbull, 2000, p. 19; see also Turnhout, 2018).

opposition between two hierarchically positioned actor-worlds crumbles. This idea of resistance is one that assumes a central and dominant stronghold like the State or a transnational company against which Andean community action is directed. By putting Andean community actor-worlds at the center of analysis, and by following their projects and interests with empathy, the relations between their worlds and those of others becomes itself the topic of investigation. Are these relations of pragmatic or strategic collaboration, of opposition, of tolerance? Attempts to answer this question about the relations between different actor-worlds and spokespersons lies at the heart of this book, and provides the empirical entry-point for re-thinking and multiplying water security.

2.4. Dislodging resistance
Towards situated astuteness

The famous Peruvian writer Jose Maria Arguedas Altamirano was a child of two worlds, the Andean world and the occidental world on the coast of Peru. Born in the Pampas watershed, he spent his early childhood with indigenous Ayacucho families and received secondary and higher education on the coast. In his last novel *El zorro de ariba y el zorro de abajo*, or 'The fox from up above and the fox from down below' (1971), he writes about these two Peruvian worlds, sierra and costa without positing a hierarchy; of a dominant costa and backward sierra. The foxes, both indigenous, represent the two regions. According to a 16th-century manuscript, the foxes met in mythical time and had a conversation near a mountaintop in which they compared their domains: "Andean reality [and] the reality of the coastal region" (F. Mitchell, 1978, p. 51).

In the novel, they meet and converse again in a contemporary fishing port on the coast. The novel is about the struggle of indigenous peoples today, whether they are migrants from the highlands trying to find work in the fishing industry or whether they live in the Andes. In both cases, writes Arguedas, they retain their cosmology and "animistic vision of life" (F. Mitchell, 1978, p. 50). Yet the foxes in their second encounter contemplate that while in the past there was always above-below interaction (*yo he bajado siempre y tu has subido*), the present is simultaneously worse and better because there are now more realities, more worlds (*mundos de más arriba y más abajo*) to deal with (Arguedas, 2013, p. 69). For Arguedas above-below –by others referred to as sierra-costa or margin-center – is not a division that exists prior to the text or history, but it is a relational one.[18] The foxes are like brothers made strangers and there is struggle and joy in both worlds. There is no dominant center or peripheral subordination; in the fishing port, coastal and Andean realities overlap and shape each other.

As the novel's plot in the fishing port unfolds, the foxes as protagonists seem to disappear. There are no more encounters or conversations. Yet the foxes are not absent, they re-enter the scene as characters so "skillfully disguised however that one can read the entire work without realizing their true identity" (F. Mitchell, 1978, p. 52). Arguedas' writing skills – or writing tricks – bring to mind the metaphor of the fox as trickster. This appeal of this metaphor and of the

[18] Arguedas (2015) is the version used for cover image of chapter 2.

idea of the trickster in different cultures has been noted by many (Haraway, 1988; cf. Levi-Strauss, 1963; Pache, 2012). Common traits of a trickster include her ability to shift shape, deceive her environment or invert situations. A trickster can mediate and transcend opposites for she lives "betwixt and between all sorts of social and spatial boundaries" (Pache, 2012, p. 491). In the contemporary central Andes, the fox or *atuq* in Quechua, is associated with astuteness, cunning and being crafty, with foresight and transition (into adulthood) as well as with theft and deploying ruses. The fox is a fool and clever at the same time: a *tonto-vivo* (Pache, 2012, p. 485). In folktale, the fox figure invokes and is associated with Andean notions of the wilderness (*sallqa*) and underworld (*uku pacha*) (see also chapter 5).

For my research, the fox is an appealing figure to think with because of how she can seemingly seamlessly move among and between Andean *actor-worlds* and deceive or manipulate environments, inverting or *translating* situations (see section 2.5). By seeing practices of mobilization and water security as perhaps fox-like, it becomes possible to acknowledge how they may sometimes or in some places appear as acts of resistance, while in others, they become acts of innovation. Resistance (here, now) becomes innovation (there, then). A slight change of perspective inverts what actors and their actions are and mean, also inverting bad to good. In this sense, "the trickster warns us to be wary of boundaries and divides" (Turnbull, 2000, p. 92) in the field and the social sciences – including empirical-conceptual divisions or binaries. It both helps to understand the practices of the actors under study, and to remain critically reflective of my own actions as a researcher who tinkers with theory in hope of translation. The concept itself plays tricks on the observer and invokes reflection (see also Haraway, 1988). It does so on me, as it seemingly did on resistance scholar James C. Scott.

Forms of everyday resistance

Being fascinated with practices of concealing, ingeniousness, polymorphism and upturning[19] while studying resistance, James C. Scott was an obvious early source of inspiration to me, mainly his two books, "Weapons of the weak" (1985) and "Seeing like a state" (1998). In the former, he considers what he calls subordinate struggles and *hidden* practices of everyday resistance; the latter is about modern state projects and the attempts of bureaucracies to make things visible or legible for the sake of centralized control. Long after reading these books for the first time, I started noticing that there is a kind of pre-set dominance-subordination frame of reference in Scott's books. By engaging with these works, I leave strikes and movements behind to use the remaining part of this chapter for other ways of securing water.

[19] Such practices and performances are studied by others: in connection to notions of bricolage (in technology, Benouniche, Zwarteveen, & Kuper, 2014; in institutions, Cleaver, 2012; Levi-Strauss, 1966); to the tactics or politics of the governed (P. Chatterjee, 2004; de Certeau, 1984), to cunning intelligence (Detienne & Vernant, 1978), mimicry (Boelens, 2008), or tinkering care (Mol, Moser, & Pols, 2010), and possibly social banditry (Hobsbawm, 1959).

In "Weapons of the Weak", Scott elaborates on practices of marginalized actors, those who are out of sight of elites or state authorities. These practices may include the concealing and pilfering of (water)resources, foot-dragging, sabotage or flight. Crucial in what Scott famously calls everyday forms of resistance is that the actions are indirect, non-confrontational and hidden (unlike social mobilization, protest or revolt). Yet, they may be and often are more effective in securing water and lifeworlds than more conspicuous and visible forms of protest or resistance. Badmouthing, ridiculing, feigning false ignorance or deference, ruses or ploys of cunning and deception are also linked with everyday resistance (P. Chatterjee, 2004; cf. Kerkvliet, 1990; Malseed, 2008). Scott associates everyday resistance with what subordinate groups do vis-a-vis dominant parties. In follow up work (1990), he makes a distinction between action 'on stage' (interactions he calls public transcripts or performances that are visible to the other party) and those on the off-stage world (where hidden transcripts and subjugated discourses are found and conjured) (see also Goffman, 1959; Tilly, 1991). The connection between the two explains acts of slyness, anonymity, disguise and deference that can trick and mislead the opponent.[20]

"Seeing like a state" introduces government attempts at society-making projects – like high-modern colonization schemes and multi-purpose hydraulic systems – that can be designed, implemented and operated according to techno-scientific logic to build utopian worlds (see also Scott, 2006a). For these projects, practices of legibility are needed for centralized control. These practices are about the measuring, standardizing, mapping, taxing and registering – and thus the making visible - of all kind of actors (both human and nonhuman). Such legibility attempts rest on simplification of people's and community realities to make them comparable across times and places and, so criticizes Scott, a lot of what happens is ignored (Boelens, 2008; Dominguez Guzmán et al., 2017; see also Foucault, 1995). He demonstrates the failure of many of these schemes and goes on to argue that if they do work, it is because of the everyday informalities, skills and cleverness of the ignored (or marginalized) groups. Scott adopts the notion of *metis*, conceptualized by Detienne and Vernant (1978) and further introduced below, as the practical knowledge and in-situ wisdom of these groups in contrast to the abstract (techno-scientific) knowledge of the centrally planned and engineered modern schemes or 'formal order'.

Both works, actually Scott's entire oeuvre, have been influential for me. After all, this thesis is about Andean indigenous peasants' struggles and responses to secure water in relation to modern hydraulic multi-purpose schemes. Yet, Scott's theoretical proposals for understanding resistance and state control have also been a source of confusion, a confusion that stems from a similar yet inverted foregrounding assumption that underlies both books. As I mentioned above, Scott's analysis is anchored in the assumption of the existence of a clear binary opposition between dominant parties and centralized order on the one hand and the weak or ignored (and marginalized) groups on the other. Yet, there is a subtle difference in how he mobilizes this

[20] Although not the topic of these works, it is acknowledged that dominant parties (or those that support them) also engage in these practices. Ben Kerkvliet (1990, 2005) conceptualizes these as everyday politics of support and compliance also present in our contemporary societies (Kerkvliet, 2009).

binary opposition in the two discussed books. In "Seeing like a state" (1998) the subordinate groups somehow act *within* the domain (or world) of a central order or formal scheme that governs them (see also de Certeau, 1984). In Scott's earlier work on weapons of the weak and public transcripts (1985;1990), he instead suggests that the on-stage interactions (visible acts seen by those controlling the scheme) somehow *rest on* the real offstage worlds of these subordinate groups.

In the conceptual terms explained earlier, it seems that Scott's second book foregrounds the actor-world of the State or formal order, whereas the books on everyday resistance make subordinate actor-worlds central. This is probably an intentional move, stemming from the observer/researcher's ability to switch among scales and among viewpoints to gain new insights (Strathern, 2004). However, there is a second point that follows from this switch and creates further confusion. The earlier works make visible (the outcome of) what Scott calls hidden practices, hidden opposition and public interactions of his research subject (a subordinate actor); while in the second book, "Seeing like a state", his research subject (a dominant actor or government agency) does not seem to display or engage in such practices, oppositions and public performances. I wondered: would Scott think that planners and scheme engineers also engage in hidden practices; are there plans and schemes in-the-making? Does he consider engineers communicating among each other how best to deliver their product – through convincing and/or concealing issues from those they target. And if so, why does he not document these?

My wonderment stems from the realization that much of what techno-managers do – like for instance displaying a map of an irrigation system - can also be considered public performance or 'on-stage' interaction, which are too "subject to ironic reconstitution through bricolage" (Turnbull, 2000, p. 102) somewhere 'off-stage', like, in this example, the office of a cartographer. Also, implementing cropping patterns, water delivery schedules and canal system operation are public performances that require tinkering, unseen labor and social relations. The off-stage actions that go into making maps and schedules are kept invisible in "Seeing Like a State", even though they are not unlike the strategic conversations in communities' worlds about indigenous representation, how to convey to others their resource stock, such as water sources or cattle composition, or what their role or position is in a regional water meeting. These are what Scott wants to draw attention to as practices of everyday resistance. In other words, Scott reveals the messy and real social worlds behind the performance in one case, while keeping them invisible in the last book. Why is this so? Why are the off-stage practices and public interactions of state actors (with communities) less worthy of attention than those of community actors? What analytical and political purposes and effects does it have to thus foreground some behaviors and actions while keeping others hidden?

When studying irrigation projects or hydraulic schemes in Peru, it seems to me that the messy practices of map-making or setting up cropping patterns are as crucial as the micro-relations of state officials engaging subaltern water users. In turn, when looking from, or centering on, actor-worlds of Andean communities, their practices of cunning can no longer be

classified as hidden but appear as often well-elaborated and reflected upon among community members. What is or appears as hidden or off-stage and what as open and on-stage is indeed a matter of staging, of perspective and situatedness. Appreciating this requires a symmetrical research approach. An approach that does not a priori treat what community, state agencies or other actors do as either visible, public or hidden, or that assumes that some actors somehow operate in the domain of (or on/off a stage set by) the other. The question, in other words, is how to thinks around a pre-given dominance-subordinate binary.

As noted, the concept of actor-worlds seems to answer this question as it usefully blurs the notion that there is a real offstage world and an onstage performance. Instead, ANT methods posit that there is only performance, and proposes to treat roles and identities of actors (human and nonhuman) as always defined in relation to other entities and through the different practices which constitute actor-worlds (Callon, 1986b; Horowitz, 2012; Turnhout, 2018). Put differently, there is no person, object or space prior to the practice (of for example showing a map or concealing cattle); there is "no 'doer' behind the deed"; instead "the 'doer' is variably constructed in and through the deed" (Judith Butler quoted in Mol, 2002, p. 37). What actors are, does not precede their performances, they are constituted in and through them by means of countless mundane, everyday practices. That such practices can and often do go on unnoticed by others does not mean that they are indirect, uncoordinated or not seen.

I now go back to the metaphor of the trickster introduced in the beginning of this section to further discuss how I propose moving beyond Scott's premises. I do this by considering two examples: constructing wetlands and constructing identity.

Situated astuteness

In this thesis (chapters 6 and 7), I analyze the water security practices of the alpaca herders of the community of Ccarhuancho, focusing in particular on how they construct wetlands and identity. In constructing wetlands, the herders seemingly acted in accordance with a state program that promoted the construction of small canals for community irrigation in the Andes. The herders created small trenches to guide their water to the patches of land that were to be turned into wetlands. They had been digging such trenches to manipulate overland flow for ages, but accommodated the prescriptions of the irrigation program. With regard to constructing identity, instead, they acted seemingly in opposition to a state project that promoted large water works for irrigation on the coast, which would drain community wetlands. The herders created material expressions that emphasized their indigenous roots (like banners and letter headings). It is common, among governance and political ecology of water scholars, to view the first as collaboration (or even incorporation) and the latter as resistance. However, while in Ccarhuancho, I observed a lot of similarities between the two. The community *asamblea* is the venue where both the construction of wetlands and the construction of identity are deliberated and strategized. Decisions are taken. Away from the *asamblea,* matters are discussed in smaller

groups or families: the role of the state, their indigenousness, the future of the wetlands, the presence of this visiting researcher. Away from the *asamblea,* community members, individually, are representing themselves as indigenous, and are digging the trenches. It is odd, from the vantage point of the community to consider either of these practices – constructing wetland and identity – as incorporating or resisting state interests.

In both instances, the community members cleverly reshape their environment and invert a situation. In the first, they convinced a state program meant for improvement of irrigation systems to invest in wetland construction, with the second they mobilized international discourses and human rights to construct themselves a new identity in a regional water conflict. These practices involve craftiness, foresight and transition; a similar kind of intelligence is at play. And they – the Ccarhuancho wetlands and identity – are intimately related to each other and to the stories, technologies, spaces and meanings that constitute the community actor-world. These, then, are practices and acts, that rely on some kind of *situated astuteness*.

Astuteness refers to the ability to outwit opponents (e.g., by deciding to construct and convey a new identity in a water conflict), but also to respond skillfully and cleverly to emerging situations and transform environments (e.g., by constructing wetlands through irrigation). So, when studying community actor-worlds, with the aim of learning from them what water is and how they mobilize to secure it and their ways of life, I consider resistance to not be the most appropriate conceptual lens. It would be seen as that what is encountered and has to be overcome to realize own projects and interests. From the vantage point of Ccarhuancho, that would be the encountered actions of the modern multipurpose hydraulic project (PETACC) that negate their wetlands or reify their identity. Yet, writing about a hydraulic development scheme's resistance against a pastoralist community would be nonsensical to most

In contrast, thinking in terms of actor-worlds is always relational, unfolding and becoming. It does not deal with an integrated whole or totality, but with heterogeneity, contingency and partial views and understandings. This way of dislodging resistance is not to deny the importance of influential and inspirational resistance scholars, to negate the very real inequalities found in the entire Andean region, or to ignore the struggles and injustice resulting from this. In fact, these three assertions motivated me to do this research. What this decentering of humans and places of supposed importance and this dislodging of resistance does instead, is to create the opportunity to study securing water that is not already fixed by a number of a-priori analytical divisions. It allows the researcher to consider broader practices, tactics and skills that communities mobilize to further their projects.

In Seeing Like a State, James Scott discusses the work of Detienne and Vernant (1978) who, as I referred to earlier, mention the notion of *metis*: a type of cunning intelligence in Greek society. Scott uses it to distinguish from the modern scientific knowledge of state projects, the local skill

of the communities 'within' it.[21] *Metis* "represents a wide array of practical skills and acquired intelligence in responding to a constantly changing natural and human environment." (Scott, 1998, p. 313). The example he uses is that of planting dates at a certain place: where government planners suggest a specific date (based on multiyear climate statistics), the 'governed' community considers planting after the leaves of a particular tree are of a particular size.

While the example is striking of the practical intelligence many Andean community members might also adhere too, the tree leaf rule is, in a way, just as standardized to that particular community as statistics are to planners. It is repeatable and easily transmitted while in Metis, the fluidity of the situation is key.

Detienne and Vernant (1978, p. 4) mention that Metis has to do with adjusting and outwitting those "transient and shifting" circumstances that "do not lend themselves to precise measurement, exact calculation or rigorous logic". Although it is easy to equate the latter logic with the abstract or scientific knowledge of central government order, I emphasize that reasoning and measuring is also part of the community actor-world: the particular tree is an oak, the leaf the size of a squirrel's ear. Instead with metis, I contend, the emphasis is on adjusting and outwitting for which forethought, care and resourcefulness are needed. Incidentally, for the Greek, the fox was "the embodiment of metis" to which they attributed "the power of reversal" (1978, p. 37). More so, Metis is about the capability of "adapting to the most baffling of situations, of assuming as many faces as there are social categories [and] of inventing a thousand ploys" (1978, p. 39) and is shown in "the flair of a politician [or] the experienced eye of a doctor" or indeed the prudence of an Andean *yachaq* (indigenous shaman or chief teacher).[22]

So aside from the practical experience and skill that Scott attributes to Metis, many of the practices he describes in Weapons of the Weak can also be considered part of this cunning intelligence. At least they are so in connection to Andean community struggles of water security. Members take on many different roles (and categories), move betwixt and between baffling worlds (and situations) and use an array of different tactics (and ploys) "to deal with a tricky situation" (ibid). In the chapters that follow the situations to be dealt with refer to the challenges and opportunities related to water security (which I will discuss next), like the participation in a protest or the creation of identity in the face of encroachment of alien interest groups, but also about the tinkering ways to extend wetlands in the face of increasing population or disappearing glaciers.

[21] Latour (1999b, pp. 174–175) (Latour, 1999b:174-5)too mentions how "the Greeks used to distinguish the straight path of reason and scientific knowledge, *episteme*, from the clever and crooked path of technical know-how, *metis*" which he attributes to Daedalus who "folds, weaves, plots, contrives, finds solutions where none are visible, using any expedient at hand, in the cracks and gaps [or el *rincón*] of ordinary routines".

[22] Also, science and the work of scientists rely on metis (Latour, 1999b). In the Andes, yachaq often refers to a shaman or healer (see also chapter 5) and literally means she or he who knows or teaches (Guerrero Quispe, 2015). Interestingly a scientist in Quechua is sometimes referred to as yachaq (whereas in other worlds shamans and scientists would be opposites).

2.5. Securing water
From steady state to emergent practice

Karen Bakker (2012, p. 914) ventured to define water security as "an acceptable level of water-related risks to humans and ecosystems, coupled with the availability of water of sufficient quantity and quality to support livelihoods, national security, human health, and ecosystem services". Although it seems encompassing, issues of what is acceptable and sufficient, also make it exclusionary, regardless of the actor-world to which the definition is applied. Regulating rivers and streams through dams and weirs assure water security in one place, where elsewhere altered flow regimes generate insecurity; developmentalists and ecologists appear at a stalemate (see section 6.3 for elaboration).

Indeed, in *Science* Bakker analyzed the "challenges and opportunities" of water security research and signaled a sense of incommensurability "given that perspectives vary between academic" disciplines (ibid); such as "law, environmental science, international relations, hydropolitics, geography, political economy, political ecology" (Zeitoun, Lankford, Bakker, & Conway, 2013, p. 4). In other words, "from a legal perspective, water security has generally been associated with allocation rules that seek to secure entitlements [...]. In contrast, from an agricultural perspective, protection from flood and drought risk is generally considered a key determinant of water security" (Cook & Bakker, 2012, p. 97). More so, says Bakker (2012, p. 915), "researchers in different disciplines tend to conduct water security research at distinct scales."

So did we: within the 'Struggling for Water Security' (SWAS) project, four PhD candidates engaged with the concept. Obviously. Early on, I connected security (of water) to freedom of fear and sources of violence and conflict (Verzijl, 2011), which very much resonate with my studies into contentious politics and struggles (section 2.2). Later we tried to make sense of water security through a community and grassroots perspective (Hoogesteger et al., 2013:21) in an attempt to center on Andean communities and their actions. We focused on the day-to-day water security struggles; a new way for approaching water security, or at least one that emphases a level of detail, or scale, only sporadically discussed (Cook & Bakker, 2012:96, table 1). We attempted to connect struggles of water security to (practices involving): resources (water, technology, territory), regulations (creating and bending rules), control (authorities and tactical affiliations) and representation (discourses, meanings and worldviews). And look for the different sites where these struggles take place (see Hoogesteger et al., 2013). We stayed clear from a wide-ranging or discipline-specific definition of what water security is, instead looking at how communities contemplate on and do it themselves. That decision will be clarified below.

Orders of perspective

The challenges of dealing with varying disciplines (domaining) and scale (magnification) are due to what Marylin Strathern (Strathern, 2004, p. xiv) signifies as the two orders of perspectives at stake when "westerners [and scientists] take up positions on things [and phenomena]". She

suggests that the "observer's facility to move between...domains...or alter the magnitude of phenomena" can give her or him the "sense that any one approach is only ever partial, that [things or] phenomena could be infinitely multiplied" (ibid.). Indeed, many water security researchers today work on the premise that different perspectives exist. Already in 2002, Radoslav Dimitrov wrote that "the multiplicity of competing notions of security" and the particular objectives connected to each, "leads one to look in certain directions for the sources of threats" (2002, p. 679).

In that respect, a much-emphasized notion in debates that signal the manifold interpretations of the concept, is "water security *for* who" (Zeitoun, 2011, p. 291, quoting Warner and Johnson 2007). There are at least three ways to address this challenge of different perspectives in water security research and elsewhere in water studies. The first is to foreground one perspective as neutral and universal; the second is to come up with a way that combines and joins (a number of) perspectives; while a third looks to develop a sensitivity to the multiplicity of phenomena that are enacted in and shape disciplines and worlds.

Zeitoun, Lankford, Krueger et al. (2016) discuss two approaches to water security, a reductionist and an integrative approach. The reductionist endorses universality, and indeed legibility and is based on technoscience that is now also considered partial and situated knowledge (ibid; see also Dominguez Guzmán et al., 2017). The latter, integrative approach, "does not necessarily seek to generalize", is more inclusive and embraces complexity (Zeitoun et al., 2016, p. 148). Such an approach, say Cook and Bakker (2012, p. 98), is holistic and "may be more analytically robust, because they are more comprehensive". Of course, holistic and integrative approaches are themselves also situated in particular networks, with only partial "views from somewhere" (Haraway, 1988, p. 590) that look for particular threats and realize specific objectives. This means that integrative or holistic notions should be approached with care, as both the holistic and the universal are singular approaches or views. I will forego an indepth analysis of reductionist or integrative views and instead turn to the following observation.

Recognizing that, through disciplines (domaining) and scales (magnification), perspectives (and thus objectives and interests) are or could be "infinitely multiplied", I have to accept with Strathern that "no one perspective offers the totalizing vista it presupposes". Paradoxically, if no total – universal or all-inclusive – view exists "it ceases to be perspectival" (2004, p. xvi). This leads me to think of a third way to address the challenge of different perspectives in water security research: a sensitivity to the multiplicity of phenomena that are enacted in and shaped by disciplines and worlds (Jensen, 2015). Influenced and inspired by critical water studies and works of post-ANT, this thesis starts with a modest attempt at that.

As a point of departure, I reconsider the notion "water security *for* who" – and instead look at 'water security *by* who'. Who is *doing* water security, defines or makes sense of it? And through which entities and practices is sense made off. I am myself, of course, also one of the sense-makers. Aside from the works I draw upon and discussions with companions and co-researchers at universities and in the field, I choose to follow certain entities, practices and actor(-world)s to understand what water security is; and not others. I turn again to Radoslav Dimitrov's comment:

"what water security *is* ..., leads one to look in certain directions for the sources of threats [and] the sites where danger lurks" or where opportunities lie (Dimitrov, 2002, p. 12). Yet this "is" is no longer universal or holistic, no longer necessarily reductionist or integrative. Instead, "the new 'is', is one that is situated" (Mol, 2002, p. 53). A definition of water security seems less telling than the space and practices by which it came about. It is thus up to the observer/researcher to study these practices in situated spaces and to situate herself or himself.

A praxiographic lens

A municipal building on the main square of Ayacucho city was the site of the first "Congreso Peruano Agua-Andes" on the 19th of September 2017. The main focus of this conference was *seguridad hídrica*, or water security. And it gathered a wide-ranging array of stakeholders: international development agencies, solidarity networks and universities; national advocacy platforms and water authorities; Ayacucho students, NGOs, municipalities and grassroots stakeholders.[23] I did not attend it but was informed about it by one of the participating presenters. The focus and whether this was a first *congreso* is off less interest to me here than the assisting actors. For there are many venues in which the same stakeholders meet and converse about climate change, pasture management, water law and more.

At this meeting, one of the sub-themes of water security was the ancestral rainwater harvesting practices of certain Andean communities, of which members were also present. One of these communities was Quispillacta. Its members (also happen to) work in NGOs, are well-traveled and published papers and book chapters; they also assist in their asamblea communal, collective (faena) commitments and do on-farm practices. I imagine them listening intently to foreign scholars and scientists' definitions of water security, and, if given the opportunity, I imagine them elaborating about their views on things and phenomena; on water and security in their worlds.

I know them. And admire them. For their arduous work and struggles to secure water, worldviews and community through a diversity of practices at conferences and on mountain tops. And for their ability to move between domains of science, government and community – to astutely tinker with and add complexity to water worlds. To learn from them, to learn how they – and other communities – *do* water security, I will use a praxiographic lens. This I will briefly explain.

Coined by Annemarie Mol (2002, p. 30), praxiography is about researching the practices which constitute or enact what, for example, water security *is*. Put differently, it is the method or "practice of doing practice research" (Buerger 2014, p. 385). The intricacies of doing is what interests me here; the doings of who or what under study, but also the doings of a researcher.

[23] See http://www.agua-andes.com/eventos/i-congreso-peruano-agua-andes-dialogo-ciencia-politica-desarrollo-sostenible (accessed on 17-09-2017).

After all, things and phenomena – including a strike, a movement, a map, an identity, wetlands, or indeed water security (conceptualizations) are "never isolated from the practices in which they are ...enacted" (Mol, 2002, p. 33). Things exist because they are practiced (idem).

Praxiography is about implicit knowledge or tacit knowledge, which is often unwritten, unspoken or undocumented and therefore not legible (see also Scott 1998). So instead of calculating how much water is needed, it looks at how the calculation is done. Practices, then, are "taken to be the mediator and carrier of such [implicit and tacit] knowledge" (Buerger 2014, p. 386) that need to be described in order to situate objects, norms and rules, but also outcomes, conceptualizations and research results. More so, attention to diverse practices potentially reveals that what is seemingly similar as something done otherwise. The same thing appears to exist as more than one. Polymorphic. To this I will come back in the next chapter.

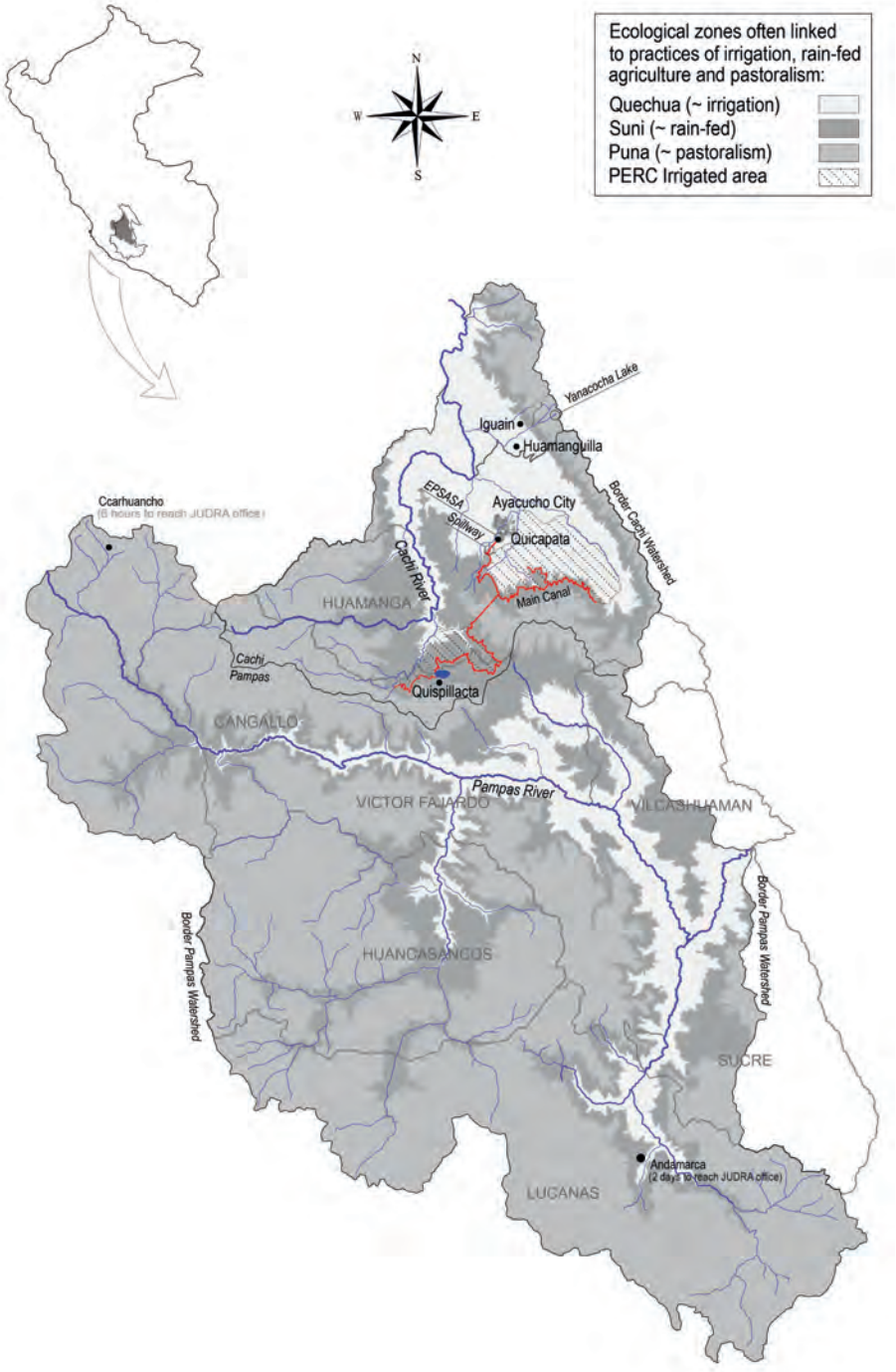
Before wrapping up this chapter, I confess I do not consider myself a praxiographer. At least, there are no rigorous praxiographies found in the thesis. I do make a modest attempt in certain chapters, but substantial material was collected before I knew of the term. Instead, I adopt a kind of praxiographic lens. By that I mean to keep, throughout the thesis, a focus on how things are done (see also Niewöhner & Beck, 2017) and do practice-oriented writing. This enables a shift from nouns (security) to verbs (securing). Analogous to the earlier shift of mobilization to mobilizing, it has the potential to change views and understandings. For example, even when water security is promoted as something static, an "end-goal" (Cook & Bakker, 2012, p. 98) or benchmark, seeing it as emergent practice means we acknowledge that whatever is static, still needs to be *done* (worked at and reproduced). Not just by water scientists or farmers: canals, dams and wetlands are also constantly at work, and (such) alliances need to be actively maintained. Thus, by using a praxiographic lens, water security no longer appears in writings as a black-box with different meanings and practices that are not articulated. As verb, securing allows for easier comprehension and makes visible that things might be 'done' in different ways by many actor-worlds. Put differently, it allows one to see that what is being secured, are the ways to 'do' or enact water. Finally, 'security' is closely related to safeguarding, defending or protecting water; something most scholarly interpretations underline (cf. Lankford, Bakker, Zeitoun, & Conway, 2013). *Securing* water more easily agrees to practices aimed at procuring, or retaining water (positions), in which many communities are also actively involved. These I analyzed alongside practices of protecting.

The subsequent chapters will illustrate this, keeping to the approach suggested in this chapter. This approach is not meant to be definite, but advocative: a plea to look at and study water security struggles in different ways. It reflects my musings and puzzling after discovering that what I found in the field could not be made sense of with the tools and theories that I initially knew and envisioned. In the field, what is mobilized are movements and protests, what is remote and inaccessible is actor-dependent and relational, what is resistance is innovative community governance. To address these points, I have questioned a number of related binaries that are often assumed in social sciences but that I did not consider useful for my analysis. Instead I

introduced three concepts to think around binary-thinking: translation as a way to analysis mobilization of (non)human actors and networks; actor-worlds to establish from where the analysis departs or is situated; and astuteness to account for practices that people use to turn a situation or entity to support their projects. With these ideas and insights, I will look at how Andean communities procure, retain, protect and defend their water (worlds).

3. Connecting water worlds:
Multiplicity and fluidity in the Central Andes

Image 2: The fractal Pampas river



Map 3: JUDRA constituency - the Ayacucho Irrigation District

In this chapter, I describe the fluidity of an Andean water user association, the JUDRA, showing that this institution or actor is practiced or done differently at different sites and situations and so produces different, yet connected and overlapping, versions or realities of itself. I first use an *asamblea* or meeting of an official Irrigator Commission in the community of Rancha to show how different, partially connected, actors get together (including hydraulic infrastructure, state water institutions and community arrangements). The different purposes of the Commission and the multiple identities of its members are revealed when observing the interferences between community customs on the one hand and practices that follow legal prescription on the other. Pending the actual arrival of water, it acts as an 'official' water user organization (section 3.1).

Rancha community members relate to water differently and have different stories as compared to community irrigators of Huamanguilla. The latter are located on the opposite bank of the Ayacucho basin and have a long history of utilizing small streams and sources. I use a vignette of a visit to a cloud-covered lake to show the different ways of making sense of and relating to water. This is a next step in starting to appreciate the multiplicity of water and water-related actor-networks (3.2).

The Ayacucho water user association (JUDRA) is one prominent water-related actor-network. Its formal appearance is that of a bureaucratically enacted water institution that has legally prescribed functions, roles and entities. The JUDRA that is situated in offices in the main city perhaps comes closest to this formal appearance. It is an appearance that is different from the 'lived' JUDRA encountered in other places and moments. I, for instance, draw attention to how the JUDRA is also a grassroots initiative in Huamanguilla, 'done' in order to secure water and strengthen people's bargaining position in terms of water development (3.3).

In yet another version, the JUDRA appears as the ally of the community of Quicapata that, together with three other communities, is seeking to secure water and inclusion in the PERC hydraulic scheme. I show how actors that are both part of the JUDRA and of the community cleverly mold notions of ecological flow and tradition in support of their cause. Putting these different versions of the JUDRA next to each other shows how natural resource institutions, even when clearly defined and designed on paper, in practice are patchy and transitory. As entities that are continuously being performed, they can be ambiguous and amendable. I turn to different spatial topologies to demonstrate that the JUDRA (and certain constitutive elements) can appear stable sometimes and at some places, yet also acts as a fluid when comparing it to versions or realities done elsewhere (3.4).

Finally, I use the chapter to show how actors intentionally play with this fluidity and heterogeneity. An example of how JUDRA is 'done' in the community of Quispillacta shows how its spokespersons are constituted in different actor-worlds and move between them: they move between different JUDRA enactments. In each they are differently understood, while at the same time appearing self-similar in all. This enables them to create entanglements among and translations between different realities that help explain not just JUDRA's fluidity but also its durability (3.5).

This chapter informs the question: *how can social mobilization and water security be conceptualized in a way that helps to make visible different Andean water realities and their entanglements?*

3.1. Asamblea ordinaria

A confluence of worlds at an irrigators meeting[24]

Meet Juana Cuti: married, mother and member of the community of Rancha. Here, she and her family work a few small, rain-fed plots and own a few animals. She regularly travels to the nearby regional capital city of Ayacucho to sell *cancha*, a form of popped corn, for additional, much needed, income.

Rancha is located near the city and Juana journeys on foot. It is a pleasant, one-hour walk downhill. One that I made several times, for a traveler is awarded with nice scenery and views of the area as you approach the city from the south and from above. The best time to enjoy this walk is outside of the rainy season, which in this part of the Andes typically is between March and December. Unlike Juana, I never walked from the city up to Rancha. Instead, I would take one of the somewhat cramped, often crowded, *colectivos* that depart from Grifo Ayacucho. The Grifo is a meeting place with a gas station and numerous small food stalls. People buy and consume and engage in small talk before they enter one of the many minibusses. The 'Los Libertadores' highway departs here, connecting Ayacucho to the distant coast in Ica and Lima. After winding uphill for nine kilometers, there is a dirt road that leads away from the highway. On a December morning in 2012, I followed that road, trying to get to the village bullring in Rancha.

Juana, too, was on her way. She left the house carrying a human-sized bag of cancha to sell. The surrounding landscape was a rolling valley, a patchwork of green, yellow and red where comuneras and comuneros cultivated tubers or broad beans, where crop residue was left on the field for fodder or where an ox had just plowed the reddish earth. It was a damp morning, thus much of that landscape was hidden from view, including the pockets of eucalyptus trees. Not that Juana needed to see to find her way. She had often come back from the city after nightfall and easily found her home. That day, however, Juana did not go to the city, but walked down to participate in a meeting held in the bullring. It was the accountability meeting (*rendición de cuentas*) of the 'official' Irrigator Commission (Comisión de Regantes). Mostly men assisted. However, her husband, like many, had a (temporary) construction job in the city, so today she assisted as a water user but also sold food as a vendor.

[24] Image 2 (p. 49): Fractal images of the Pampas river (left, the river headwater; right the river mouth). Source: Google Earth, earth.google.com/web/

The material and cases presented in sections 3-5 were previously published in Verzijl & Dominguez (2015), "The powers of water user association: on multiplicity fluidity and durability in the Peruvian Andes"; and partly in Hoogesteger & Verzijl (2015), "Grassroots scalar politics: Insights from peasant struggles in the Ecuadorian and Peruvian Andes". These are adapted to support the chapter's question on connected water worlds.

The get-together

The language at the meeting in Rancha was Quechua. Some Spanish words were used; *tarifa* and *riego tecnificado* (water fee and pressurized irrigation) stood out, but other than that, it was difficult to actively participate without speaking the language. Not all seats in the stadium were occupied and people clustered in groups. Juana sat on the opposite side from where I was observing. I noticed that she approached only her group and the one next to it, but did not make her way across the stadium to sell her snacks. I would have bought cancha if she would have come, but also did not approach her. In the middle of the bullring stood a wooden table and a few chairs, staged for the Commission board. From here, the board members could see about half the stadium. Although groups could have moved over, some preferred to remain seated and stared at the back of the board. Armando, the Commission president, welcomed everybody.

I had known Armando for years, ever since in 2009 he and I co-researched the electoral process of this Commission – with the near-impossible-to-pronounce name of *Ccelloccacca-Huachualla* (see box 2). Irrigator Commissions are government prescribed subsidiaries[25] of the Ayacucho water user association, the JUDRA.

Geographically, the Ccelloccacca-Huachualla area covers Rancha as well as parts of four other communities. It was one of the few Irrigator Commissions that, from the beginning in 2009 onwards, had followed government electoral regulations and installed candidate lists. In most other Commissions, voting was done by show of hands (or interesting variations thereof). During the process (and our research), Armando was designated as the leader of one of the lists and won the elections. He is from Rancha, a young agronomy student and introvert, at least in the company of engineers and community leaders. He works the chacra of his family and was ultimately elected to the JUDRA board and appointed as its technical manager later in 2010.[26]

In December 2012, Armando was at the end of this three-year term, handling the annual budget and settlement would be one of his last tasks as president of the Commission. The key

[25] By law, Peruvian water users have to organize themselves in a three-tier structure of Juntas de Usuarios (Water User Association), subsidiary Irrigator Commissions, and below those the Irrigator Committees (General Water Law 17552, since 1969, replaced with the Water Resources Law 29338 in 2009). Over time the responsibility of more management functions was transferred to the users (see also Vos 2002; Verzijl 2007). Juntas have to be established at set Irrigation Districts, while Irrigator Commission had to be formed at the level of a stream or secondary canals. Committees are usually found at intakes or village levels. See also section 3.3 for further elaboration.

[26] With these elections and the instalment of the new board, the term of César, the JUDRA president from 2007-2009, that included the national strike, had ended (see section 2.1). This also meant that the sitting JUDRA staff, secretary Julia Tejada and technical manager Untal Quispe (who will be introduced in section 3.2 and), who initially received me in Ayacucho, were replaced. I remained friends with them over the years and both ended up working for a government program on modern irrigation (PSI) focussing on Socos (section 4.5). Armando did his internship with Untal in 2008 and was in this way introduced to JUDRA. He stuck around afterwards to help Untal with certain consultancies, which is how he and I met.

agenda point of that meeting was a controversial issue. It involved negotiations with other water user groups about compensation for the faenas (and kinds of investments) that Rancha community members had invested since 1997 to procure and secure a water share. This was also the reason for my presence at the meeting.

I spent half an hour hearing, not understanding, Quechua; and watching how Juana was listening to Armando, then stashing her goods, then walking around apologetically in the act of selling them. She sat down somewhere to listen and repeated the sequence. After a while, I stood up and left the bullring. Outside, women were cooking and talking in Quechua. I struck up a conversation with a male ex-board member, also from Rancha, who just got a meal from the women. We talked about the problems that the Commission was facing. For six years now, they were 'officially' organized and recognized by the Local Water Authority, he said, and for more than a decade, they were included in the hydraulic scheme of the large infrastructure project, PERC. However, they had not yet received a drop of water. This was true for the bigger part of Rancha. The lower part received water, but the hydraulic infrastructure failed to service the entire community. Yet, its members had invested time, labor and money to see it realized. The ex-board member mentioned political favoritism in PERC, but also reprimanded the current Commission board for poorly pursuing the matter. Now, other communities also started claiming a part of their water and PERC officials had told them that the infrastructure, which they helped build over the years through communal faenas, would transport water to these communities as well.

The ex-board member finished the meal and seemed to thank the women. All of them chuckled and then he asked me how I made sense of the meeting. We all shared a laugh about my seven-word-Quechua vocabulary and got to talk about the few Spanish words that I heard Armando say. The ex-board member expressed his opinion that these meetings should be entirely in Spanish before I turned the conversation back to these other communities and the controversy I was trying to understand. Around us other people were engaged in small talk while inside the bullring, the meeting continued.

The break-down

I can only speculate about the ex-board member's opinion. Maybe it was for my benefit, maybe all his outside dealings as a board member happened in Spanish. Doing everything in Spanish might further discourage people like Juana to participate actively or just come to sell food. What is worth noting though, is that through these 'official' Irrigator Commissions, new concepts travel(ed) to Andean community actor-worlds that were and are so alien that they cannot be translated. Words like water tariff payment, accountability, pressurized irrigation and integrated water resources management, popularly called *GIRH* (*Gestión Integrada de Recursos Hídricos*). The meeting also provided other noteworthy examples of how elements of Andean communities and state water institutions are becoming entangled. First, in the get-together, there is a mesh of

customary assembly activities[27] and prescribed water user association practices. The settling of Commission expenditures for one, but also the selling of food and preserving of contacts. Second, there is the issue over faenas, long-established in Andean communities, used here to extend a modern large-scale hydraulic project. According to the members of the community of Rancha, they invested, for 15 years, time and labor. By doing this, they earned their right to use the infrastructure (see also section 4.5). Others reasoned that it was the responsibility of the state to provide (drinking) water. This was the controversy I was tracing, aside of course from a third issue: that irrigation water had yet to arrive in Rancha while they had been (acting like) an 'official' Irrigator Commission for years already.

The documentation recognizing the Irrigator Commission of Ccelloccacca-Huachuahalla can be found in the offices of the JUDRA and the government water authorities. It includes a registered user list and mentions the area that corresponds to the commission, located, like the city, on the right bank of the Ayacucho basin. Water for the city is delivered by the PERC project on the Campanayocc mountain (see map 4). For a share of the water to reach Rancha from here, an inverted siphon would have been needed to cross the Alameda valley. When the ex-board member mentioned political favoritism, he referred to the decision to construct this siphon at a, for Rancha at least, complicated location. Instead of connecting Campanayocc to Huachualla (a place from where Rancha community members would have had easy water access), the chosen location near Ccellocaccha (and the municipality of Socos) meant that an additional second siphon would be needed for Rancha people to obtain water. In December 2012, this second siphon had yet to be constructed.

In sum, this get-together provided an illustration of how a water user organization is practiced. Put differently, it showed a performance of a commission meeting with particular actors and associations that "enter into its making" (Michael, 2017, p. 56) like board members and food vendors, a table insight the bull-ring and a cooking pot outside, an annual report and popped corn. At the same time, I also found different actor-worlds at work, including that of the community Rancha and the legally prescribed water institution, JUDRA. These worlds can intermingle, converge or clash, at a single gathering. I noticed how the people present were members of both, with some performing more as comunera(o) and others more as JUDRA functionary. They seemingly are part of various actor-worlds. The significance of this in the connecting of different water-related worlds will be further explored in this chapter.[28]

[27] Anthropological studies have shown that many Andean customary institutions favour diversity. Assemblies also have the purpose to catch up on 'outside' news, exchange goods and products, express daily worries and celebrate the gathering itself; as often people have to travel far to attend (cf. Mayer, 2002). Mixed meetings, where these kinds of practices are fussed with state-sanctioned programs or institutions are frequently organized in the Andes.

[28] For that exploration, I follow Marisol de la Cadena's observation (2010, p. 347) that the practices and histories of an Andean community are shaped in "collaborative friction with practices and institutions other to itself [and in that manner it is] 'partially connected' with and participates in ... nation-state institutions" and vice

I trace and analyze, in this chapter, in what ways the JUDRA is practiced – or at least some of the ways – and whether these different versions add to its durability, or not. I do so in the same manner as I did with strikes and movements in the previous chapter. Thus, I continue to utilize such concepts as translation, situatedness, and the trickster, but also introduce new ones like fluidity and multiplicity. In this sense, the chapter is an amplification of the musings and puzzles that were provoked by doing participant observation on a 'same thing' at various sites and moments or, put differently, in various actor-worlds. During fieldwork, I enrolled several co-researchers, like Armando, who, aside from being JUDRA functionaries, were also members, representatives or spokespersons of an Andean community. I followed them as they navigated the different actor-worlds in and through which the JUDRA was performed (see also box 2). Water, in these worlds, is an obvious crucial actor and just as crucial are the practices of securing it – of defending, protecting, procuring or retaining water (related positions).

Box 2: Co-researching and following actors

During and after the JUDRA elections of 2009, I worked closely with 6 research collaborators – local actors who had an active role as JUDRA staff or in one of the Irrigator Commissions. These elections are held every three years to renew the boards of the JUDRA and its subsidiaries, the Irrigator Commissions and Committees. Apart from these elections, the collaborators helped to gain insight into controversies related to water security in which the respective Commissions they researched were involved. For acceptability reasons, most of them followed their own Commission or one they had close relations with (see also Bolin, 1990:142). In conversations and reports I urged them to describe the events rather than merely give their opinion. This idea of co-researching extended my ethnographic method (Mol, 2008:9-10) and I considered very rewarding.

The cases introduced in this chapter: Rancha, Huamanguilla, Quicapata and Quispillacta are studied and learned about in this manner. When I could, I followed these actors, to meetings and conflict mediations, as well as in their daily activities at the JUDRA office, NGOs or local communities (see also Latour, 2005:12). They are no longer just 'the studied' but rather co-learners (Law, 1994) and offered knowledge about the stories (of controversies, practices) they were themselves involved in, shaping my (partial) understanding of JUDRA.

The strategy to follow actors as with any method, does not just describe local realities but is also part of their enactment and the traces of our collaborations were left in the JUDRA patchwork. The simple notion that we, Armando, the others and myself, presented ourselves as doing work to the benefit of JUDRA in several Commissions might well have contributed to Armando being chosen as JUDRA board member. I do not know. What I emphasize however, is that there is no observing from a distance or neutral method (Law, 2004:7), from which researchers can interpret the stories they hear, observe or write about. And that sense-making is situated in academic networks – disciplines and core values of research groups.

versa. The JUDRA and its subsidiary Irrigator Commissions can be enacted as institutions of a national water bureaucracy or administration.

The last three sections look at the JUDRA through its different enactments, but before that, I introduce two functionaries who, so I found, easily moved between, and operated in, these different water worlds or water realities: Julia Tejada and Untal Quispe. He is an agricultural engineer from Huamanguilla, an indigenous community at the foot of the Razuwilka mountain; she is an accountant from Quicapata, a peri-urban community lodged between the city of Ayacucho and the summit of the Campanayocc mountain, on the slopes of which she has her chacra. These two mountains, located on opposite banks in the Ayacucho basin, connect to different water realities; a concept which I will attempt to elucidate first, before performing the JUDRA.

3.2. Andean waters

Unearthing water realties in the Ayacucho Basin

An important nonhuman actor in the contemporary water distribution of the Ayacucho basin is the Campanayocc mountain. It is a smooth hilltop in the Province of Huamanga that overlooks the capital city. Water is delivered here from far away through a number of connected infrastructural works (such as canals, tunnels, reservoirs and intake structures). These are part of PERC, a modern multi-purpose hydraulic project. Finally, water arrives at Campanayocc via the Canal Suministro. From here, it is destined for urban drinking water, (potential) hydro-power and ecological flow for the main city, as well as (un)official irrigation for several semi-urban communities, including Quicapata of which Julia Tejada is a member. Also, from here, 500 liters per second are reserved and diverted for Rancha, the Socos municipality, and other communities on the other side of the Alameda Valley (see also chapter 4). Furthermore, the Ayacucho water treatment plant and future hydroelectric power stations are found or envisioned on this mountain. Campanayocc is a hub of water flows. The PERC actor-world, which aside from water infrastructure, also includes project organization, studies, assessments, monitoring networks and more, practices – or enacts –what could be considered a kind of technocratic reality of water.

Campanayocc also offers a spectacular view of the entire Ayacucho basin[29] with the city at its feet and the PERC main irrigation canal visible as a line drawn across the mountainous backdrop in the east. Nearby, Rancha can be seen to the north-west while faraway on the opposite bank of the basin, to the north-east, a rugged mountain peak stands out, known as Razuwilka - or *Apu* Razuwilka, as for many members of Ayacucho communities it is a spirit-endowed entity. In their cosmovisions, mountains are not just large piles of rock or sites of natural resources but powerful animated actors: earth-beings.[30] Imbued with personhood, these beings provide for humans,

[29] The nonhuman actor Campanayocc is discussed later in this chapter in relation to community struggles and in Chapter four in terms of technological affordances of the PERC system. For a description of the Ayacucho basin see also Mitchell (1991).

[30] Earth-beings – like mountains, outcrops, lakes and water sources – is a term used by, among others, Marisol de la Cadena (2015) and further elaborated throughout this thesis (mainly chapter 5 and 6); it acknowledges a sense of spirit or animated character to certain nonhuman actors in Andean community actor-worlds.

command respect, none more so, in this basin, than Apu Razuwilka. These Apus were and continue to be an intricate part of numerous Andean community actor-worlds (cf. Boelens, 2014).

Like Campanayocc today, a large imperial city once existed at the foot of Apu Razuwilka. It was here that the Wari culture flourished over a millennium ago. An urban center with 40,000 inhabitants, the city began to decay after 1100 CE. Its impressive ruins, however, can still be visited today in the municipality of Quinua. And although an explanation of the Wari rise and demise is beyond the scope of this chapter, two points are worth noting to understand the following story of Andean waters. First, the slopes of Razuwilka are part of a 2000-year long history of irrigation rituals, technologies and organization (see also box 3). Second, the worship and care of earth-beings was, and remains, fundamental to the irrigation practices and community lifeworlds in the region. In community worlds, which aside from revered beings like mountains and lakes also includes community organization, faenas, rituals, reciprocal networks and more, a different kind of water reality than the techno-rational PERC one is practiced – or enacted[31].

Razuwilka is located in the Province of Huanta, which used to be the place of relative water abundance in comparison to the left bank of the Ayacucho basin. Peruvian anthropologist Ivan Degregori (2011, pp. 82–83) mentions a historical animosity between the city of Ayacucho in the Province of Huamanga and the city (and Province) of Huanta, which is linked to the political power of the first and the water availability of the second. While there is little irrigation tradition in Huamanga, longstanding irrigation communities exist in Huanta (W. P. Mitchell, 1976; Oré, 2007). One of them is the indigenous community, now also district (or municipality), of Huamanguilla (Zapata Velasco, Pereyra Chávez, & Rojas Rojas, 2008).

Untal Quispe is from Huamanguilla and he spoke to me of old, pre-Columbian, canals and of water retention reservoirs to store water; several of which are still in use. An ancient dam also exists that was constructed in Pre-Incan times to increase the water in the Yanacocha Lake. This water was then diverted by a trunk canal to an adjacent stream that carried water to the urban center of the Wari (Valdez & Valdez, 1998). Untal told me the canal has withered but the dam not. This I needed to see.

Enchanted lake

If ever there was a lake in the clouds, it had to be this one. Or so was my impression in January 2017. I was standing on the shore of Yanacocha (lit. the black lake), a small lake in the puna zone of Huamanguilla, 4000 m.a.s.l. I could not see any mountain peaks. They were concealed by a thick cloud cover about 50 meters above the lake. I could not see the valley either, for there were clouds below me as well. A strange sensation. The air was thick. At certain moments part of the clouds dissolved or moved and steep outcrops became visible. It looked and felt rather daunting. I was told that Yanacocha was encircled by near-vertical rock formations and does not have a catchment area to augment it. Instead, it was fed by an underground source. It is about a kilometer long and 300 meters wide.

[31] This does not mean there are no technoscientific elements in such enactments. See elaboration in this section.

Box 3: On Wari, Warpa, Water and Wacas

The Wari imperial city was one of the largest Andean urban centers in pre-Columbian history (W. H. Isbell, 2008; W. P. Mitchell, 1991). A population of 40,000 is deemed a low estimate. Some suggest 70,000 lived here covering an area of over a dozen square kilometers. Either way, it remained the biggest city the region had seen until the second half of the 20th century, when it was surpassed, number-wise, by the current capital of Ayacucho (Degregori, 2011). It was at this time that studies ensued about modern hydraulic works to provide the current capital with water, and electricity.

Prior to Wari (urban) expansion, the Ayacucho basin was the cradle of the Warpa culture. Its people lived in small agricultural communities and, around 200 BCE, were skilled at terrace (andenes) and canal (yarqa) construction. The Warpa utilized the small torrents rushing down from Razuwilka and other mountain tops and are considered the earliest irrigation culture in the Central Andes (Denevan, 2001; Lumbreras, 1974). They occupied a particular ecological altitude belt, the Quechua zone, roughly between 2600-3500 m.a.s.l., where maize was the staple crop. However, Warpa pottery is found in the higher puna zone, above 4,000 m.a.s.l., in regions beyond the Ayacucho basin and as far South as the Pampas watershed (in the Chuschi Municipality; see chapter 5) (Valdez, 1997). This indicates exchange (trueque) relations with pastoralists far away (ibid). In fact, based on pottery production (form, images), the Warpas were influenced by and had relations with coastal societies like the Paracas and later Nazca peoples as well (ibid).

Huancavelica historians suggest that the Warpa culture extended to the left bank of the Cachi river and its tributaries, one of which is today called the Warpa river, which originates in the Chonta mountain range. They further suggest that Warpa and Paracas exchange was connected to settlements near Choclococha lake (T. J. Carrasco, 2003). This lake is considered the birthplace (place of origin) of many Ayacucho ethnicities.

Around the 5th century CE, Warpa peoples moved from many communities to a few urban centers, giving rise to the Wari empire which eventually stretched from Chiclayo to Cusco. While this box does not go into the drivers of Wari expansion (cf. Glowacki & Malpass, 2003) it is interesting to note that changing climate conditions, mainly prolonged droughts around the 6th century CE worked to the Wari advantage (ibid.; see also Arnold, 1975: 193). And centuries later, led to their demise.

By mobilizing technology, including built terraces, canals, reservoirs and roads, seed selection and quipu recording, the Wari generated higher yields. This, say scholars, enabled the Wari not only to conquer, but also to colonize other valleys (W. H. Isbell, 2008; Schreiber, 2004). Wari sites are often near large bodies of water and certain mountains and rock formations, which suggests they enrolled local scared spaces, or wacas, in their attempts, to possibly interest local indigenous population groups. One of these colonisations is the Valley of Sondondo, in the south of Ayacucho (Schreiber, 2004). The valley lies at the foot of Apu Qarawarazu another regionally important earth-being still worshipped and cared for today (see chapter 5.4).

There were several floating trout cages in the middle of the lake. This was one of the reasons my travel companions wanted to come. A fisherman was moving about on the cages and we waved him over. He got in a small wooden boat and slowly made his way to the shore. I realized it was cold, and although it was not raining, we were getting wet quickly. The boat drifted alongside and we introduced ourselves. My companions were Julia and Untal. He knew the area

well, but for her it was also the first time to visit Yanacocha. They wanted to buy trout; I wanted to see the old dam and withered trunk canal. The latter was abandoned before the colonial period, but the old dam had been in use until a year and a half ago, until a higher one was constructed some 200 meters downstream. Since it was, however, the beginning of the rainy season, or better, it was the end of the irrigation season. The old dam could still be seen and explored.

The fisherman was a bit grumpy at first but opened up with every sentence. He was not from Huamanguilla, but from the other side of the Razuwilka mountain. He liked it here because of the peace and quiet. He lived here, most of the year without going down and was alone, sort of. Herders came by occasionally and, he explained, a bull lived beneath the lake. Sometimes tourists would trek through the area as water and certain plants that grow here are attributed with healing effects. As it turned out, a few months back, a group of tourists had come and there had been a fatal accident. Police had had trouble reaching the area. The bull, said the fisherman, had risen from the lake and taken a life. My companions Julia and Untal nodded matter-of-factly. As if concurring, "these are things that happen". The story was not only unsurprising to them. They seemed to understand the why of it. After that, the conversation turned to trout and bargaining on prices and amounts of fish. Once settled, the small boat returned to the floating cages.

On our way down, half of the fish was left at a Huamanguilla hamlet. It was the parental home of Untal. We took the rest to the city on the other side of the Ayacucho basin. In the car, Untal explained that every year there was a ritual festivity at the foot of the old dam. This happens during the time of *Yarqa Aspiy* or the cleaning of canals. Inhabitants maintain the canal sections that correspond to their hamlet and clean their way from their fields to the source, Yanacocha. At the dam site, two groups are formed corresponding to the hamlets on the left and right banks of the stream that emanates below the lake, and they end up making repairs to the dam in a friendly competition. Afterward a ceremonial payment is made to Yanachocha and water users drink and dance in celebration.[32]

The reason to relate this anecdote is that it clearly illustrates how two (former) JUDRA functionaries – two people who work(ed) in government-mandated agencies or organizations administering and documenting water use and users[33] - effortlessly absorbed and conveyed stories about honoring mountains, celebrating lakes and emerging mythical bulls. They thus are able to enact both administrative waters and indigenous waters. This is remarkable because although water is key to both the legally-prescribed-JUDRA and the Andean-community-cosmovision actor-worlds, it is difficult, if not impossible, to make sense of one by referring to the other. The realities are not just different. They are incompatible.

[32] In many Andean communities water is managed according to longstanding communal practices and rights, which include labour arrangements like *faenas* and *ayni* and ritual celebrations like Yarqa Aspiy held in August or September at the beginning of their agricultural calendar (W. P. Mitchell, 1976; Vera Delgado, 2011).

[33] After leaving the JUDRA in 2010 and a period of temporary jobs, both started working for the government program PSI-sierra (Programa Subsectorial de Irrigaciones), which objective is to improve water management at the level of the JUDRA and Irrigator Commissions. They were still employed when we traveled to Yanacocha in 2017.

Enacted realities

After the realization of PERC, the place of relative water abundance[34] shifted, from Apu Razuwilka, on the left bank of the basin, to the Campanayocc mountain on the right.[35] I consider the lakeside encounter and shared stories in Huamanguilla and the account of the 'official' Irrigators meeting in Rancha, wherein these mountains appear, to be connected to distinct Andean waters: realities in which water is emergent or becoming, through practices, in particular networks of entities, procedures, rituals, technologies and stories.

How Andean waters differ can be observed from reading the works of Andean water scholars. On the one hand, as Rutgerd Boelens shows, there are practices and bonds among spirit-endowed mountains, Mother Earth and *comunera(o)s andinos* that are fundamental "to guide water flows" (2014, p. 241); on the other hand so are practices and connections between gravity, the Manning Equation and *ingeneiros agrícolas* or agricultural engineers (cf. Bottega & Hoogendam, 2004). The latter dominate hydrology textbooks and scientific water paradigms. They enact what can be considered a kind of 'modern water', which forms the basis of many contemporary (techno-scientific) water regimes that consider water as a substance to manage and control so as to make it useful to 'humankind' (Linton, 2010; see also Scott, 2006a).[36] Here water is often considered as an innate resource that is the same everywhere at any time. Andean communities and those who study them reveal other ways and sensibilities of relating to water and the material world (see also Bachelard, 1983; Illich, 1986; Strang, 2006) – that are found throughout the Andes (Boelens, 2008; cf. Valderrama & Escalante, 1996; Vera Delgado, 2011). Here water is often seen as part of a reciprocal relation of care, as the stuff to co-exist with (ABA, 2014; Dominguez Guzmán et al., 2017; Gerbrandy & Hoogendam, 1998). Hesitantly – and only for the remainder of this section – I consider this as 'indigenous water'. Both get water to fields, yet this water is 'done' differently; it is brought into being, and made sense of in particular networks (or actor-worlds) through "particular gatherings of practices, technologies, and stories that constitute" different water realities (Lavau, 2013, p. 418; Boelens, 2015a; Rasmussen, 2015).

Reality, says Annemarie Mol, does not precede everyday or mundane water practices "in which we interact with it, but is rather shaped within these practices". In this "process of shaping", the open, rather than fixed, and contested, rather than stable, character of *a* (water) reality is revealed

[34] I say relative as not everyone received water; the water users in Rancha, among them

[35] The Ayacucho basin is the cradle of Andean irrigation as well as the only site in Peru where an irrigation command area of a modern hydraulic multi-purpose project is situated in the highlands. In contrast all large hydraulic projects in Peru (and many beyond) capture water in the Andes to service the costa plains (Vera Delgado, 2011; Vos, 2002; Vos & Marshall, 2017).

[36] Jaimie Linton (2010) uses modern water to describe a particular way of relating – or associating – to water through science and technology. Following the ontological turn in geography and anthropology, there is an increased interest in different ways of enacting water (Barnes & Alatout, 2012; Dominguez Guzmán et al., 2017; cf. Hamlin, 2000).

(1999, p. 75). This insight brings forth the dictum that "reality is being done" instead of constituting a backdrop against which people go about their business. The implications are that realties, and thus water worlds, are continuously becoming and performative[37] (see also Law, 2004; Stensrud, 2015). In other words, different practices 'to guide water flows', in for example the communities of Rancha or Huamanguilla, make up different Andean waters; *enact* different water worlds, not simply socially or discursively but also practically and materially (Gad, Jensen, & Winthereik, 2015, p. 75).

Even though I used such labels to denote their difference, I hesitate to refer to the described Andean waters, the ones for instance in Rancha and Huamanguilla, as examples of either 'modern water' or 'indigenous water'. Following the discussions in chapter two, I have come to realize that using such divisional boundaries as "modernity and tradition, or "indigenous knowledge and modern technoscience" risks rendering invisible "everyday entanglements and multiplicity" at a single site (Omura, Otsuki, Satsuka, & Morita, 2019, p. xiii; see chapter 5). After all, large hydraulic works (like siphons, canals and dams) are realized using community faenas in Rancha or maintained using ritual celebration in Huamanguilla, by community members carrying around both chicha and smartphones. Yet, the labels of modern and indigenous water, I think, do nicely help show how people differently make sense of and practice water by associating heterogeneous entities and/with each other. Since water realities are constantly emerging, new entities can be mobilized to become part of (or translated into) ongoing water (re)enactments. Realities are transformed, anchored in practices that can also change (Mol 2002).

If it is possible to trace multiple realities, which are partially connected but irreducible to each other, the idea of a singular world (or a universe) becomes untenable. There is no overarching structure or system that holds a "multiple world of different enactments" together (Law, 2015, p. 127). Instead, worlds intersect and overlap in often contingent ways. A world "may be constituted by more worlds inside, and may be itself part of another world, none necessarily simpler or more complex than others" (Otsuki et al., 2019, p. 2). Worlds out there are thus messy; objects and entities are multiple (Law, 2004). What can be "theoretically or formally 'proven'" in terms of ontological multiplicity (Gad et al., 2015, p. 68; see also box 4), however, is, if at all possible, not the point of this chapter.

[37] In this thesis 'performative', 'enactment' and 'bring into being' are considered three related terms used to question "essentialism and ...the notation that entities somehow pre-exist our apprehension of them" (Woolgar & Lezaun, 2013: 324). In principle I will use enactment or enacting. Despite the difference I understand these terms similarly in the thesis.

Similarly, the term or concept used to indicate what is enacted, performed or brought into being differs: realities, ontologies, worlds. There are subtle differences (Otsuki, Satsuka, Omura, & Morita, 2019) and also depend on the object or actor being multiplied. The choice of concept in relation to empirical material matters. I use 'worlds' when I want to highlight the different cosmologies which inform the experience of and relation to landscapes or environments that are practiced/enacted; I use 'realities' when I want to highlight difference in practices. Or when Andean actors I met, observed and interviewed refer to realities themselves to indicate difference (see also box 5).

Box 4: On post-ANT and a tiny glossary

If I were to define post-ANT, it would be as an inventive and inspirational series of works that, among others, question notions of fixation, perspectivism and universalism by showing the fluidity, performativity and multiplicity of the things and entities around us. An important early publication, sometimes cited as a kind of a post-ANT departure point (Gad & Jensen, 2010; Michael, 2017), is "Actor-Network Theory and After", edited by John Law and John Hassard in 1999. However, Annemarie Mol and John Law's insights into social topologies and fluidity came before that (Law & Mol, 1998; see for example Mol & Law, 1994). Both authors could be considered key post-ANT practitioners to whom, aside from those studying science and medical practices, more and more Andean and water scholars are indebted to (see, for example, Barnes and Alatout, 2012; De la Cadena, 2015; Zegwaard, 2016). Still, I choose not to use or mobilize the term post-ANT because I see a clear continuation in how early concepts, like translation or actor-worlds, and the new ones outlined below, are used in this thesis (see also box 1); that is to help establish an approach - like an attitude – to practice research (see also Gad and Jensen, 2015). For this tiny outline of selected concepts, I draw on those who made far more extensive and better glossaries before me (Law, 2004; Michael, 2017).

Fluidity refers to objects and spaces without clear boundaries or compositions; new relations and actors go into their making; others dissolve or are removed. Connections that make up a fluid continuously "transform themselves without fracture" (Mol and Law 1994, p.643). Therefore, fluids cannot be fully circumscribed or rendered visible. This, in turn, means that writing about fluids is to partly make them mensurable – and is thus political because of the choices made and methods used by the author (see also section 6.5).

Multiplicity is a concept that starts from the notion that reality is enacted through – or in – practices. Different enactments of an object or space, for example, a canal or a wetland environment, bring forth a multiplicity of realities or worlds (Mol, 2002; Law, 2004). There is no 'really real' (or real-world) that precedes or "lies behind these enactments" (Michael 2017, p. 161). The observation that the same object or space can be multiple – that is enacted in different practices – gives way to a popular phrase in ANT: an enacted object "is more than one, and less than many" (Mol, 2002, p. 82).

Ontological politics is the result of overlapping or interfering realities or worlds. Sometimes practiced realities co-exist, sometimes they clash openly and sometimes one set of practices invisibly extinguishes a second. There is no longer a universal truth for identifying and understanding a situation (Law, 2004). Ontological politics, in a way, is about 'what is' rather than 'who gets' and enfolds the practices by which one reality wins out over another (Micheal, 2017). This also includes the act of researching and writing; and the motivation of the researcher "for enacting one kind of reality rather than another" (Law, 2004, p. 162).

Spokespersons are the actors who have "situated themselves within a network [or have been made to] such that they are able to speak on behalf of all the other relevant entities" (Michael, 2017, p. 164). Becoming a spokesperson involves translation (interessing and enrolling) of other entities (ibid). In a project on multiple worlds, I prefer this term over prime-mover (see section 2.2); it is possible to have different spokespersons representing a world in different situations.

What is important, politically, is the choice of the analyst to approach the world as either multiple or as a single container-world (Law, 2015). In the latter, (that is the dominant western) single-reality-one-world approach, stories about honoring mountains and celebrating lakes are relegated to culture; they become belief or even superstition. In a multiple world, these are part of a reality among many, done or practiced in a particular way. The latter approach allows you to "imagine a liberal [unbiased and enlightened] way of handling" power differences among different groups of water users; whereas in the former multiple world approach such an enlightened position or "liberal institution to mediate between the different realities" becomes an impossibility (Law, 2015, p. 127).

In this thesis, I hope to modestly contribute to an understanding of Andean struggles for water security through an approach that considers reality as consisting of multiple and performative (or enacted) worlds. I am attracted to such an approach because it enables researchers to be reflexive about one's situatedness and method (Law, 2004); to refrain from grand theory (Dominguez, 2019); and to identify ways of relating to water that would otherwise remain invisible or be lost (Dominguez, Verzijl and Zwarteveen, 2017). Put otherwise, if one accepts that realities are 'being done', that they are multiple and performative, this usefully extends to ethnographic practice as well: "description and analysis are also performative efforts to articulate and change worlds" (Gad, Jensen and Winthereik, p. 83; see also box 4).

Performing or enacting, therefore, refers to the actors described above, who live (or co-exist) with and constantly (re)enact Andean water worlds through practices, stories and associations. It also refers to those actors involved in sense-making or worlding (De la Cadena, 2015), including local community users and ingenieros agrícolas, policy advocates, and researchers as well as authors (Law, 2004; see also Singleton & Michael, 1993). After all, say Zwarteveen, Roth and Boelens (2005, p. 260), texts often also "reflect with whom the authors (most) identify and whom they hope to impress [or interest], convince or enroll in their projects". Authors and researchers are thus always also engaged in politics, ontological politics. They themselves, through their acts of description and sense-making, are also implicated and involved in practices by which one world or reality 'wins' – is made more plausible – as compared to another (Michael, 2017). For example, a modern version of water (is made to) appear(s) more true or likely than an indigenous one; or enacting the JUDRA as part of nation-state institutions is preferred over enactments of the JUDRA "done" in different community actor-worlds. I will next describe some of these enactments.

3.3. JUDRA

Grass-rooting an "official" water user association

The JUDRA, the Ayacucho water user association, is a stakeholder platform, and was identified as the starting point of this thesis to study Andean grassroots initiatives to secure water. One of these initiatives was the attempt to set up a larger Pan Andean platform that soon included water user associations from the Peruvian Amazon as well. It was called CCJUSS (*Comisión Central de*

Juntas de Usuarios Sierra Selva) and was created to counter the perceived hegemony of the costa reality in government matters of water, and to defend the rights and realities of those living in the sierra and *selva* (see also box 5). The initiative quickly waned after the start-up funds, obtained from the NGO Oxfam, were spent. What remained was the initiator, the NGO and several other elements and actors, including legal decrees and government agencies. I use these to show how the JUDRA came to be and emerges in, connects to and entangles with other actor-worlds. And how, in doing so, it morphs into different versions of itself. The initiator of CCJUSS was Untal Quispe, one of the companions who, together with Julia Tejada, traveled with me to visit Yanacocha.

Before I continue with the story about JUDRA origins, let's once again recall that visit and the matter-of-factly reaction by Untal and Julia to the story of the fisherman about the bull underneath Yanacocha and how it and the lake can act upon people and cause accidents. Their nodding suggested to me not only that they are acquainted with such stories, but also that they can imagine or speculate why they are told, and when they are told. Stories like these have to do with earth-beings (de la Cadena, 2015) – an enchanted lake and a spirit-endowed mountain – and possibly are about the new dam that was constructed without people having given proper care and *pago* to and respect for these nonhuman beings.[38] Their nodding also suggests a familiarity with a way of relating to water and the environment that is different from legally prescribed organizational and modern legibility practices. What makes their reaction interesting and complex is that Julia studied accounting and Untal is an agricultural engineer: these are professions that qualify them for positions in water bureaucracy institutions, and that implies that they are also familiar with the logic and languages of these institutions. Untal and Julia do not appear to find it difficult to navigate these two different worlds.

I first met them in 2008, a few days prior to the *Paro Agrario Nacional Indefinido* (see section 2.1). At that time, Julia was the JUDRA secretary, while Untal was the technical manager - both voluntary.

Performing a JUDRA

In February of 2008, a week or so after the national strike (section 2.1), when the heat died down, we sat in the JUDRA office in the city of Ayacucho. It was located on the compound of the Ayacucho Peasant Federation (FADA), because the JUDRA itself lacked resources. Inside there were a few nonmatching steel desks, a filing cabinet, some old computers and some creaky chairs to sit on. Here Untal Quispe explained what the JUDRA did and how it was created at the turn of the century. At the time of our meeting, it counted with more than 40,000 water users in 48

[38] The bull underneath the lake is part of Andean cosmovisions (see also Arguedas, 2002). I never asked Julia or Untal about it, but years earlier, around the time we first met, I (and they) attended a public hearing in the community of Quispillacta. Here community members refer to similar stories and express concern when outsiders venture too close (see section 5.1).

subsidiary Irrigator Commissions, which in turn were subdivided in 450 Irrigator Committees. In total, 22 Irrigator Commissions received water from the new, modern, Rio Cachi multi-purpose project (PERC), the rest used local water sources for small-scale, community-managed irrigation systems.[39]

Untal handed me a booklet: the JUDRA strategic development plan, in which a map presented the JUDRA constituency.[40] The map showed two watersheds, Pampas and Cachi, which make up the Ayacucho Irrigation District (see also map 3). To the west, both watersheds, and thus JUDRA territory, extend into the Region of Huancavelica.

Yet, to my knowledge, the communities in this area of Huancavelica that by law are part of the JUDRA, never assisted in meetings, or were referred to in documents of JUDRA. Similarly, the water user association has a more limited outreach to the territory west and south of the main rivers, Pampas and Cachi. These rivers run in deep canyons, well below agricultural fields, and can only be passed at the (few) existing bridges. Mountain ranges and deeply carved rivers are formidable obstacles in the geography of JUDRA. Members of irrigation communities in the south have to travel two days to reach the JUDRA office and are mostly absent.

The JUDRA constituency, legally set, is part of a distinct reality, one that is enacted in the water-user and water authority offices in Ayacucho city and Lima. That these southern user groups do assist in mobilizations and anniversary reunions is indicative of broader objectives than those stated in the water law, on which Untal and government officials put so much emphasis – and has to do with forging and maintaining alliances to further community projects and interests.

The JUDRA strategic development plan also presented the association's vision and mission: it defined itself as a grassroots organization (*organización de base*) that strengthen leaders, to contribute to the socio-economic and cultural well-being of the Ayacucho population. Development, peace-keeping, agricultural policy, and change of attitude featured more prominently in the JUDRA vision and mission than issues of water management. The booklet further mentioned the date, 10-12-2000, on which the JUDRA, was created; to be recognized later by the local water authority, through resolution 031-2001-CTAR-AYAC-DRAI-ATRDA. It was the date Untal Quispe told me when I asked about the formation of the institution.

During our early conversations, he frequently referred to the General Water Law 17752 (GWL) to explain what the JUDRA did: According to the GWL (issued in 1969),[41] it is compulsory for water users to form associations or *Juntas de Usuarios* at the level of each Irrigation

[39] The Commission of Ccelloccacca-Huachualla (section 3.1), including members of the Rancha community, is one of the 22; despite not having water at the time. The hamlets of Huamanguilla are committees of a 'community-managed' Irrigator Commission, called Chinchasuyo (section 3.2).

[40] The JUDRA constituency overlaps 10 Provinces, 69 Municipalities and hundreds of local communities in two Regions, Ayacucho and Huancavelica.

[41] The General Water Law became obsolete in 2009, when a new water law, D.L. 29338 was adopted (see following sections).

District. The main objective of Juntas is to support the local water authority, ATDR,[42] of said Irrigation District, which is a decentralized representative of the Ministry of Agriculture. Junta support entailed assistance with the construction and maintenance of irrigation works; the administrative tasks of registering users, land holdings and crop choices for operation and water distribution purposes; and the collection of a user tariff. In 1989, following an amendment of the GWL, much of the responsibility of these functions was transferred to the Juntas, which are three-tier organizations consisting of a General assembly, Irrigator Commissions and Irrigator Committees. Untal mentioned that the Junta is responsible for the administration of rights, resolutions, budgets and projects of the Commissions, as well as tariff collection and management of large-scale infrastructure. The Commissions are in charge of water distribution within a 'sector' of the irrigation district. The Committees, mostly operating at local village level, are to assist in maintenance and Commission assembly tasks.[43]

At the beginning of the 1990s, there were no attempts made in Ayacucho to form the mandatory water user association.[44] Around that time, the construction of the modern multi-purpose hydraulic project, PERC, had started in the Cachi watershed. PERC would provide irrigation to the municipalities on the left bank of the Ayacucho basin. Furthermore, via a separate branch, called the Suministro Canal, two cubic meters per second of drinking water and ecological flow was to be supplied to the capital city, while also generating hydro-power.[45] Untal was the first to tell the specifications of PERC to me, (see also section 4.1), in technicalities and stated objectives.

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[42] ATDR (or *Administrador Técnico de Distritos de Riego*) was the decentral government office initially (1969) in charge of allocation, administration and distribution of water (rights), as well as tariff collection and conflict resolution. Later, from the 1990s onwards many of the tasks were transferred to the water user associations or *Juntas*. After 2009 (see previous footnote), the ATDR was replaced with the ALA (*Autoridad Local de Agua*) that had even less management tasks, focusing on administration of water (rights).

[43] Elsewhere I discuss the GWL more thoroughly (Verzijl, 2007). For a historic overview and explanation of the different amendments and policies connected to water legislation in Peru, see GSAAC (2003).

[44] Yet, some Irrigator Commissions existed since the 1980s in the Province of Huanta, formed endogenously when irrigation communities pursued a particular development objective (see also Bolin, 1990; Oré, 2007). Since the 1960s, the Peruvian state started extending water control to the Andean highlands, imposing water user associations and new forms of distribution (Gelles, 1996; cf. Lynch, 1988; Vera Delgado, 2011). This bureaucratic transition, as Lynch (1991:45) calls it, refers to "a process of technological, social and political change" in local Andean irrigation institutions that was brought on by an increased presence of governmental agencies and interventions; which in turn were actively pursued by communities (ibid.: 46). The result was "the imposition of bureaucratic culture" (ibid.) onto the local irrigation institutions that relied on historically and culturally embedded practices, customs and (ritual) performances (Boelens, 2015a; cf. B. J. Isbell, 1978; W. P. Mitchell, 1991; Vera Delgado & Zwarteveen, 2007). However, (Gelles, 1996:105) posits at the turn of the century that in many Andean communities this "bureaucratic transition has yet to take place". With the discussions of previous sections (and chapter 2), I observe that bureaucratic and community irrigation institutions can be enacted at a single locality and overlap, coexist through friction.

[45] It was from this branch that Rancha and the water users of de Commission Ccelloccacca-Huachualla were also allocated water for irrigation (section 3.1).

Box 5: Storied realities

There is a good chance ethnographers of water governance in Andean countries have heard of or observed stakeholders – peasants, pastoralists and public officials – involved in supra-community water controversies referring to different realities. It was one of the reasons that drew me to CCJUSS, an Ayacucho-based initiative that united different water user associations. The platform was partly rooted in the general dissent among Andean water users that national water policies and water legislation (and funds, no doubt) were predominantly geared towards and tailored to the associations of the coast. CCJUSS aimed to change water laws and norms in correspondence to the *distinct realities* of each area (see also Hoogesteger & Verzijl, 2015).
I frequently witnessed how people made reference to the existence of different realities. In a meeting about the water conflict between Ica and Huancavelica actors (see chapter 7) in November 2008, *Huancavelicanos* from MEGAH, an advocacy platform of government, NGO and community representatives (ibid), emphasized that water use in the sierra *"es de otra realidad"*. They did this to raise the awareness of the actors from Ica - the irrigators and water institutions from the downstream costa valley, underscoring that their reality is only one, and not necessarily the best. It was a heated discussion about the speed of decision-making and follow-up actions. The idea that realities on the coast are different from those in the Andes was a recurring topic in the conflict.

Some weeks before the election of the Ayacucho JUDRA, in October 2009, I was listening in on a group conversation just outside the JUDRA office, following a meeting. The reference to a 'different reality' came up again, this time by the water users and representatives of the community of Quispillacta and other actors in the *cuenca alta* (upper Cachi watershed) who were talking about the *cuenca baja* (the lower part near the capital Huamanga) and its water users whom, according to the former, enjoyed a favorable water allocation (of 24 hours in comparison to 12 hours which Irrigator Commissions receive in the upper watershed). The topic of conversation focused on allocation with the emphasis that their distinct reality and water needs were not recognized. In this case, both groups *alta* and *baja* were in the sierra, both part of the same large-scale PERC irrigation system.

Again, later I was listening to an informal talk: A group of alpaca herders in Ccarhuancho were digging small canals as part of a national program to construct and rehabilitate watercourses of community irrigation systems. During a break, they were discussing the program among themselves as well as their canals, which serve to extend and improve wetlands (see also section 6.4). They, too, mentioned their "reality is not the same", referring to the small-scale irrigation systems of the lower ecological zones that the program (principally) targeted. In their brief chat, the herders contemplated whether they have more and longer canals and should hence be considered differently in the program. They also complained about the general dearth of such programs for them.

Indeed, mentions of realities and differences seemed to pervade the research area; showing a sense among water users that water practices, arrangements and associations are always situated, in particular in environmental niches. Mobilizing that difference targets what the people in question believed to be a favored other, usually found downstream from them, or at lower zones. The articulations of a distinct reality appear to connect 'contrariwise' to the established negative stereotypical and racial hierarchy performed in Peru, which holds that the *indigena* and his or her practices you inquire about, are always uphill from where you ask about them (see also de la Cadena, 2000).

Indeed, during those early conversations, Untal responded to my questions about the JUDRA in a rather bureaucratic and formal language. He quoted a lot of legal decrees and law articles and made reference to 'official' specifications or requirements; he mentioned the fact that Junta formation is mandatory and used an official resolution to indicate the date when the JUDRA was formed. By using this language, Untal confirmed a commonly held belief among Peruvian water professionals and scholars, that the JUDRA is a government-imposed institution (see also Huamanchumo, Pena, Silva, & Hendriks, 2008; Oré, 2007) and a mechanism of state water control and user regulation (see also Boelens, 2009), one that follows prescribed procedures to optimize water use. Yet, and as I will show in the next sections, this version of what the JUDRA is (one focuses on how it is 'done' in city offices), is just one of a number of possible versions. There are sites where the JUDRA took and takes on different forms or shapes and has different origin stories.

JUDRA roots

Following the development of PERC, government agencies did try to install a Junta in Ayacucho. In 1995, a first attempt was made. In that year, the Local Water Authority or *ATDR* of the Ayacucho Irrigation District was installed, almost three decades after the GWL instigated that these authorities were required. This ATDR tried to organize the communities that would be beneficiaries of the PERC project once completed (all located on the left bank of the basin). These were mainly from the Province of Huamanga and did not have the same experience with organized irrigation as communities on the right bank (see also Oré, 2007). Surprisingly or not, this ATDR attempt to impose the JUDRA failed. Communities in Huamanga could not be interested. More so, irrigators of the Province of Huanta resisted the attempt, since they had been, up to that moment, the focal point of state irrigation development programs in Ayacucho. They were concerned that the PERC project would marginalize their position; and so, to secure their water-related position, they thwarted the attempt and threatened the ATDR, who finally resigned.[46] No Junta was formed.

A few years after the failed government attempt to form a water user association, an irrigator from the community of Huamanguilla tried anew. This irrigator was Untal Quispe. He told me this story months after we first met, in a casual conversation, when we hung out at the JUDRA office. We talked about topics like what he did for (additional) income or how he had experienced the civil war. During these talks, he mentioned how he had been the driving force behind the creation of the JUDRA. To understand how he was successful, while the Local Water Authority was not, it is necessary to see which actors he enrolled and which associations or connections he

[46] Account from Clara Huamani, interviewed on 13th of March 2012. She had studied agronomy at the University of Huamanga and was the first ATDR in Ayacucho. In 2012 she was still working for the directorate of agriculture of the Regional Government of Ayacucho, but after that experience did not work in water-related functions.

managed to make. Using Michel Callon's (1986a) mobilization terminology (see section 2.2), Untal can be seen as the key spokesperson. What follows is his (or the community's) problematization of a water security situation.

During the civil war between the Maoist-Leninist Shining Path and government forces, the military established a stronghold in the municipality of Iguain, which is adjacent to Huamanguilla (and also part of the province of Huanta). This military presence allowed people from Iguain to take control of the water that was previously used by their neighbors in Huamanguilla. In the aftermath of the civil war, Huamanguilla was left with a severe water shortage. Although the Yanacocha lake, from which Untal's community drew water, was located on Huamanguilla territory, the stream that emanates from it becomes the border with Iguain further downstream. It is possible that by supporting the military, certain groups in Inguain were backed when drawing water from the stream. In any case, a conflict over water allocation ensued. This was not merely a matter between Iguain and Huamanguilla, but also had to do with post-civil war resettlement programs and returnees that made a mess of existing water allocation arrangements.[47]

As a young community member, water user and a recently graduated agricultural engineer, Untal converted himself into the spokesperson for securing community water. There were basically two avenues for Huamanguilla irrigators to achieve this goal: to get legal backing against what they believed was an illegitimate capturing of their water source, or to increase the capacity of the lake. An official water user association could address both. Untal Quispe enrolled several actors for this project: his community members, the lake, the Huanta (province) identity, neighboring community irrigation organizations, hydrological studies, water and agricultural professionals, the agronomy faculty of the Huamanga University and a stack of agreements among these actors.

First, Untal Quispe convinced community leaders and members of his plans to create a Junta to secure water. They supported him in arranging the prerequisites to form an Irrigator Commission that would represent their system and elected him as the Commission president. Secondly, the dam project that would enhance the capacity of the lake[48] was revamped. Hydrological studies, technical drawings and engineering expertise were to persuade others (local irrigators but also governmental agencies) of the importance of Yanacocha. However, to constitute an (umbrella-type) *Junta* at the level of the Ayacucho Irrigation District, the GWL indicated that at least three Irrigator Commissions were needed. So Untal convinced other

[47] One example that Untal mentioned was that people from elsewhere in the community were resettled on the plains between Yanachocha lake and the hamlets that originally used the source creating intra and inter community tension.

[48] The possibility to increase the capacity of Yanachocha by building a dam was first evaluated in the 1950s. Since then more than 20 studies have been conducted and reported on. Several attempts at construction have been made. During one of these attempts, in 1984, the Shining Path assassinated the lead engineer. It was not until 2015 that the new dam was operational (I visited the site in January 2017). It is not uncommon for similar hydraulic projects to gestate for decades. It was sadly not uncommon for lead engineers to be targets in the civil war (see chapter 4).

Huanta communities and Irrigator Commissions to join Huamanguilla. The idea to have a Huanta bloc was appealing to several longstanding irrigation communities, given the recent focus of government programs and agencies on the PERC multi-purpose project in Huamanga. Interestingly, also Iguain eventually joined to strengthen the dam alternative and secure Huanta's position. Finally, regional agricultural agencies and a new ATDR were persuaded with the prospects of Commissions and users incorporated into an administrative structure that complied with the water law.

Untal attempts to enlist these actors were successful and a decree "creating" JUDRA was promptly issued in 2000. The entire process took two years. During that time, there was limited participation from the communities of Huamanga. As water delivery from PERC remained unreliable or absent, these communities could not be interested and enrolled. All but one of the irrigation organizations that had joined,[49] and all initial Junta-board members, came from Huanta; these were the same actors that had thwarted the earlier, 1995, attempt of the ATDR. Untal was elected as the JUDRA's inaugural president.

This story allows seeing the JUDRA as an enacted process or entity. It was enacted not as a bureaucratic institution residing in city offices, but as a grassroots initiative of various actors for the purpose of strengthening their historic community systems and remain (in) the focus of irrigation development in Ayacucho, that is to secure public funding, water and water-related services.

A Postscript. In 2004, despite being re-elected, the Local Water Authority replaced Untal and the JUDRA board with representatives from Huamanga. In 2007, a new, third, JUDRA president was elected, who came from the PERC-serviced Irrigator Commission of Carmen Alto. This was César to whom I was introduced during the Ayacucho protest. By then, it was already an accepted truth in the Ayacucho water sector that the JUDRA had been created by resolution 031-2001-CTAR-AYAC-DRAI-ATRDA, in concurrence with the realization of the PERC project (cf. Warner & Oré, 2006). The 'grassroots' version of the institution only intermittently re-appeared. For instance, when Huanta irrigation organizations continued to operate as 'sub-Junta Huanta', to distinguish themselves from the rest of the JUDRA. In this form, they continue to be a grassroots initiative, and one that is not legally recognized. They still convene, among themselves, to contemplate ways to strengthen their collective position; certainly, since PERC draws other government agencies and NGOs to it. This is also how Huanta irrigators came marching on the first day of the "Paro Agrario Nacional Indefinido" (see section 2.1), leaving César and others to catch up as they continued straight to the main square. While many of them gradually stopped participating in JUDRA asambleas, they continued to perform in the form of a stack of necessary legal resolutions of Irrigator Commissions.

[49] That one organization from Huamanga that joined were water users from the municipality of Socos: The Irrigator Commission of San Melchor. It existed prior to 1998 and was one of the few community irrigation institutions on the left bank of the Basin. Still, the interest of Socos and motive to seek allies, was connected to a denial of water by PERC and is described in the next chapter.

These accounts show one Ayacucho Water User Association that is practiced or performed as a bureaucratic institution and one that looks more like a grassroots initiative. It suggests that natural resource governance institutions, apart from being clearly defined, designed and crafted, are also mutable and patchy and therefore fluid. So, not only what actors or networks actually *are* matters, but also the manner of performing and connecting. Before I elaborate on that and what this might do for understanding such institutions, I will first introduce my second travel companion of that visit to the Yanacocha Lake, Julia Tejeda.

3.4. Institution topologies

JUDRA as region, network and fluid

Julia Tejeda is an active member of Quicapata, a small semi-urban community, on the slopes of the Campanayocc Mountain (see map 4). The water treatment plant of EPSASA (*Empresa Prestadora de Servicios de Saneamiento Ayacucho*), the Ayacucho urban water company, is located there and provides drinking water for the city. The community of Quicapata emerged from a farmer group (or *Grupo Campesino*) that was given control of hacienda lands after the Agrarian Reform of 1968. At that time, a treatment plant, though much smaller, already existed. In 2009, both the village and the EPSASA plant were swallowed by the expanding city. In fact, a few hundred members of Quicapata now live interspersed with over 2000 other persons, many of whose houses stand on former community land. Still, Quicapata members could hold onto about 100 hectares of arable land. Historically, a lack of water sources has been a constraining factor in the community. In the past, community members of Quicapata could, unofficially, obtain some water from EPSASA if they – regularly and in case of calamity – maintained the infrastructure that carried water to the treatment plant. It was never a steady or reliable source. When César was elected president of the JUDRA in 2007, Julia Tejada was one of his confidants and she assisted him, voluntarily, as a secretary for over a year. César himself was not from Quicapata but had fields relatively close by in a sector called Yanama. More so, he worked as an operator and guard on the EPSASA plant and after-hours engaged in conversation and drinks with Quicapata community members.[50]

What institutions do

In 1997, water availability for Quicapata changed with the completion of the construction of the Canal Suministro, including a spillway structure at the end. This canal was, as Untal once explained, to deliver drinking water and further provide an ecological flow to the city and its surroundings as well as water for (future) hydropower. I later found out that its construction was

[50] To further interweave associations: EPSASA, according to the Peruvian water law, is also a member of JUDRA. Together with Electro-Centro (responsible for hydropower use) they are two permanent board members (*vocales*) representing non-agrarian water users.

the main priority of the PERC project. Other components, like a storage reservoir and main irrigation infrastructure, would take several more years to finish. According to PERC engineers and the JUDRA staff I interviewed in 2009, EPSASA was responsible for the water (transport) from the spillway structure up to the treatment plant. However, at the end of the canal, water just got discharged into the environment. Instead of designing some conveyance structure, EPSASA let the water flow freely into the Alameda Valley and captured it instead downstream, closer to its treatment plant.

During the first years, the Suministro Canal carried abundant water over the spillway (as other parts of PERC were not finished). This assured an abundant ecological flow for the Alameda River that runs through the city and also allowed Quicapata and three other communities to start developing irrigation organizations. Unfortunately, Quicapata and its three neighbors were never recognized by the PERC hydraulic scheme. With the completion of infrastructure elsewhere in 2005, that surplus water started to dwindle.

In 2006, the four communities became part of JUDRA through the Irrigator Commission of Carmen Alto. They were thus formally recognized by the Local Water Authority but without being incorporated in the PERC hydrological scheme (like, for example, Rancha was). Differently put, they were acknowledged as an official organization, but held no permanent water right; they were only permitted to use 'excess' water. By 2007, Quicapata and the other communities were left to 'commandeer' the ecological flow (150 l/s in the hydraulic scheme), which was erratic and not designated for irrigation use.

To be considered in the hydraulic scheme, the four communities turned to JUDRA to start negotiating with the government agencies in charge of PERC. Here Julia Tejada, but also César, were instrumental; they knew how to move and translate between community and government actor-worlds. However, despite enrolling the ATDR, (Local Water Authority) and obtaining formal recognition, despite having the local mayor as an ally and despite their close link with EPSASSA, the communities could not convince PERC engineers – who in turn disapproved of the Local Water Authority to recognize the communities.

More drastic measures were taken later that year when members of the four communities, together with JUDRA staff, occupied one of the PERC offices as a way of protest. This episode was published in the newspaper and entered in the portfolio of documents that the communities used to legitimize their claim against an injustice: being formally recognized in an Irrigator Commission and JUDRA, but without water being assigned to them. Their documents also included signed (but later retracted) commitments of PERC officials. After this, new mobilizations were planned and put into action, according to similar repertoires and with comparable outcomes. Instead of detailing those, I turn to look at how the JUDRA is 'being done' in this case. To that end, I need to briefly elaborate on a few points of Peruvian water legislation.

In March 2009, a new water law, the Water Resources Law (WRL), came into effect that replaced the GWL. It changed the constituency of JUDRA, since the law demanded organization along watershed boundaries. The Pampas and Cachi watersheds were separated and *Juntas* needed

to be formed in both. Notwithstanding criticism,[51] two further aspects that were virtually absent in the GWL are worth mentioning, since these were enrolled by Quicapata and their neighboring communities. First, the environment and an ecological flow (for environmental use downstream) were unmentioned in the old law and are to be guaranteed according to the new one.[52] Second, the new law prescribes an increased recognition of ancestral 'usos y costumbres'[53] (tradition and customs) of local irrigation institutions.

Quicapata and the other communities mobilized these articles of the law, which they interwove with their own practices. They considered that 'usos y costumbres' were applicable to them, since they had been using that water for ten years and thus held a historical claim. Equally, the legally guaranteed ecological flow was adapted to their logic. With active help from the JUDRA staff and board, they argued that they were part of the 'ecology', keeping the slopes stable as well as the environment, of which they were part, sound. Quicapata and its neighbors drew on notions of good governance and sustainability to claim a right to water and be considered in the PERC hydraulic scheme. Conversely, PERC engineers, also referring to ideas of good governance and sustainability, reasoned the opposite. In their logic of rational water management, ecological flow did not cater to irrigation, customary or otherwise, which Quicapata members and their neighbors would not even have if not for modern technology. They also blamed EPSASA for not extending the infrastructure from the spillway to the treatment plant and letting water first flow free to be captured. Finally, and despite early denial, the four communities were included in the PERC hydraulic scheme in 2011. These and other events and moments related to the JUDRA enactments are presented on a timeline in figure 1. In the end, the four communities were assigned half of the reserved ecological flow (20 l/s per community out of 150 l/s). In the case of Quicapata, JUDRA appears as a close ally to the communities' struggle for water.

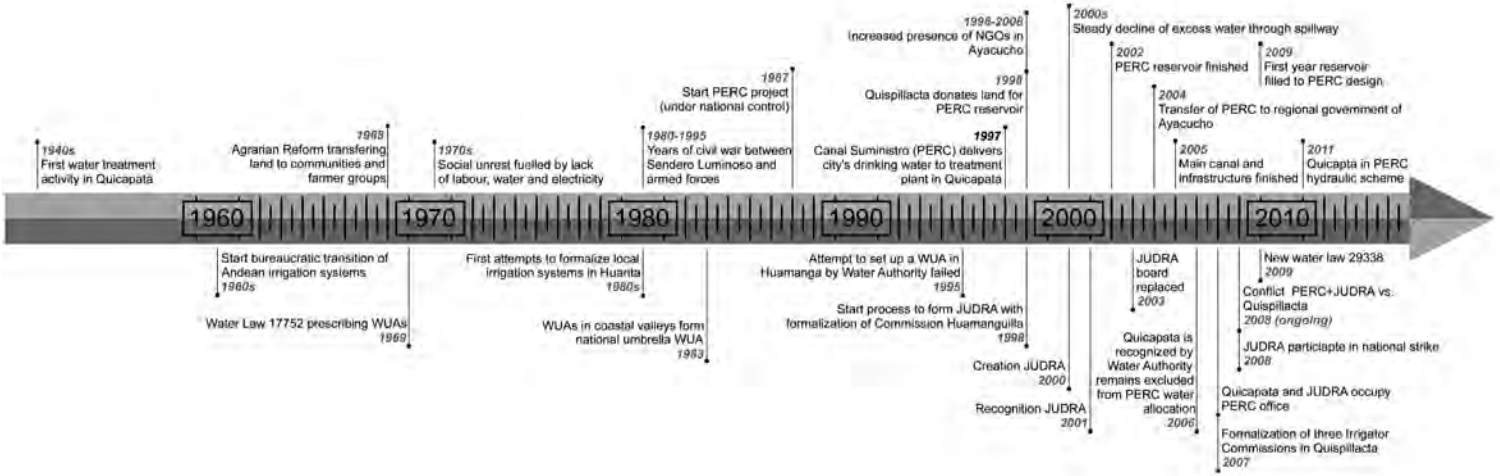
[51] A full analysis of legal repercussions is beyond the scope of this chapter. I refer to Ore and Rap (2009), Vera Delgado (2011), Boelens and Seemann (2014), Sosa Landeo (2017).

[52] DL 29338, Art 53 & 57.

[53] DL 29338, Art 64 & 32

Figure 1: Timeline JUDRA

Consolidation and related events



Several insights can be drawn from this story. First, I consider the way that ecological flow and usos y custombres were mobilized and tinkered with as examples of the situated astuteness or metis discussed in section 2.4. Quicapata community members attempted to turn a situation and twist objects around by enrolling and mobilizing allies, including the WRL and concepts and objects therein.[54] They did not resist or reject an imposed institution, nor did they support or obey. Instead, they practice a version that is entangled with other ones. The resulting friction has positive effects for Quicapata – and ensures JUDRA durability. Second, and related to the former, in the case of Quicapata, the JUDRA enactment seems rather fluid. There are no clear boundaries and many 'official' Junta associations, such as water allocation documents, are superfluous or lacking. After 2009, the JUDRA constituency and corresponding area was no longer legally backed. Yet, JUDRA continued to be practiced; seemingly kneaded and transformed, constituent entities bent and twisted.

More than some bordered spatial region, presented in its strategic development plan as a map, more than a stack of official legal resolutions or a set of prescribed water management functions found in the office of the Local Water Authority (LWA), JUDRA is also a lived institution of mundane and intertwined practices that are important to understand "how institutions work" (cf. Cleaver and Franks 2005). Lived institutions are what actors do. They variedly associate with others and bring into being a relational or connected world.[55] This suggests it is possible for institutions to operate intermittently and to be enduring (Lund, 2001, p. 52), since they can appear now, at this site, for this objective and appear later, at a different site, for another purpose. This situatedness and polymorphism makes an institution like JUDRA seem fluidly not rigidly structured (see also de Laet & Mol, 2000). Boundaries are not fixed, entities mutable, and connections to other actors not stable; other constituent parts might appear absent, yet the institution can still endure. To see how an institution, like JUDRA, can seem fluid and durable, it is worthwhile to briefly consider different spatial topologies.

Properties of connectedness

Topology is the branch of mathematics that can be defined as "the study of those properties of an object which remain unchanged when that object is subjected to stretching, shrinking, [bending] and twisting without tearing, piercing or gluing" (Joshi, 2004, pp. 71–72). Topology thus looks at the shape of different things and different sorts of spaces (Law, 2002). It is also a

[54] These concepts and objects – in this case *usos y costumbres* or water flows – can be considered "both plastic enough to adapt to local needs and constraints of the several parties employing [or mobilizing] them, yet robust enough to maintain [some] common identity across sites"; these, Susan Leigh Star and James Griesemer call boundary objects (1989, p. 393) which "have different meanings in different social worlds" but remain recognizable enough "to more than one world" (ibid).

[55] Following this suggestion, I note that in the LWA office or among bureaucrats the JUDRA is also a lived institution with mundane practices that bring a version of it into being; a version that is not more real or more hierarchical than other ones.

metaphor for studying how an institution endures under continuous altering, adapting and fluctuating.

The map that Untal showed during one of our first conversations fits "with what we tend to think of as 'space' in Euro- American common-sense", says John Law (2002, p. 95): as Euclidian space, defined by three-dimensional coordinates. Herein the JUDRA is a region. Boundaries delineate it and distance is what positions Huamanguilla to, for example, Quicapata. The boundaries of regions (spaces) may not always be very clear, stable or widely agreed upon. For example, Huancavelica communities, which, according to the map, would belong to the JUDRA territory do not participate in the JUDRA. As a second example, the 2009 WRL, issued in Lima, set new boundaries that elsewhere, at the JUDRA office, took a decade to stabilize.

The JUDRA can also be seen as a network space with legal resolutions connected to water sources, its constituency to recognized Irrigator Commissions in a legally established Irrigation District, its operation connected to enrolled staff, but also hydraulic infrastructure and scheduling spreadsheets, and more. The idea of (early) ANT is to consider objects and spaces as a network that remains stable as long as its connected entities are held in place. Remove an entity and the network breaks down or is translated into something else (Mol & Law, 1994, p. 661). The above accounts of the JUDRA office and communities of Rancha, Huamanguilla and Quicapata show that the JUDRA connections are not all that stable, with some being superfluous and others absent alltogether. The office is short on operational resources, Rancha lacks infrastructure, Quicapata does not appear on water allocation spreadsheets and many Irrigator Commissions do not have an updated legal recognition. In all accounts, all these enactments, there is something called the JUDRA, but what and how it is, is fluid.

So, in a third topology, that of the fluid, coined by Mol and Law, not all connections or established boundaries are essential to maintain institutional cohesion. Instead, "boundaries come and go, allow leakage or disappear altogether, while [connections and] relations transform themselves without fracture" (1994, p. 643). Accepting that institutional space can be fluid means creating space to recognize how it can gradually stretch or shrink, consisting of mutable entities that bend or twist. As the government water administration increasingly works to create a JUDRA-space that is networked and stable, this version is adopted among fluid social spaces, like community actor-worlds, thus morphing into multiple shapes as it entangles with other actors, knowledges and practices (Blok, 2010). In other words, the JUDRA can be observed in multiple forms or versions that overlap and interfere. Important in that respect is to consider that "space is also a performance" or enactment (Law 2002, 97) and entities may exist in "several spatial systems" (ibid., p. 101).

These three spatial topologies, I believe, offer an inventive way of looking at water institutions. Instead of normatively qualifying everything that cannot be defined or delineated as weak or inefficient (a deficiency that has to be repaired), it allows appreciating that institutions can remain constant even in less mensurable ways, and even though they appear in different forms. In doing this, it becomes possible to appreciate that institutions shift shape and meaning, become and do something else, depending on the actors-worlds by and in which they appear or

are mobilized. In that regard, it is good to also underline that there are no sharp separations between these typologies. The JUDRA exists as fluid, a network and as a region. In fluid space, entities are bent or twisted that "could only ever have come into being within the logic of other topologies" (Mol & Law, 1994, p. 663). I have touched upon this by briefly. Through maps and spreadsheets, the JUDRA appears as region and network. In reversal, that which is networked or stable often rests on and within what is patched together and malleable. I will try to show this in the next section by introducing another co-researcher.

3.5. Weaving worlds together

Spokespersons as translators

The water source upon on which EPSASA and Quicapata rely, lies beyond the Ayacucho basin. Its point of managerial distribution is located in the indigenous community of Quispillacta. From here, the water is transported, in canals and through siphons, to the tunnel Ichocruz-Chiara that leads into the basin. The next chapters elaborate further on the infrastructure of the PERC multi-purpose project and on the entangled water worlds in Quispillacta.

For now, I follow another co-researcher, Fernando Ventura, a comunero of Quispillacta who lives in the city. He worked with me during the observation of the JUDRA election period in 2009, is an agronomy student and involved in a small company that sells sprinkler technology. For Fernando, the Junta and Irrigator Commission meetings also work as a suitable network and marketplace. He is a member of the NGO Kanas and regularly travels to the community for small scale development projects. Quispillacta is known in Ayacucho for being very well organized. Kanas, as well as a second NGO ABA (Asociación Bartolomé Aripaylla), are founded by and staffed with community members whose core intervention area is the community. Originally Quispillacta was not considered for irrigation in the PERC hydraulic scheme, even though the main storage reservoir was located on its territory. Before the reservoir, there used to be a lake that was fed by an underground source. According to community members, the chained bull that lived beneath the lake still resides in the reservoir (see chapter 5).

In response to their exclusion from the PERC project, the community mobilized in long winding protests. Eventually, they were included. This also means that they had to form mandatory Irrigator Commissions. Connected to this, Kanas was awarded funding by Oxfam America to create and strengthen local water user organizations in 2006. As part of this a diagnostic study of the area and water users had to be realized. For this, the donor, however, insisted on appointing a specialist with whom it had previous experience. That specialist was Untal Quispe, who had worked with Fernando's NGO as a private consultant and (later) as JUDRA staff. In 2007 the Local Water Authority recognized three Irrigator Commissions in Quispillacta.

In 2009 I accompanied Fernando to the election day of one of them, his Irrigator Commission Chiqllarazu Baja. The ways in which the JUDRA is practiced, there at that moment, and subsequently in the offices of JUDRA and the local water authority are about makeshift and the tinkering and patching of the rules and procedures set out by a state water institution.

Conjuring up JUDRA elections

Elections of water user associations are held every three years. New boards have to be chosen for Juntas, Irrigator Commissions and Irrigator Committees. In June of 2009, the National Water Authority (ANA) drafted and issued a resolution on electoral procedures. This was sent to the Ayacucho Local Water Authority (ALA), who adapted it and issued a second resolution with further details. After this, JUDRA staff elaborated a third document with practical regulations and instructions. The three documents included a plethora of legal procedures, deadlines to form sub-committees and instructions for users, as well as formats to report the results.

I observed the election day of Irrigator Commission Chiqllarazu Baja, on the 10th of October 2009, the day of the legal deadline. Of the 353 users, only about 80 were present. About two-thirds were women and children. Among the men present, there were three board members of the Commission, the president of the community (as a water user) and Fernando, who was actually also board member.

Despite all efforts of the ANA, ALA and JUDRA to instruct the water users, no preparations were made: no electoral board was formed; no lists prepared and not enough voters were present. What is more, several households had plots in more than one sector and were counted twice as users, while some women and children were representing several family members at once. The absence of men, so was explained, was due to the payday of PERC rehabilitation work and construction of secondary infrastructure in the area. The meeting, like in Rancha, was held in Quechua, leaving me to observe behaviors and confirming afterward with Fernando.

About an hour into the meeting, the president of the community, assisting as a user, but also considered a principal and respected authority in Quispillacta, intervened. He was visibly upset with the board of the Commission and the overall lack of organization. He demanded a better job or, if this new institution was not a fit for their community, that they terminate the Commission altogether. He ventilated a discontent to the constant presence of external agencies and professionals (PERC, JUDRA) that were operating in his community, causing more problems than prosperity. More so, the area above the reservoir and conveyance canal, the bulk of community land, was not receiving benefits from this presence at all. He also lashed out at Fernando, whose NGO introduced and organized these Commissions that now appeared to barely function.

Looking belittled, Fernando and the Commission board decided to pragmatically go through the list of ANA and JUDRA requirements. In the next couple of hours, they chose an electoral committee, closed the meeting, opened a second meeting led by the electoral board and canceled it for not reaching quorum and opened a third meeting to choose the new board. There were no candidate lists. Instead, men were nominated for a board function and election occurred by show of hands. Everything happened in an ad-hoc, and what seemed like a haphazard manner, with lots of laughter. Afterward, in Ayacucho, Fernando handed over the required documents

to JUDRA. Although procedures, guide and deadlines had been bent and stretched, he succeeded in thus creating an appearance of compliance and order.

What I take away from this episode is that the JUDRA is 'small' in Quispillacta; a version that takes shape as a handful of unfit, externally-mandated, board members and something that poorly services the community. It is also easy to see how Fernando and Quispillacta tweaked and transformed institutional instructions. And then mobilized these as well as other actors present to translate a messy meeting into a list of elected representatives. A fluid water user association indeed. Still, the way of nominating and raising hands was very similar to how (intra)community elections were done. If looked at from the vantage point of the Quispillacta actor-world, this was the norm(al), rather than a question of making do in an ad-hoc manner.[56]

In any case, it was not the instance of makeshift or bricolage that I wanted to emphasize in this electoral process. For that, I turn to what happens after Fernando (and many others from other Irrigator Commissions) handed over the required documents in Ayacucho, since it is in the offices of JUDRA and LWA that things were arranged through tinkering and improvising. For more than a week, the technical manager of the JUDRA, the chief Water Authority of Ayacucho and two secretaries were feverishly trying to figure out, for 48 Irrigator Commissions, how to bend practices into rule. Peasant delegates were called back in, forms and documents were corrected afterward and often records were backdated, after which resolutions were issued (that recognized the new boards) and send to the ANA. As if everything went by the book. There is a fine line between practices of tabulation and manipulation to legitimize a nation-state institution. Bureaucratic bricolage at its best? Who is to say? But what the last illustration shows is that government water administration is also a lived institution with mundane practices. And that the work to create a networked JUDRA rests on and connects with what is patched together in fluid social worlds.

I am left to conclude how different actor-worlds and JUDRA enactments connect. Herein, it seems, some of my co-researchers play pivotal parts as spokespersons of, and translators between, these worlds (see box 4).

In Quispillacta, during the election rally, Fernando Ventura appeared as the JUDRA spokesperson. He represented the JUDRA, being knowledgeable about its affairs. He is also, for example, at a Junta asamblea in the city, able to speak on behalf of the community.[57] Untal Quispe was once the spokesperson of the community of Huamanguilla, charged with setting up a water

[56] Observing this election episode, formal authority, often attributed to government agencies, seems to be located much more with the community president's intervention and commanded respect, which are often labelled as bricolage response to prescribed procedures (Cleaver, 2012; de Certeau, 1984; Scott, 1998), but depends, I contend, on which actor-world the analysis departs from (see section 2.3 and 2.4).

[57] All Irrigator Commissions in Quispillacta had students, like Fernando, assigned as (extra) board member or *vocal*. They lived in the city and could more easily attend meetings, consult with institutions, engage engineers and study and discuss documentation. Land is required to be eligible so they were 'given' a very small plot (some 400 square meters) and appeared as registered users. The students transmit the information back to their community. The astuteness in this story is obvious (section 2.4).

user organization to secure water for his community. He is formed by (or exists through) the community actor-world. In other words, as comunero he embodies the community. This is why he is able to make perfect sense of, for example, earth-beings and the story about the bull underneath the lake that was so alien to me. On the other hand, he was also the technical manager of a government-imposed water institution – and before that, its president, acting as a kind of spokesperson for a water bureaucracy vis-à-vis Ayacucho irrigators. These co-researchers thus move "betwixt and between all sorts of social and spatial boundaries" and worlds (Pache, 2012, p. 491 see also section 2.4) turning up differently in each, yet also remaining the same. To further explicate this, I again draw on a mathematical metaphor.

Following fractals, connecting worlds

Fractals, in mathematics, refer to those recurring patterns or geometric shapes where "the degree of their irregularity [that is their degree of complexity] and/or fragmentation is identical at all scales" (Mandelbrot, 1983, p. 1). In other words, one of the principal properties of fractal objects is that of self-similarity. Fractal images and objects can be found in 'nature' such as compound leaves, watersheds, branched trees and meandering rivers. The images at the beginning of this chapter, for example, show a single river. The Pampas River – and in particular its source, in the community of Ccarhuancho, and the place where it joins the Cachi River. Besides a scale factor, pattern and shape are similar. It is fractal.

Mandelbrott's notion of fractals appeals to social scientists who indicate that, while looking at particular phenomena, "complexity is reproduced regardless of the details on which one zooms in" (Jensen, 2007, p. 832). Perhaps best known in this regard is anthropologist Marilyn Strathern. In her book "Partial Connections" (2004), she refers to fractals to argue against totalities or parts-whole thinking (see also section 2.4). In other words, from the view where particularities of the confluence of Cachi and Pampas waters can be seen and studied, the details of the headwater stream in Ccarhuancho escape the observer; the innumerable and infinitesimal (human-made) transformations of water flow go unnoticed (see chapter 6). A total view cannot be realized. Something similar can be said about the different versions of the JUDRA. The countless interactions that bring the JUDRA into being in Rancha go unnoticed in, for example, Quispillacta or the offices in Ayacucho. Like with the Pampas River, there is possible vantage point from where to see the whole JUDRA – or the true JUDRA. There is not *one* water institution, but multiple, self-similar, versions of it that are being done in different and fluid social worlds.

Instead of wholes, there are thus partially connected or fractal worlds, which, says Green (2005, p. 135), "have no centers, no tops or bottoms, no clear edges". If space, and indeed the world, is enacted in multiple ways and each enactment may mobilize and be made up of other actor-worlds, while possible being part of another world itself, then notions of reproduced complexity and self-similarity maybe of help in understanding the messy connections among

them (Law, 2004; Otsuki et al., 2019) and of help in understanding the simultaneous durability and malleability of JUDRA.

I consider again the JUDRA spokespersons of this chapter: Fernando, Julia, Untal and Armando, who embody their respective community and, at certain situations, speak on its behalf: They are actors with connections to their community actor-worlds that are intrinsic and tacit, wherever they go. Here the idea of a fractal world touches upon Roy Wagner's use of the metaphor to describe "personhood as expressed in relations of kinship", ethnicity or other social categories (Kullman, 2017, p. 134). Wagner's "fractal person is never a unit standing in relation to an aggregate, or an aggregate standing in relation to a unit, but always an entity with relationship integrally implied" (Wagner, 1991, p. 163). In other words, persons don't exist in and of themselves, but are constituted in relational webs in which they act (Law & Mol, 1995, p. 277) and only understand (or can be understood) through them (Kullman, 2017, p. 134).

The four spokespersons could be standing on the shore of a mountainous lake, far away from Ayacucho, even Peru, and make sense of what is happening in ways beyond the worlds of multi-purpose projects or state water administration in which they also operate and lead. And in which they are thus also constituted. They appear "like fractals, self-similar even though, depending on how [what site or scale] you look at them, they also appear to be different" (de la Cadena, 2010, p. 346).

Marisol de la Cadena (2015) uses fractality to describe her co-laboring (or co-researching) with yachaq, or healer, Nazario Turpo. She explains that he learns of modern medicine and global warming while retaining his healing practices, his understanding of water and enraged earth-beings. His knowledge is extended rather than displaced, which gave him the ability to move between worlds, and "through them offer his as well" (xxiii).

Similar to Nazario, the co-researchers I worked with have knowledge beyond administrative or techno-scientific water worlds. Beyond my own.[58] At the same time, they – and others like them – also co-constitute, and as spokespersons determine, a JUDRA enacted as a government-sanctioned water institution. In other words, they do not only move among them but weave worlds together. In the enactments that they are involved in, they bend certain existing entities, discard others and introduce new ones, such as usos y costumbres and ecological flow. They thus create entanglements between different JUDRA-realities that are being done. Because of these entanglements, the JUDRA endures, even when apparent key entities, like legal perquisites, boundaries and institutional resources are waning, dissolving or lacking. The durability of the JUDRA is precisely because of this fluidity.

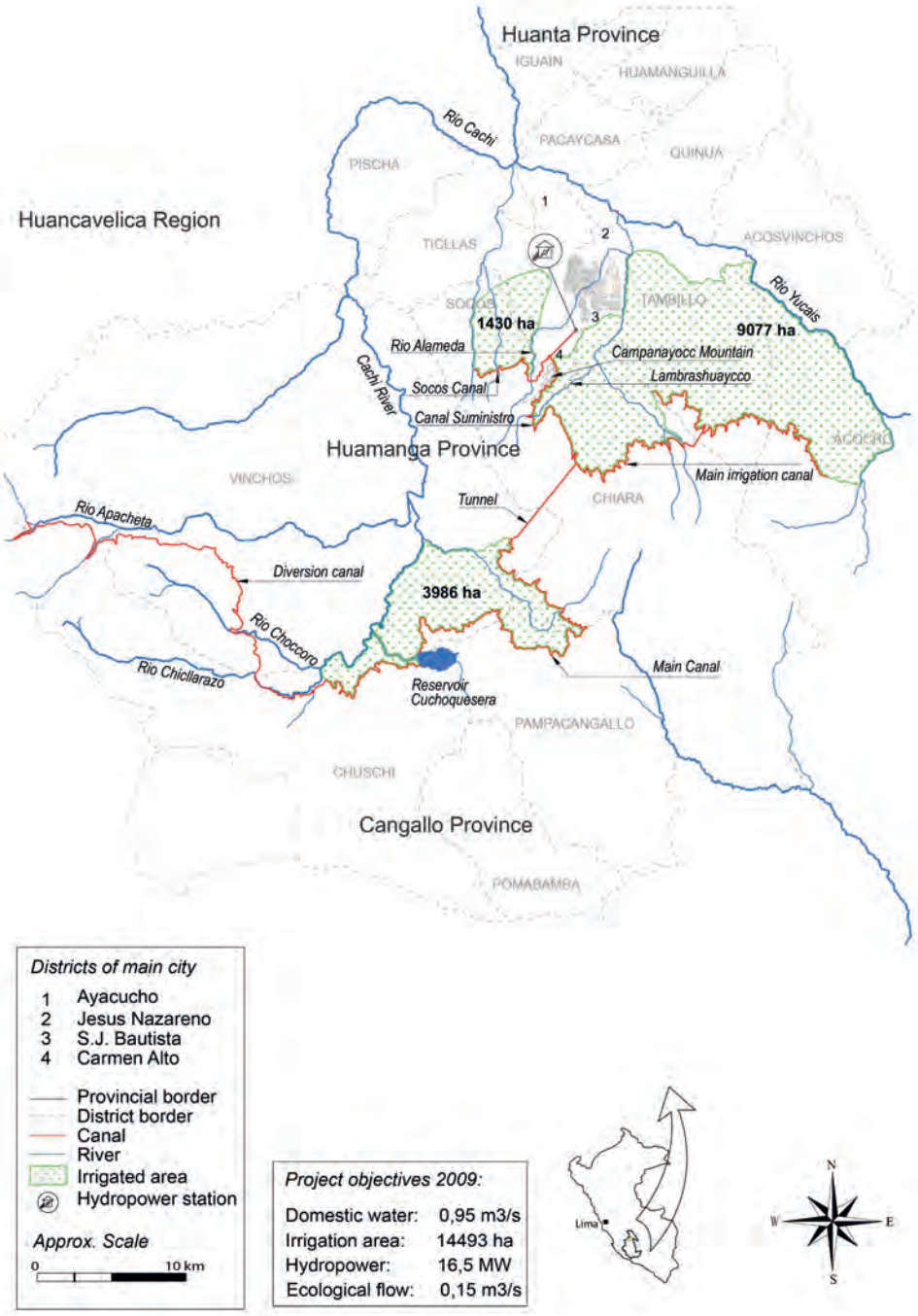
In this chapter, I have shown the fluidity of an Andean water user association by giving examples of how it is practiced or done differently at different sites and situations. These included an Irrigators Assembly in Rancha, an office in Ayacucho and varied situations in the communities of Huamanguilla, Quicapata and Quispillacta. Fluidity refers here to a lack of fixed boundaries

[58] But occasionally I am made, to some extent, part of those, for example when Julia and Untal talked with the fishermen at Yanacocha lake, or when I made a ritual payment at an *ushnu* platform (see chapter 5).

or stable entities. Andean water user associations transform, are modified or dissolved while the JUDRA somehow continues to be performed. To make sense of this, I have contemplated the multiplicity of Andean water realities or worlds and have described how certain actors behave as spokespersons for those worlds in which they are also constituted. They move through and create entanglements among realities or worlds, which results in a water user association that is "more than one, and less than many." A JUDRA that is durable precisely because it is fluid and multiple.

To make this point, I have only written about a few of many more enactments and some questions might thus arise about the usefulness of the approach and selection of enactments. For me, an approach to practicing water research that departs from multiplicity – that is from different partially connected realities – helps the practitioner to keep an eye out for potential other realities out there and realize that there is no all-encompassing view to be had. It is useful because it is sensitive to those practices and enactments that are fluid and, therefore, less visible. The choice to write about these not only helps to create them, it is a political act. In the next chapters, then, I engage in politics and write about some of these fluid worlds.

4. Publics work on public works:
Democratizing hydraulic infrastructure in Socos, Ayacucho



Map 4: PERC Project with objectives per 2009

This is the chapter that describes the anthropology of design and realization of a public works project and the role of Andean communities in that. In this particular case, these are the communities and other actors of the Socos district, who transformed PERC, a multi-purpose hydraulic project, in Ayacucho.

A tour of different Ayacucho water institutions in 2009 portrays the PERC project in a particular state, with set objectives and a normative standpoint on who ought to be in and who should not. Without outright indignation, but with a degree of annoyance, interviewees stressed that the Socos secondary canal was recently added due to trickery and politics. Technically it was not part of PERC, or at least should not be. Two possible ways to start exploring the democratization of technology objectives and normativity are centering on project engineers and experts or by following Andean communities. To that end, I will trace historic design alternatives concurrently with the actions of the Socos communities (section 4.1).

Socos was one of the larger indigenous communities in the Ayacucho basin that maintained certain autonomy despite being surrounded by small haciendas. Between the 1940s and 1960s, Socos bought out several hacendados to extend the community. At the same time, early studies emerged about the possibility of diverting water from the Cachi river for the capital city of Ayacucho. The contact between members of Socos and engineers looking into the feasibility of river diversion led to the idea of irrigation in Socos territory. The promise of water has been alluring, decades before infrastructure would be realized (4.2).

Hydraulic infrastructure projects are (trans)formed by interests of different groups and actor-worlds making and shaping designs; they are not realized by just taking economic or technical characteristics. I review historic design alternatives to learn how irrigation paradigms were loosened to include communities with the hope of pacifying the violence between government forces and Sendero Luminoso. So, while initially part of the plans, Socos was ousted when a large storage reservoir, Cuchoquesera, was considered. An actualization of PERC after the conflict created a new prospect for Socos to secure Cachi water (4.3).

Pleading for their lost claim within the established water governance confines did not bear much fruit. So, in order to obtain water from PERC, certain members of Socos, partially connected to other institutions, used lateral thinking and ploys of cunning to 'interess' (or captivate), enroll and mobilize other actors and allies. They tried to entice PERC engineers with banquets in their honor or convince national government officials, exploiting the latter's lack of knowledge relevant and applicable to the local socio-geographical situation. They also explored new venues, like changing designs, government reforms and kinship ties to officials. These were used together with the submission of proposals to donor NGOs and the organization of collective working parties. But the members of Socos also protested and blocked road passages. They worked astutely to advance their cause (4.4).

Water finally arrived in Socos. While this had consequences elsewhere in the PERC command area, the inclusion quickly became the new normal. Yet, hydraulic projects, engineer paradigms or governance principles are never complete or fully closed. Instead, technology (of PERC) is performed and made sense of in multiple ways. Also, by community worlds. Articulating a self-evidentness and sequential story is also a performance. Through the new canal, Socos became the forefront of sprinkler introduction in the area, as new public groups with other interests also partially connect to and laid claims on it; a technology in perpetual flux. It is the essence of democratizing hydraulic infrastructure (4.5).

This chapter informs the question: *how do Andean communities and water user groups shape large scale hydraulic infrastructure (plans) to secure (either procure or protect) a water source and what are the impacts hereof.*

4.1. The inevitable progress of PERC

A then-and-there diagnostic of a large-scale technological system[59]

During the first weeks of fieldwork in Ayacucho, I visited a number of organizations in an attempt to learn more about the *Proyecto Especial Rio Cachi* or PERC, its infrastructure and operations. I hoped this would reveal entrances for another case study of supra-community collective action that aimed to secure water from it. PERC is a multi-purpose hydraulic project – and as most other mega water works in Peru, controversial because of who are included and who ignored.

The buzz in the Peruvian water sector those days was that PERC performed poorly and was rife with corruption, or so I was told by staff of an international development cooperation agency as well as by water professionals who themselves did not live in Ayacucho. The former ones also explained that PERC, in light of this, had been recently recommissioned. Its previous branches of design and construction, operation and maintenance, and rural extension work, had been reallocated across town as offices of regional government called PRIDER, CDA and PDA, respectively.[60] Lucky for me, Ayacucho is quite easy to move around in and several offices and water institutions were near to each other. PRIDER (*Programa Regional de Irrigación y Desarrollo Rural*) was a block away from the JUDRA office, which was my research HQ. In between was the compound of the Agriculture Directorate of Ayacucho, including the Local Water Authority (LWA) (see also Map 2).

On one of those days, I had an appointment with the LWA and strolled to the compound from the JUDRA office. It was fenced, with a large green gate that had a smaller door integrated in it. A group of comuneros was standing outside, discussing with the doorman. It appeared they could not identify themselves and were denied entrance. I was asked what I wanted and told the doorman of my meeting with the LWA. My passport? Nope, not with me. But I offered to call the JUDRA technical manager or the LWA to straighten things out. There was murmur around, and after a few seconds I was waived in and awkwardly walked through the gate.

In front of the LWA office there was a line of irrigators waiting. I sat down at the end and after a while I was asked by one of them where I was from, what I was doing. I answered and returned the question. He was from Maucallacta, as were a few others. Their business was meeting the LWA about the formation of an Irrigator Commission. It was my first meeting with irrigators from Socos, though I did not realize it at that moment. Maucallacta is one of the many communities and hamlets in the municipality of Socos. Then, a young woman from inside the

[59] Image 3 (p. 85): The Socos comunero (right, at a faena; left, on the fountain on Socos public square). Source: P. Aponte (left) & Author (right).

[60] PERC was a *Proyecto Especial* which was transferred from national to regional government in 2003 as part of Peru's decentralization policy (see also chapter 7). However, labor conditions of PERC's tenured workers, as well as certain financial backings from the treasury remained in place. To undo the former and put the hydraulic project more under control of the regional government in Ayacucho the project was cancelled in 2007; its activities re-accommodated under different branches. Popularly, it continued under names like "*Proyecto Rio Cachi*" or "*Irrigacion Cachi*" or was simply known by its acronym: PERC, which I will do as well.

office told me I could come in. My suggestion to wait was waived off. I passed the line of irrigators, again awkwardly, and stepped inside.

The LWA spoke of many conflicts in his jurisdiction and the PERC command area that had to do with a lack of capacity, a shortfall in formalization and poor tariff payment by users. Similar to JUDRA, the LWA had minimal resources and no means of transportation. This, unlike the offices and branches related to PERC which had mobility and logistical resources that I was occasionally offered to use or draw on when going to the field.

I was also invited to participate in a PRIDER workshop about conflicts in PERC and learned that much of the secondary infrastructure had yet to be constructed; responsibility for that, legally, lay with water user organizations. At the time of my visits, in 2009, only 40 percent of the scheduled command area was properly serviced. There was doubt among the engineers on how to approach or solve this issue of water insecurity. I also visited CDA (*Coordinación de Actividades*), in charge of operation and maintenance of the infrastructure, including the storage reservoir in Quispillacta. Here I was shown videos of how pipes and hoses had been installed in the Canal Suminstro to irrigate areas that, according to engineering logic, were too steep to cultivate; the soils were of bad quality. CDA occupied the building that had been the main PERC office until it was recommissioned. Also located here was PDA (*Promoción y Desarrollo Agropecuario*), which provided funds for JUDRA staff after the strike and also aimed to promote sprinkler irrigation at particular pilot sites in PERC. Sprinkler irrigation was needed, even envisioned, if the entire command area was to be serviced.

The impression I got from these interviews and encounters was that PERC was an ad-hoc ensemble of modern technology, unfinished or improvised infrastructure, state agencies and unregistered users (invisible to them), of competing irrigation logics and above all of uncertain water availability and delivery.

Accused of astuteness

I visited many other water organizations during those first fieldwork weeks, and all the NGO professionals and water user representatives I talked with had, like the engineers, more or less similar accounts about the aims of PERC. All respondents referred to the year 1987 as the start of the project and that it was to bring progress and development to the region. The same project objectives were acknowledged: to supply the regional capital city with 0,95 m^3/s of domestic water, generate 16.5 MW of hydropower through a plant near the city, irrigate almost 15,000 hectares across the region, and assure 150 l/s of ecological flow to the Alameda river that crosses the city. Not everyone mentioned the numbers though, but its multi-purpose character was evident. I was readily provided with maps and information of the system from individual JUDRA, CDA and PRIDER engineers. It visualized and captured the PERC project, as presented in map 4. Important also, to get a feel of infrastructure dimensions, is to note that the main canal has a capacity of 7 m^3/s that is split after the main tunnel in a large irrigation canal of 5 m^3/s and a 'Canal Suminstro' of 2 m^3/s .

Despite appearing on the PERC map, most interviewees stated that the Socos communities were not considered in the original designs and were only included since 2004 or 2005. They were fairly negative about the inclusion, citing political tinkering and corruption as reasons for this. Moreover, several (ex)project engineers considered this inclusion also technically unsound or non-sustainable. The inclusion affected the rest of the irrigated area, consisting of 12 municipalities and 20,000 irrigator families, particularly so in the tail-end of the system. Additionally, I was told that the quantity of water diverted to Socos (0.5 m^3/s from the *Suministro* Canal of 2 m^3/s) would put the city's (future) hydro-power plant and water supply in jeopardy. One NGO professional explained that "*los de Socos son vivos*", meaning "those from Socos are astute", and circumvented established participatory and governance arrangements. They tricked their way in.

In contrast, the people from Socos, spread over a few dozen villages, considered that they always had had a valid claim to be included in this infrastructure system, had the support of the highest authority, had contributed immensely with their own resources, and they had been marginalized and thwarted many times in their efforts. When I talked with Socos comuneros, one or two became emotional while giving their explanations, recalling the atrocities of a civil war that became entangled with their history of water struggle. Others reacted upset about the elicit illegitimacy of their inclusion and were firmly in setting the record straight for me.

I had found my case study of supra-community mobilization. This chapter explores the astuteness and resourceful practices of Socos community members and *their* validity of the claim to be included, in relation to the design and realization of a large-scale hydraulic infrastructure system. My awkward advantage that perhaps Socos community members lacked, was my position for getting into the archives and accessing the expert opinions from the different institutions and offices around Ayacucho and beyond. For sure, it is an incomplete exploration. Nonetheless, it accurately reveals, I think, the contradictions and messiness of democratizing a large technology system in which different (public) groups have different stakes and therefore perform or enact the system in multiple ways.

PERC and publics

PERC, like many large hydraulic works, is a contentious project, targeting certain publics[61] and marginalizing others (see also Bijker, Hughes and Pinch, 1987; Hard, 1993; Flyvbjerg, Bruzelius and Rothengatter, 2003; Glenna, 2010; Hidalgo-bastidas, Boelens and Isch, 2018). With hydraulic

[61] The term publics, or public groups, in this chapter is drawn from the work of Noortje Mares (2005) and refers to a gathering of people that mobilize themselves to address a particular issue (or common interest), for example the realization of an irrigation canal (or deactivation of it). It is frequently used in discussions on large technological systems and democratic societies and, or so I hold, are more useful than such divisions as expert-lay groups or design and impact constituencies (Pfaffenberger, 1992). Publics might coincide with communities but often include also other actors or allies that address the issue. It is more of supra-community gathering (see also the issue of the Ingahuasi catchwater drain described in chapter 7).

projects in the Andes, the involvement of and interventions by these publics tend to center on certain entities, such as dams and diversion canals, both through acts of protest or disruption as well as participatory design and labor investment (see also Hamlett, 2003; Hoogesteger & Verzijl, 2015; Marres, 2005b). Often infrastructure or technological objects might be seen as something negative by one public group, while others consider it as something potentially positive and good (this chapter; see also Sørensen, 2004; Tironi, 2014).

This chapter explores the normativities and politics of technology democratization. There are two broad lines of inquiry on how to approach this. A first line discusses the actions (or techniques) to bring lay social groups into participatory contact with technology experts in a particular governance setting (Hamlett, 2003; Rowe & Frewer, 2005; Stirling, 2008) – that is, to bring techno-science into democracy.[62] A second line of thought discusses the actions (or practices) of excluded or marginalized publics, to (re)shape technology (design), according to their worldviews, norms and interests (Feenberg, 2010; Pfaffenberger, 1992; Veak, 2000) – that is, to make techno-science projects more democratic. In this chapter, 'more democratic' refers to more interests materially inscribed in the technology at stake.

The subtle difference, for me, is that the first line of analysis seems to center on the technocratic views and performances of experts while the second line corresponds more to Andean community actor-worlds. The second allows technology to be multiplied, while the first tends to incorporate views and interests into a governance setting (Nahuis & van Lente, 2008, pp. 570–572) that has already established, to a great extent, the technological aims and agenda, which regulate "what questions are considered open for discussion and what are considered non-questions" (Carolan, 2008, p. 509; Stirling, 2008).

An obvious case in point are large hydraulic infrastructures, like dams and diversion canals that, says Pfaffenberger (1992, p. 285), "embody these aims [and agendas, and] are cloaked in myths of unusual power fundamental to the preservation" of a society (see also Bijker, 2007). Those who contest these aims and setting are shunted aside and must seek other venues to intervene (Feenberg, 1999; and the work on the Andean countries' multi-purpose hydraulic projects and techno-science politics by Hidalgo-Bastidas, 2019; Swyngedouw, 2010; see also chapter 6)

Thinking along these two lines of analysis, I mention two points to be attentive to and critical of when researching democratization processes: the first one is about who participates with whom, or in whose setting. I have shown in the previous chapter how community worlds differ from those of techno-science in such a way that one cannot be used to explain the other. Rationality and rational decision-making are thus key to democratic governance and are actor-world dependent. The second point is about whether making technology more democratic – the set of practices by which one's interest becomes materially inscribed in technological object or

[62] This is well elaborated in Science and Technology Studies (STS) (Carolan, 2008; Lengwiler, 2008; Marres, 2007) and the water sector (Meinzen-dick, 1997; Warner, 2006)

system - is a process that follows the established mores of democracies, or not. Put differently, is the process transparent and deliberative or do interventions have to be more creative or cunning? I look again at Pfaffenberger's observation above about hydraulic infrastructure: This mirrors the concerns of the engineers and water professionals that I interviewed when they explained the aims of PERC and its importance in terms of progress and development for the future of Ayacucho society. Despite my impression of the project as a messy ensemble, they hold PERC as the result of a rational design trajectory with little space for failures, frictions and controversies past. Their accounts resemble what Herbert Butterfield (1931) referred to as a Whig history in which the past is explained as a series of logical steps, deliberate decisions and inevitable progress culminating in the present state of things. The project or governance setting is the outcome of logical thinking.

The observation also helps to explain the reservation of the engineers and water professionals about those who challenge those PERC aims and arrangements; as the members of Socos communities were accused of doing through astute thinking and tinkering. More importantly, this last point suggests a situatedness of Whig interpretations. Often, however, established arrangements and governance settings of today began as contested and cunning practices, gradually reshaped and recasted by actors as logical outcomes and contexts (de Bono, 1971; Gomart & Hajer, 2003, p. 34; Nahuis & van Lente, 2008). Keeping that in mind, I will trace the actions of Socos comunera(o)s and see how they influenced the design and outcome of such a large technological system. To this end, the next section introduces the Socos communities and their canal, 'Lateral Socos'.

4.2. 'Lateral Socos'.
The makings of an infrastructure controversy

Today, 'Lateral Socos' transports 500 liters per second and brings water to more than a dozen communities that, according to my interviewees, were previously not considered in the PERC project. This secondary canal or side canal, would service an area of 1430 hectare, which is spreading – or even sprinkling – it too thin. By my estimation, 500 liters for 1430 hectare entails scarcity by design, with the aim to service as many users as possible, and is a recipe for contestation. Indeed, like with so many Andean infrastructural projects, controversies abound: in this case about who could claim access to this water – to which I will come back in section 4.5.

I visited Lateral Socos several times between 2009 and 2014. In December 2011, I was following an ad-hoc maintenance party to clean part of the canal. After rainfall, there are always small mudslides and debris coming down the slope that needed to be cleared. Two irrigators' leaders were present to show around a city engineer and I tagged along. They were the presidents of the Irrigator Commissions of Socos and of Ccelloccacca-Huachualla. The canal itself was not that big, but the platform cut out from the slope was (see image 3). Trucks passed here, I was told, to deliver the concrete slabs and profiles from which the canal was to be made. While the

other irrigators went to work, we walked a short distance towards a small trench that was dug out of the mountain and running down the slope from the platform that followed the altitude line. One of the leaders explained to me that this trench would fit the tubes of a future inverted siphon – carrying water (100 l/s) from Ccelloccacca, where we were standing, to the Huachualla Hill. From this hill, the community of Rancha, and its neighbors would distribute the water further (see section 3.1).

The president of the Irrigator Commission of Socos and the eingineer stayed behind while I continued with Armando, the president of Ccelloccacca-Huachualla. The name of his commission was thus derived from these two places that connect a (future) water flow. We walked alongside the canal, on the platform, heading towards the second, existing, siphon structure. Two large pipes conveyed the water from the Campanayocc Mountain to this side of the valley – where the Socos Canal began. However, technically the siphon and the secondary infrastructure that connected it to the Canal Suministro were also part of Lateral Socos. I asked about the alternative route of the siphon that was favored by Rancha. It looked like a valid option as well, but then 400 l/s would have to be siphoned from Huachualla to Ccelloccacca. The existing route would clearly be preferable to most of the irrigators in Socos.

The reactions of *Soquinos* (people from Socos) about water going to Rancha was usually one of two. Some acknowledged Rancha community members as long-time allies, others insisted that water was initially granted to Socos and it was, therefore, their exclusive access right. Shortly after that visit, I made plans to go the municipal office to investigate these claims further.

El Pueblo Socos

Socos, its public square is located at an altitude of 3,400 m.a.s.l. on the left bank of the 'Ayacucho basin'. To go to Socos, from Ayacucho city, is similar to going to Rancha: you pass Grifo *Ayacucho* and follow the Los Libertadores highway to the coast. After passing Rancha, a tarmac road on the right-side branches of the highway. The secondary (or lateral road) is several kilometers long and, like the canal, runs across the slope. Certain parts are in bad shape due to soil creep. The people of Socos are in charge of maintenance. Although both road and highway are connected, I never heard or observed these being considered as a single technological system.

Entering the square, a plaque catches the eye: "Socos, capital de maiz organíco". The square itself seems typical for an Andean municipal town. It is circumvented by low, mud-brick structures and has, on one side, a new, multi-story building, which is the municipal office. The center of the square was a park and the middle point was a large fountain with a statue of a Socos comunero on top carrying a *pico* and a maize stalk (see image 3). Socos was a corn cultivating community, a celebrated crop throughout the Andes, grown at a specific niche, the Quechua zone. Its sporadic water resources were used to irrigate the maizales and connected to ritual practices of sowing, canal cleaning or Yarqa Aspiy and payments to their earth beings or *Tayta Wamanis* (Carillo Medina, 2008; Ventura & Navarro, 2001).

The area between the central village of Socos, via the main road 'Los Libertadores', to the community of Rancha is said to be geologically unstable. Because of soil creep, localized landslides keep occurring at the same site (Megard, 1967). It appears as if the earth is slowly moving. It is also why both highway and tarmac road are not flat, but bumpy, at certain stretches.

I had an appointment with the alcalde of Socos to explain my research and request access to the municipal archive to trace the claim of the Soquinos to the Cachi water. I had a university letter with me that explained this to facilitate permission. The alcalde was much more interested in future projects and what his administration wanted to accomplish for Socos. He agreed though, to send me the Municipal Development Plan of Socos and granted, with subdued enthusiasm, access to the archive. This turned out to be a provisionally constructed shed on top of the multi-story building. It was literally a heap of binders, waiting to be cataloged. Except for an environmental impact assessment of Lateral Socos I couldn't find any useful leads about its inclusion in PERC, nor its history.

Elsewhere historians recognize Socos as one of the larger indigenous communities[63] in the Ayacucho basin that 'navigated' a sea of relatively small haciendas (*funditos*) that occupied the valleys adjacent to the capital city of Huamanga (Urrutia Ceruti & Araujo, 1998). At the time of independence in the 1820s, Socos, despite losing territory to landlords, retained its autonomy (Zapata Velasco et al., 2008) and according to elder Soquinos, they started to buy back several bordering funditos between the 1940s and 1960s. During those decades, the population of the indigenous community of Socos was, I estimate, between 150-200 families,[64] including a handful of influential families (gamonales) who enjoyed better resource access and controlled the community administratively.

In 1968, these families, together with a befriended hacienda owner, arranged the status of a 'municipality' or district. This was important because they gained a formal institutional space that was assigned a budget from the treasury. In that same year, la Reforma Agraria redistributed lands of the haciendas that surrounded Socos to former serfs, organized in the farmer cooperatives Sinchi Roca. Most likely, due to the small size of the hacienda lands, there were over two dozen hamlets of ex-serfs that, in due time, transformed into communities. Most notably, many gained recognition as comunidad campesina in 1987, during the presidency of Alan Garcia. These new communities were, in comparison with Socos, smaller in both size and population, but the

[63] Another one of these larger communities was Huamanguilla, also a maize cultivating community, but with better water access and pasture grounds on the slopes of Razuhuilca. In fact, Huamanguilla was the place where in 1539, the original capital city of Ayacucho was founded as an economic and military outpost between Lima and Cusco. Insurgencies of local ethic groups, however, led to the abandonment of the earliest and better watered settlement on the right bank of the Ayacucho basin to its current location on the strategically more secure left bank (Stern, 1982). Here the surrounding lands, including Socos, were in general of poorer quality and without perennial water. The development of the city of Ayacucho and the region was limited to a mere strategic outpost, unless somehow water could be brought in.

[64] Plan de Desarrollo Comunal Socos, 2009.

average family landholding was bigger (about 5 hectares) and often private. Land in the larger Socos community was held in common and usufruct right to it was and remains extremely fragmented. A peasant family with 15 plots, totaling 2-3 hectares, is not uncommon.

With '*el pueblo Socos'* or the Socos population, I refer to the members of both the older, large community and the more recent smaller ones. As a municipality (as part of government administration), Socos consists of 7000 persons and more than 30 communities, which do not always cooperate smoothly, but mobilize jointly to secure resources. Throughout its municipal history, and in general for the surrounding area in the Ayacucho Basin, the coveted resources were: water and electricity.

The promise of irrigation

There are stories in Ayacucho about the initial vision of capturing water from the Cachi river. These early histories center around Simon Bolivar, *El Libertador*. In 1824, after his forces won the decisive 'Battle of Ayacucho' against the Spanish forces that assured Latin America's independence, Bolivar settled in the city for several months to regroup. Upon perceiving the endemic water scarcity, he issued a decree that stated the provision of irrigation for the areas surrounding the city, with water from the Cachi River, to commemorate the victory and pay tribute to the Ayacucho Basin and its people. Local informants tell that, in order to expel remaining royalists, Bolivar patrolled in the area, learned the topography and hence knew where to capture and convey water to Ayacucho. From the Cachi River, a canal would circle the mountain range into the left bank of the Ayacucho Basin – and on its way to the city the canal passed the territory of Socos. While realization was economically and technically problematic, the idea of utilizing Cachi water became a collective dream of people in Ayacucho (and Socos) more than a century before any modern design would be attempted. Bolivar's tribute and decree appear today in many PERC diagnostics and design documents.

I consulted one of the engineers who was involved in the early stages of PERC and he figured the actual decree could be found in either the regional or municipal archives. I visited the former, as I was told documents were better cataloged and the archivist very knowable. And he was, but we could not trace the decree. The engineer also tipped me about Hydrotechnic Corporation, a New York based company, working in the Central Andes in the 1950s en 1960s; initially working on studies for USAID regarding small scale hydropower and irrigation development.[65] In 1964 Hydrotechnic Corporation signed a contract with the Peruvian National Government. Commissioned by the Ministry of Public Works it would deliver feasibility studies for 14 hydropower plants. One of them was the Cachi project.

[65] For an historical account of Peru's hydrotechnical electrification and modernization history in the Central Andes, and the complex interactions herein among hydraulic engineers and Andean communities, see Hommes and Boelens (2018).

The resulting report (Hydrotechnic-Corporation, 1966) consisted of a systematization of existing data: A first study, carried out in 1942, only considered water for irrigation near the city and concluded that costs were too high and land of poor quality. A second study, in 1952, was the first to suggest the hydropower component. A tunnel was proposed that would take water from the Cachi River to Ayacucho. The end of the tunnel would be less than a kilometer from Socos' public square (ibid). Though the study concluded that costs were too high.

The engineer I consulted, explained to me that Hydrotechnic first considered an option that was to construct a hydro-plant near the river, with 20 kilometers of transmission lines (over Socos territory) carrying electricity to the city. This was indeed one of the alternatives in the report. The one that was "technically feasible and would require fewer investments" than others. A conveyance canal of 3 m^3/s would run along the altitude line, parallel to the Cachi River for 24 kilometers. This would, at the end of the canal, create a 350-meter drop to the powerhouse that was constructed near the riverbank below. This option would generate 6 MW and was mentioned as "the best scheme" (Hydrotechnic Corporation 1966).

However, a decree in 1964 emphasized "the need and public value of irrigating…lands surrounding the city of Ayacucho and neighboring regions with water from the Cachi River" (ibid). Hydrotechnic's new design option also included a tunnel, but this was, due to geological reasons, located more to the south. This new option had the advantage that water, after passing through the new powerhouse on the Campanayocc Mountain, allowed the irrigation of 800 hectares of land on the outskirts of the city: The Pampas del Arco y de Panteón. The "great disadvantage would be the high costs" of hydro-electricity generation. Hydrotechnic's conclusion was that social aspects "represent factors that may not be expressed in monetary terms but rather in terms of welfare" (ibid). More so, additional detailed geological studies were needed with regard to subsoil stability in the area.

To make their design, Hydrotechnic staff undertook several reconnaissance trips to the project area; importantly, they made topographic and geological investigations with regard to tunnel and canal courses. There is no doubt this would have put engineer staff in contact with members from the Socos communities. For example, to request 'permission' of local community authorities to conduct the studies and to ask community members for information about geological particularities.

It is possible that the idea of the Cachi River – through a tunnel – miraculously appearing in Socos would be something unbelievable to local Soquinos. On the other hand, it is more likely that a diversified population of small hacienda owners (funditos), local notables (gamonales) and community members would meet and discuss the opportunities of that water. Although the focus of Hydrotechnic was on hydropower generation, and no water was allocated to Socos, it is hard to imagine that the Soquinos were unaware of its potential.

That this is likely seems confirmed by the fact that in June of 1967, the National Service of Geology and Mining received a petition from the communal authorities of Socos to come and study the soil creep and lands slides in the area (Megard, 1967). Either contacts existed between

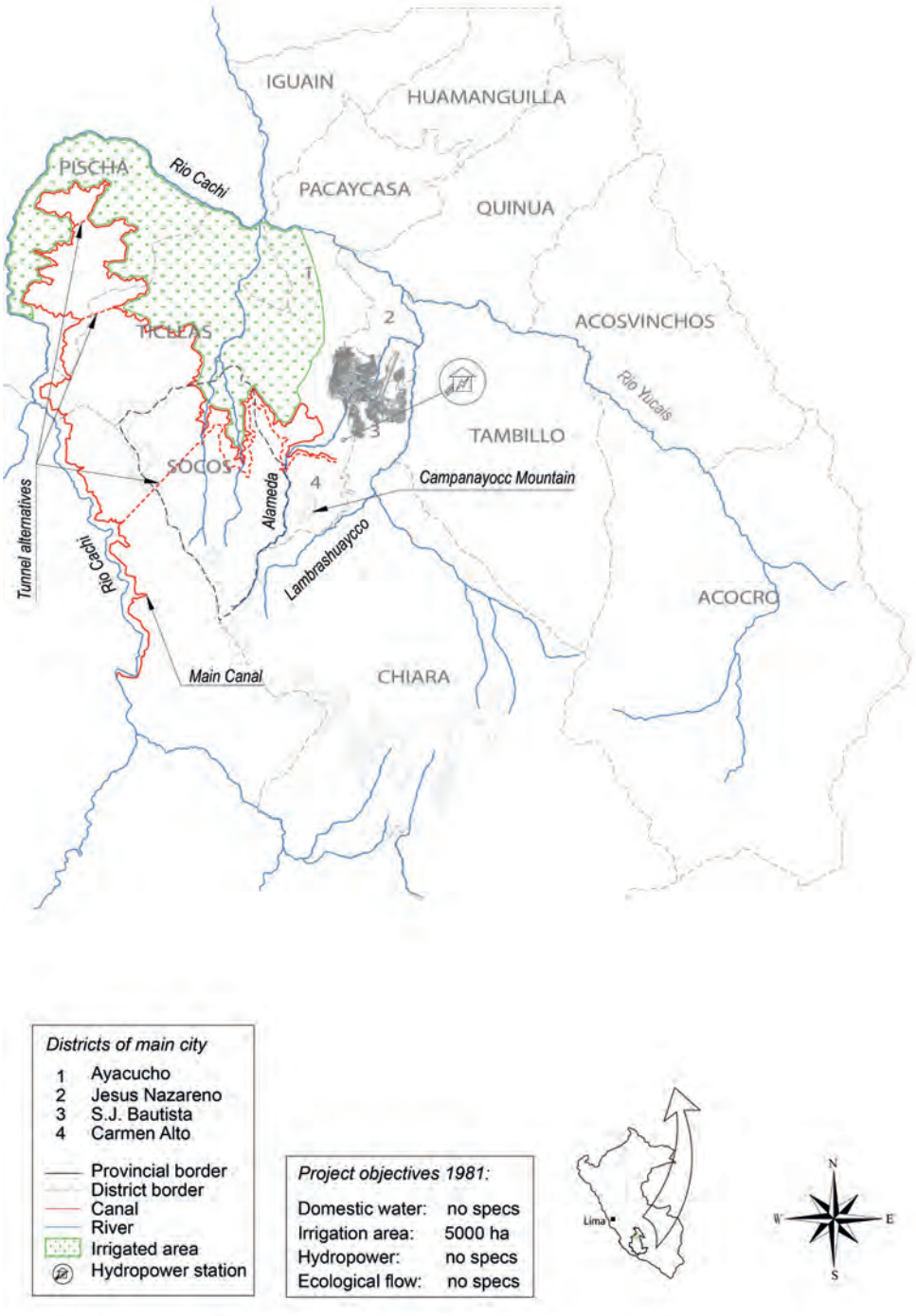
the authorities and this service from the time of the Hydrotechnic study or, based on contacts during the study, the authorities were gathering more information for future negotiation. Both are plausible. And would show that people from Socos were aware of a potential project to utilize Cachi water from an early time. At the very least, they knew how to mobilize government agencies to come and do techno-scientific analysis regarding community resources.

In 1979, the Ayacucho Development Institute (CORFA), joined with the National Engineering University (UNI) to make a preliminary design for the development of hydropower and water supply for the city of Ayacucho and its surrounding farmland.[66] The CORFA design focused much more on irrigation than hydropower generation. Reminiscent of 'Bolivar's vision', the CORFA-UNI study proposed a long canal, of 150 kilometers, carrying 5 m^3/s, that would circle the mountain range, passing 4 municipalities including Socos, on its way to the Campanayocc Mountain. Here a 350-meter drop would generate electricity and provide domestic water. More so, it proposed to irrigate 5000 hectares in the regions and valleys around Ayacucho city.

CORFA also suggested various tunnel alternatives that would cut across the mountain ridge; one of them led directly into Socos territory. For this, Ayacucho engineers traveled to the area for measurements, soil studies and geological surveys. Several Soquinos, or people from Socos, who I interviewed remember these visits in which they accompanied the engineers. This set a contact between them and the project experts who told them of the coming water. The big difference with the Hydrotechnic survey was that the new studies were led by regional professionals with whom contact, because of language, identity and proximity, was easier to maintain (and had an emphasis on irrigation). In 1981 the final report was considered favorable and CORFA set out to find a party to finalize the design. The CORFA-UNI alternative is shown in map 5.

Although there was no such thing as participatory design, the Soquinos did forge ties and found their way to the offices of CORFA engineers and regional government in the city. The idea of forthcoming irrigation must have been both promising and powerful to all involved.

[66] The COFRA/UNI study could not be obtained. Ayacucho engineers that mentioned it often referred to the archives of PERC or Regional Government, but once I had access to these, the study could not be found. Some engineers also referred to each other as possibly having the study but this also turned out negative. However, there was information found on the CORFA design in the publicity magazines that PERC printed annually about project progress and promotion. Interestingly those magazines were not kept by PERC engineers but were loaned to me by representatives of the FADA (The Ayacucho Peasant Federation).



Map 5: CORFA Design

4.3. Technology in flux.
An anthropology of design

It is interesting to observe how in its report, Hydrotechnic hesitates about which alternative to endorse. Being hired to assess hydropower feasibility throughout Peru, its report recommended the tunnel alternative in Ayacucho, which was not "the *best* hydroelectric development" option (Hydrotechnic Corporation 1966). For the calculated energy demand of 6000 kilowatts, the costs per installed kilowatt would be almost double – in comparison to the alternative near the Cachi River – and was "well above present rates and the consumers' ability to pay". More so, the surrounding farmlands considered for this "dual-purpose project" were deemed of low quality. Yet welfare and the social aspects made the tunnel alternative the option that was *"evaluated in detail"* (ibid).

What follows from this assessment is striking, at least to me, in that the Ayacucho social situation in the 1960s was such that local decision-makers in this Andean region seemed to overrule a techno-scientific engineering company from the United States. The incident underlines that large dual or multi-purpose hydraulic projects are determined by more than economic or technical characteristics alone and depend as much on social values, practices and political agenda-setting of differently situated actors and involved publics and social groups (Feenberg, 1999; Hidalgo-Bastidas, 2019). In their seminal work, Bijker, Hughes and Pinch (1987, p. 13) "present technological development as a non-determined, multi-directional *flux* that involves constant negotiation and renegotiation among and between groups shaping the technology". Slightly adapted, technology in flux suggest in this thesis, a degree of fluidity of a technological object or system wherein actors or components can transform or mutate, even be removed or added, without compromising object consistency or the system breaking down (de Laet & Mol, 2000; section 3.4).

This echoes a general constructivist approach to technology I adhere to in this thesis – maintaining that environment, social groups and hydraulic infrastructure are entangled in and (re)shape each other in overlapping networks or actor-worlds, wherein entities (such as canals, reservoirs and catchment areas) are heterogeneously performed or enacted (Jensen & Morita, 2015; Nahuis & van Lente, 2008). In other words, different social groups will view "not only the problem differently, but also success or failure", or legitimacy (Bijker et al., 1987, p. 14) because of the way that they bring (or practice) the technology in question into being. There is thus no single trajectory, or one best option, of designing and implementing a large hydraulic system. There are many. And these are not necessarily historical alternatives, long forgotten, but also happen and are realized at the same time (Gad and Jensen, 2010). Which realization is reported on and documented – those based on engineering delineation or communities description – is an act of politics and co-realization. In the next sections I present both historical alternatives and the realization of water infrastructure by the communities of Socos.

The CyA design

Communities in Socos, and elsewhere in the region, were not formally involved in the design of the Cachi Project. There was no policy of participation in the designs of Hydrotechnic or CORFA. They did, however, have an indirect influence, that resonated in the decisions to emphasize irrigation development. During the 1970s, social unrest in Ayacucho was increasing as *Sendero Luminoso* or Shining Path, spread from the city's university to the countryside. Development plans were made, partly, in attempt to pacify the region (CyA, 1983). But this was too little too late. The burning of ballot boxes in the municipality of Chuschi in 1980, allegedly by comuneros from Quispillacta, is marked by historians as the beginning of a violent uprising. Sendero's actions and the military's counter-insurgency terrorized Andean communities for the 15 years to come (Stern, 1998).

One of the most gruesome atrocities occurred in Socos in November 1983. At a local wedding ceremony, over 30 inhabitants, men, women and children, were executed by military forces running amok. It was the biggest massacre at the hands of the government[67] and many Soquinos fled to the city and reduced cultivating their fields. Testimonies, taken by the Truth and Reconciliation Commission, revealed that there was no motive for this action and no compensation was made to the widows and orphans (CVR, 2003). In that year, more adversity seemed to hit Socos when a Lima-based design consultancy, CyA, which CORFA hired to make the final detailed designs, drastically altered the Cachi project.

A storage reservoir, Cuchoquesera, was introduced, which in turn let to a new canal course and tunnel site, further south and at a much higher altitude. CyA, or Consultores y Asesores S.A., rejected the CORFA-UNI design referring to the two main technical issues: first, the geological fault line and area between Rancha and Socos, sensitive to landslide development and slumping (CyA, 1983; Megard, 1967) were considered to complicate tunnel construction and canal stability. Second, much of the potential CORFA-UNI command area was considered unsuited for irrigated agriculture, based on the FAO soil classification of that time.

The biggest consequence of this design change was the relocation and expansion of the irrigation area to the southwest of the city, also reaching the right bank of the Ayacucho basin where soils were more apt for agriculture. It excluded the previously considered municipalities, except for Socos, and included new ones, like the municipality of Huamanguilla. The proximity of Socos to the hydro-power plant on the Campanayocc Mountain (its location was left unchanged in this new design) kept the door ajar (see map 6). But this was short-lived.

[67] The movie "La Boca del Lobo" by Francisco Lombardi (1988) is based on this massacre in Socos. The movie follows a military detachment send to a 'remote' Andean town where they dealt with an invisible enemy all around them. Its shows the results of a 'dirty war' between Sendero and the army and brutality towards Andean villagers (see also Barrow, 2006).

In the months following the initial report of CyA, the decision was made to discard the existing hydro-power option at Campanayocc (a single drop of some 600 meters to generate 15MW) for three smaller plants in a cascade in the Lambrashuaycco gorge (about 900 meters in three drops to generate 20,7MW). This option had two distinct advantages: first, an additional 300-meter drop was created to address the severe power shortage (herein water which passed the last drop could not be used domestically as it would fall below city level); second and more importantly, each smaller drop needed a plant that was cheaper and faster to build for a city in immediate need of electricity. The company CyA reserved 2.6 m^3/s for new hydroelectricity options and domestic use; this new design, however, seemed to have closed the door on Socos. Once inside the gorge, water could no longer be redirected to its fields. The CyA design is presented in map 6.

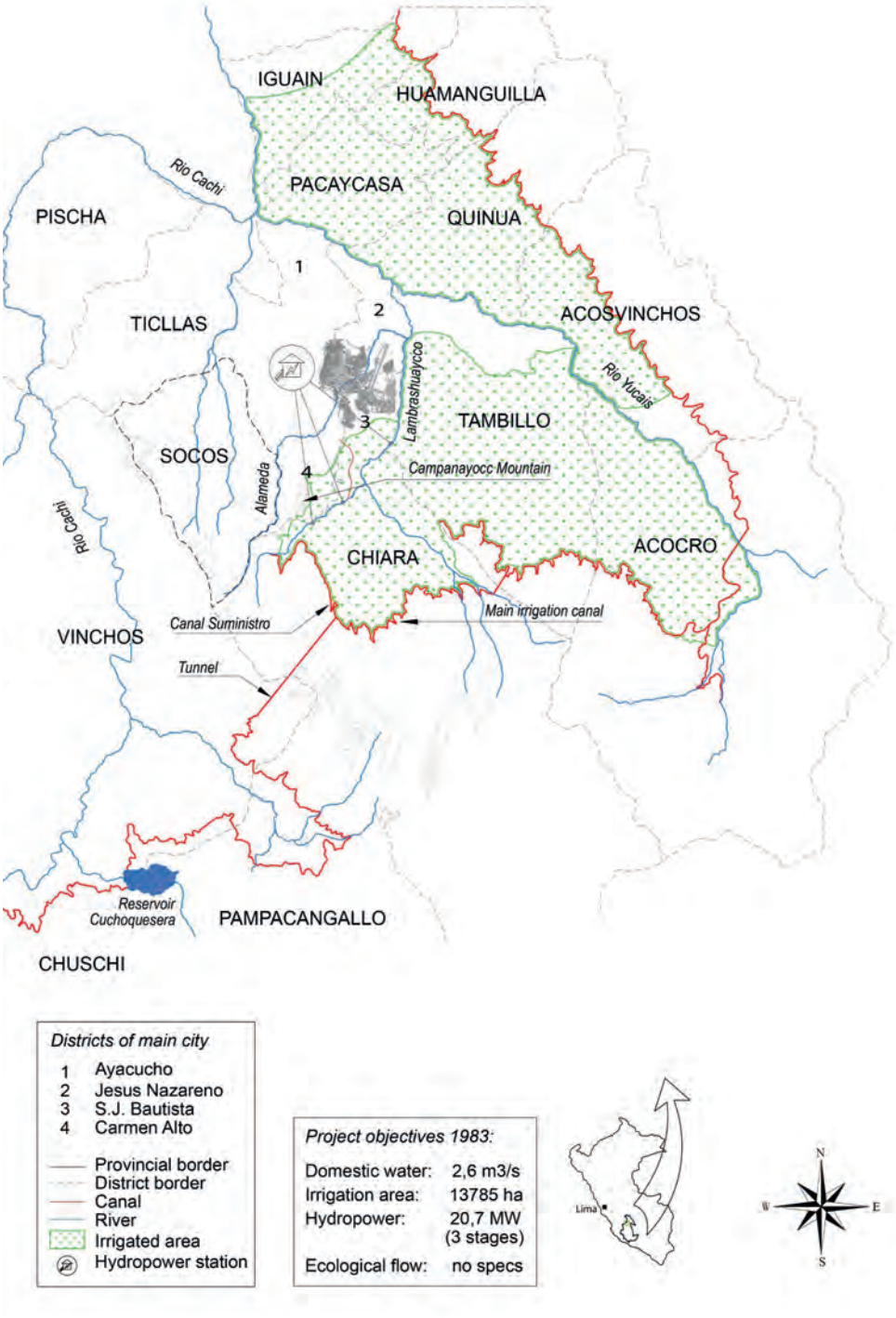
While civil war obviously stifled project advance, CORFA engineers did travel, in 1985-86, to the upper parts of the Cachi River to review the reservoir site and catchment area, as well as the canal course from reservoir to the tunnel. According to ex-CORFA professionals, they conversed with local communities, explaining the technological system and the opportunities its construction would entail (see also Chapter 5).

In 1987, amidst the atrocities of civil war, the government's national development institute (INADE) created the *Proyecto Especial Rio Cachi* (PERC): a multi-purpose project with the idea to develop the region, create livelihood opportunities and immediate jobs, and so pacify the violent conflict. INADE was a dominant national engineering agency with considerable budget and centralized control. It sent half a dozen experts from the capital Lima to oversee and manage the PERC project, including its newly appointed director. However, within weeks, and before any actual work could commence, these experts were assassinated. Shining Path rebels would only allow local Ayacucho engineers on this hydraulic project.[68]

The HC design

In the CyA design, no irrigation (or electricity) was planned in the upper part of the Cachi River, between the reservoir and the tunnel. The new PERC project, through one of its offices, did offer small-scale community development and extension work, but the sparsely populated area, between 3,700 m.a.s.l. (reservoir) and 3,600 m.a.s.l, (tunnel) was considered too high and unsuited for irrigated agriculture, at least according to the prevailing engineering paradigm within INADE. This area was the domain of cattle herders who also kept small patches of tuber cultivation. Here, past haciendas and communities were larger than in Socos. Regardless, local community members demanded jobs and inclusion, in exchange for their cooperation and admission to their communal land.

[68] Interview with a former director 03-03-2012



Map 6: CyA Design

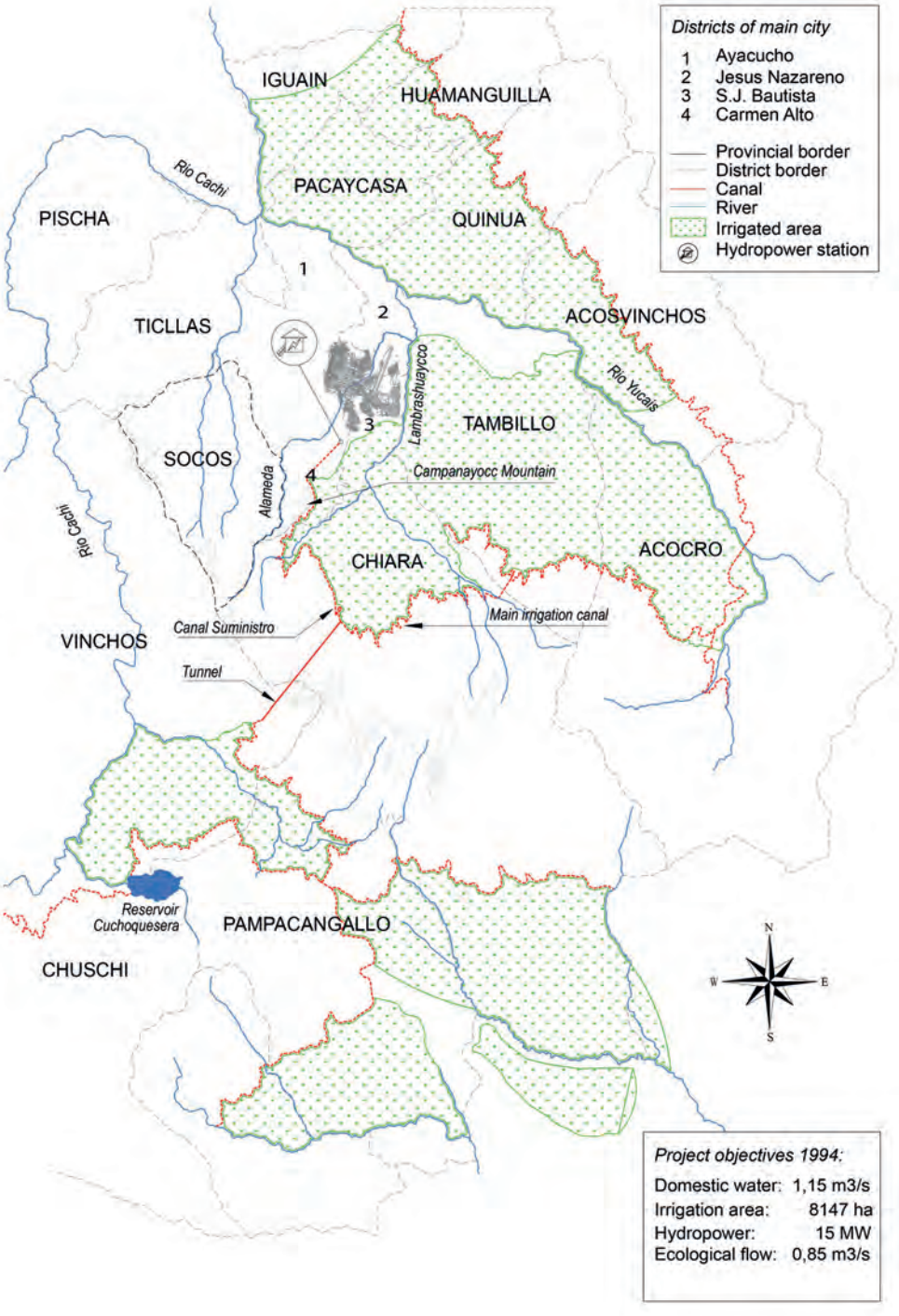
In many cases of large hydraulic projects, little attention is paid to such local demands of public groups (cf. Vera Delgado, 2011). However, in 1988, after the director of INADE conducted a field visit and witnessed the threatening situation, two compromises were made that challenged the prevailing technological thinking and gave a further design alteration. First, the local communities of the upper part of the Cachi river, between the reservoir and the tunnel, were included. This added to the irrigation command area some 4000 hectares of land hitherto considered 'unsuited' for irrigation by technocratic experts and engineers. Second, a more technically and economically efficient siphon was canceled in favor of a socially desired extension of the main canal by 40 km. This created more (construction) jobs and included more public groups so as to assure local cooperation and alliances for stability in the area.[69]

Slowly the violent conflict subsided. In 1992, the Shining Path leader was captured. By then, electricity and the hydropower component of PERC were less urgent, since, in 1988-89, Ayacucho was connected to the Mantaro transmission network, 135 km to the north of the city (HC, 1994). PERC was employing thousands of workers in canal construction work. Furthermore, it enlisted the services of a new Peruvian engineering consultancy, HC & Asociados S.R.L., and a Brazilian engineering conglomerate, Odebrecht, to update and finalize design and start realization of the major public works. HC was a new company and had a local office in Ayacucho from where close collaboration with PERC was made possible. The director of HC previously worked for CyA and continued optimizing the design. This created a new opening for Socos.

Ever since the design of Hydrotechnic and their conclusion that government subsidy might be needed, matters of amortization and rate of return haunted the viability of PERC. Even after construction had started. In 1994, HC made an inventory of additional water sources that could complement the water stored in the Cuchoquesera reservoir (to be built). It also reconsidered the values of system efficiency, which together allowed HC's design to boost the potential irrigated command area to 28,000 hectares. This included some of the region's best quality soils located far from Ayacucho city in a more sparsely populated area in the Pampas Watershed.

More so, with Ayacucho city connected to the Mantaro Transmission Network, the triple cascade option to generate hydropower was reverted to a version similar to the CORFA-UNI design: on the Campanayocc Mountain (a single drop generating 15MW). The HC design further considered a domestic water flow of 1.15 m^3/s and a new ecological flow of 0.85 m^3/s for the Alameda river flowing to and through the city. Map 7 presents the HC design.

[69] Interview with PERC engineer 22-02-2012



Map 7: HC Design

4.4. Lateral thinking.
On cunning spokespersons and creative practice

From being beneficiary of Cachi water and site of important infrastructure in design, Socos was left aside and no longer considered by the time construction of diversion canals and tunnels begun in the early 1990s. Figure 2 gives a timeline of the Socos inclusion and related events.

PERC followed HC & Asociados S.R.L option and went with the improved water regulation, because of the reservoir, a better tunnel location, and more quality soils to irrigate. There was a deep valley (of the Alameda River) separating fields in Socos from the water delivered on the Campanayocc Mountain. Engineers at that moment did not see Socos' inclusion as a logical option (anymore). To revert that situation, community members would have to circumvent that logic. To democratize PERC, they had to seek new and different venues to intervene: be resourceful and astute and do some out-of-the-box thinking.

Lateral thinking, broadly speaking, implies approaching a (tricky) situation not directly but through cunning circumvention and creative practice. It was coined by Edward de Bono as a mode of thought or "an attitude and habit of mind" (1971, p. 20), which contrasts with vertical thinking. With the latter, he means the more conventional critical thinking, following stepwise logic and reasoning. Any point of view in vertical thinking is derived from previous steps leading to right-wrong conclusions. Lateral thinking, on the other hand, helps to come up with new and different ways of seeing things (ibid.); in other words, different views co-exist and are non-derivative.

De Bono's ideas resemble notions of metis and logos introduced in the second chapter,[70] when I discussed situated astuteness of actors, including researchers, to realize their interests and projects. Following stepwise logic and reasoning would not have led to Socos' inclusion. They needed some trickster ploys and innovative spirit. Likewise, lateral thinking helps me to circumvent existing conventions on and conceptualization of good water governance and demonstrate the democratic potential of Socos' actions. So instead of a conceptual elaboration, I will briefly touch upon de Bono's interesting analogies to explain lateral and vertical thinking as it connects to the design history of PERC, the tunnel dilemma and ultimately the way for Soquinos to be included again.

The terms lateral and vertical were inspired by the practice of digging a hole. And the observation that, in case of design problems, "it is not possible to dig a hole in a different place by digging the same hole deeper" (1971, p. 20). Differently put, vertical ideas are about going in-depth, lateral thought is about trying elsewhere. De Bono's observations suggest that techno-scientific projects are often focused on "the logical enlargement of some accepted hole" (1971, p. 22). Partly because of past investment, partly because of the direction inscribed in the (design) project, engineers look to improve the existing metaphoric hole. Or tunnel. Often, however,

[70] Like in cases of astuteness or trickster ploys (see section 2.4), "very often the lateral solution to a problem is regarded by vertical thinkers as a form of cheating". For de Bono it is that which also "proves the usefulness of lateral thinking" as it reveals that the "accusers have been bound by rigid rules and assumptions [and methods] which do not in fact exist" (1971, p. 78) - but are themselves performances.

techno-scientific advance is made when the hole in progress is abandoned and a new one started (ibid.).

The attempts of Hydrotechnic and CORFA to improve the tunnel into Socos, is a case in point. For three decades, since 1952, engineers looked for ways to realize a tunnel and canal on geologically unstable terrain. Finally, CyA suggested to dig in an altogether different location, where soils were more stable, as a way out of a tricky situation.

When an idea, like CyA's new tunnel alternative, is embraced, it becomes the new first step of sequential logic. "With most situations, what starts as a temporary and provisional manner of looking at them soon turns into the only possible way, especially if encouraged by success" or promise of progress (de Bono, 1971, p. 69). This rationalization, in retrospect, cements Whig histories of hydraulic infrastructure. It becomes the dominant view – in this case held by Ayacucho engineers and water professionals.

Elsewhere de Bono talks about dominant ideas or logic using a metaphor of the course of deeply carved rivers that by their "very flow increase the probability of those paths for the future". To counter that logic, "new channels are deliberately cut to alter the flow of the water" (1971, p. 14). In what follows, I explore through what channels Soquinos went, to make that alteration happen.

Banquets and officiaries

Rodolfo was a topography surveyor working for PERC and also a comunero of the Socos community, from one of the influential families (gamonales), according to other Soquinos. He was considered the promotor of Socos' (re-)entry in PERC. With the Campanayocc alternative on the drawing board again, Rodolfo collected some cash from the 30 or so Socos construction workers on the PERC payroll in 1994. They invited PERC and HC experts for a drink on the Campanayocc Mountain from where you could see the Socos municipality. After that pleasant gathering, it was agreed that Rodolfo could investigate the feasibility of a canal to Socos. Later that year, the director included Socos in PERC's water allocation scheme, with 500 l/s and assured to allocate funds in the 1995 budget to realize this.

At the end of 1994, the different communities of the Socos municipality organized a big banquet, a feast in honor of the PERC project. Various groups prepared food, comuneros and comuneras walked around with jugs of chicha and passed this alcoholic beverage around. The director of PERC was present with his staff. During various rounds of drinks, and before serving the food, Socos notables would go on to speak about the importance of the project and the water that was allocated. Unfortunately, the first speaker, a slightly intoxicated president from one of the communities, lost his control and lashed out at the director of PERC, accusing him and his office of taking bribes. The president claimed that if you wanted to be a construction worker, you had to buy yourself in by donating livestock. Offended, and before food was taken, the director and the PERC delegation left. No budget was allocated to Socos that next year, no

design, no construction, no water. Socos was kept in the water allocation scheme just without plans or resources to get it there.[71]

In 1996, Oswaldo Tejada, a clerk in the city of Huamanga, was elected *alcalde*, or mayor, of the Socos municipality. His focus, upon taking that function, was rural electrification for all communities of Socos. A tense dynamic between influential (gamonal) families – Rodolfo's and Tejada's – kept the *alcalde* from approaching PERC.[72] Then, later that year, the director of PERC was dismissed, and with him went much of his staff, including Rodolfo, and the company HC. The *alcalde* quickly visited the new director, who unlike his predecessors was from Lima, only to hear there was no budget.

The next year, Socos was the driving force behind a petition that urged for the continuation of the canal on the Campanayocc Mountain to the four municipalities that were originally considered in the CORFA-UNI design. Curiously, it included signatures of five municipalities in Huancavelica, the region on the other side of the Cachi River. Adding signatures to a petition that is presented at institutions in Lima is a known tactic, says Tejeda, when officials have no detailed knowledge of the area and are impressed by more stamps and autographs. It turned out that the five Huancavelica municipalities and the four municipalities of the CORFA-UNI design jointly mobilized to obtain rural electrification programs for the many dispersed villages in the area. Collectively traveling to and from Lima, the *alcaldes* had discussed how to help each other out. In this case, they presented the electrification and irrigation demands together.[73]

In September 1999, Peruvian President Alberto Fujimori appeared, unexpected, on the public square in Socos. Initially, most inhabitants fled, explained one *Soquino*, because of fear of a military convoy. As it turned out, Fujimori picked Socos to announce his commitment to construct and finish the PERC reservoir that CyA had proposed. This, Fujimori stated, would solve the problems of irrigation and drinking water. The next day Socos was front-page news in the national media.

It is not at all clear why Fujimori chose Socos to make his appearance. It was unexpected for the local population, as they had already been denied further support by PERC. According to Tejada, it was because Socos was the most water-scarce area in Huamanga. Other Soquinos and PERC Engineers indicated the government's attempt to politically distance themselves for the military misbehavior in 1983. Whatever the reason was, the visit and newspaper article enabled Socos' plea for water.

The stories and practices of Rodolfo and Tejeda, both from the community of Socos, show that they know their way around hydraulic projects and government administration while, presumably, knowing intimately about maintaining maizales, ritual practices of sowing and canal cleaning, and payments to their earth beings (Carillo Medina, 2008; Stensrud, 2019; Ventura & Navarro, 2001). Like Untal and Julia (chapter 3) they move and create entanglements between different actor-worlds, displaying a situated astuteness to secure Andean waters. The next section shows how Soquinos astutely mobilized protest.

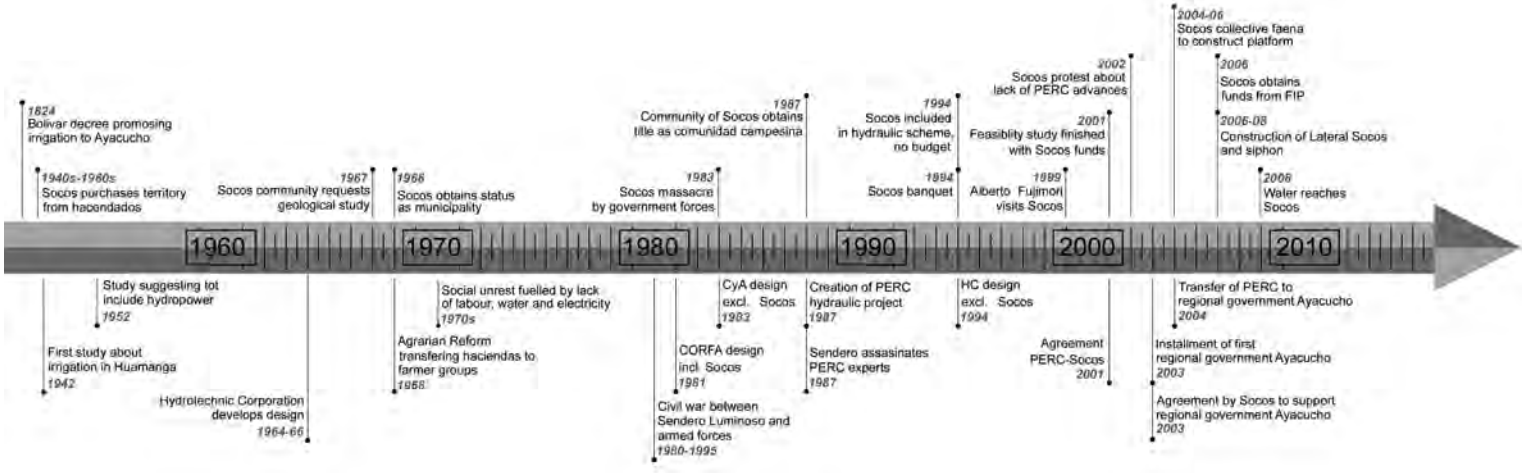
[71] Interview Rodolfo 03-03-2012.

[72] Personal communication with Alcalde Tejada 27-02-2012.

[73] Interview Alcalde Tejada 14-03-2012.

Figure 2: Timeline Socos

Inclusion and related events



Presidents and publics

After the fall of Fujimori's authoritarian regime, new INADE officials were appointed in 2001, including a new PERC director from Ayacucho. In that year, a treaty was finally signed between Socos authorities and PERC. The latter would evaluate the inclusion of Socos and provide agricultural capacity training for the new irrigators. Socos would assure the participation of local community members in the PERC project (setting) and come up with the funds needed for the concluding feasibility study. The former entailed adhering to legal arrangements and conditions[74] but also labor investment during collective workdays. Regarding the latter, 20.000 soles (~5,800 dollars) of public, municipal, funds were used to finish the study. Certainly, the strategy to become a municipality, in 1968, made accessing such funds easier. The construction costs, projected at 1.7 million dollars, however, would be impossible to muster.

Frustrated by a lack of advance and ambiguity about construction costs, the Socos population marched on the city in 2002, to demand water and funds. Around 1500 people walked the 13 km to the city in public protest. I was told that all communities in Socos assisted, including those who, geographically or otherwise, would not benefit from the water. All agreed to send a delegation of 15-20 persons and the beneficiary communities came with much more. They claimed to be forgotten by the government and PERC, especially with the water now having arrived at Campanayocc: "this project also belongs to Socos. If it means we have to dig manually, we will fetch the water" – but to little avail at that time.

It was the time, also, of the beginning of a decentralization wave in Peru. In 2002 regional elections were held for the first time and from the six presidential candidates in Ayacucho, three were ex-directors of PERC, yet none of these won. Instead, Omar Quesada, from the APRA political party, took office in January 2003. In November of 2003, as part of these decentralization policies, the PERC project was transferred from national (INADE) to the regional government. Furthermore, as a consequence of elections, there was also another personnel overhaul within PERC. An engineer from Socos became responsible for the design and construction office of the project. He lived in the city but also had a house in the main village and farming plots in the Socos community, just like the newly elected Socos *alcalde* Rodriguez. Both of them had ties to the APRA party.

It was alcalde Rodriguez who was charged with finding the funds for the realization of 'Lateral Socos'. As one of the possibilities, he sent the feasibility study to the Fondo Italo-Peruano (FIP), but they rejected the project.

[74] Part of the Socos community, which earlier obtained legal recognition as an Irrigator Commission of a small source on their territory, joined several other communities in Ayacucho (Huanta Province) to form a regional Water User Association (JUDRA; see chapter 3); a strategic move to forge allies and validate their claim vis-à-vis PERC and regional government. At that time, Socos was the only community from those in the envisioned in the PERC scheme that participated in the JUDRA – the institution that, according to Peruvian water law, is appointed to manage large-scale irrigation infrastructure (though not the headworks).

Frustrated again, the Soquinos once more marched to the city in protest - this time in fewer numbers, but with more results. They were invited by the new regional president Quesada and the following agreement was made: PERC would extend the supply canal from the Campanayocc Mountain to the location of the siphon entrance, from where Socos communities (provided they obtained funds) would continue the construction to its communities. Furthermore, they agreed that PERC engineers would help to accommodate the study according to FIP recommendations. It was re-submitted and eventually accepted. With PERC extending the supply canal, FIP would finance the project for the amount of 3 million soles (about 1 million dollars).[75] Now it was up to the communities of Socos to make good on their vow of "digging manually" and construct the platform for trucks to supply material and equipment along the canal course.

What would follow was an impressive public work effort: a supra-communal faena. For nearly 2 years, between 2004-2006, each community worked Saturdays and Sundays on an assigned section of the platform. Hundreds of peasants would assist each week. According to a former president of the community of Socos, work was voluntary, but everyone participated; sanctions were not necessary. It was simple: no work, no water.

With the platform nearly completed, there was one final condition pending for FIP to release the funds to construct the siphon and the canal: PERC's promised extension of the supply canal had to be realized first. Socos, through the municipality, communities and individuals – and with the help of other allies – had struggled and waited for almost four decades to get water to its territory and now it was up to PERC to comply. Late in 2003, regional president Quesada came to the public square in Socos. PERC had just been transferred to his administration and the previous agreement was reaffirmed, yet slightly modified.

According to the community president of Socos at that time, president Quesada ensured that water would reach Socos during his term while the communities agreed to support his administration publicly. Each community received a letter from the regional government on where to appear. Transport from Socos to the city (and occasional refreshments) was normally provided for through someone in the Quesada administration. The leaders of each community decided if the population in its entirety would go or just a delegation. And so, the confronted groups went to work again. They marched again to the city but now in support of regional government activities. They appeared at the airport when foreign ambassadors arrived. They mobilized and occupied the central square in the city to express to the national government their faith in regional policies and they filled up the city's theatre on the day of the annual accountability of regional government expenditures. According to former Socos leaders, Omar Quesada kept his word. Moreover, in the first months after the transfer of PERC, the Socos engineer in charge of the design and construction office of PERC, got the position of general director of the entire project in 2004. The PERC extended the supply canal and in 2006, FIP released the funds for the completion of 'Lateral Socos'.

[75] Interview with Alcalde Rodriguez 03-09-2012.

4.5. Closure.
Or the re-(de)stabilization of a technological system?

It was this last agreement with President Quesada, on top of general chaos surrounding PERC,[76] which seems to have led the engineers and water professionals, which I interviewed at the beginning of fieldwork, to believe that the inclusion of Socos was recent and tainted. Despite acknowledgement of Socos in the PERC's water allocation scheme (agreed in 1995), the lack of funds meant that no infrastructure materialized until 2006; while elsewhere in Huamanga people were already irrigating. This conveyed even more that Socos was not part of PERC.

That being said, the case of Lateral Socos is the only one in PERC where communities actively took charge of realizing a secondary canal, from study and design to (funds for) construction. It is certainly understandable why Soquinos claim a right to Cachi water.

It was 2008 when water first flowed down Lateral Socos; 500 l/s on paper,[77] which was a year prior to my interviews with actors of the Ayacucho water sector (see section 4.1). The canal course runs over the geologically unstable soils that earlier were a reason to reject the CORFA-UNI design. More so, the chacras once deemed unsuited for irrigated agriculture are now receiving water and contribute to community wellbeing. From the water that passes the siphon, a share of the water will be distributed to the sector of the community of Rancha. Since at least 1997, when Alcalde Tejeda took his petition to Lima, the authorities of Rancha walked alongside Socos. However, since Rancha is part of the municipality of Huamanga, it stood also separate. Regardless, retrieved documents and observed *asambleas* showed that Rancha community members had contributed in protests, through labor and with financial means. It underlines the opinion of certain Soquinos that Rancha is a longtime ally in their water struggle and acknowledgment that 100 l/s will be allocated to this sector. That is, once the second siphon would be constructed and that would take several more years.

After water arrived, the inclusion of Socos and Rancha quickly became established logic in the Ayacucho water sector. In 2010, one representative from Socos and one from Rancha, from the respective Irrigator Commissions of Socos and Ccelloccacha Huachualla were chosen and installed as part of the new five-men JUDRA board.[78] For consecutive electoral periods, they

[76] In period of transfer from national government (INADE) to Regional government, the PERC project was confronted with a parliamentary committee report (published in 2002) about corruption and misuse in the preceding decade. Moreover, contractual and salary conditions of PERC employees, guaranteed in the transfer, were at odds with other regional government officials and a drain on its budget. As mentioned in section 4.1, in 2007, a new regional president decommissioned and dismantled PERC and relocated its offices under branches of regional government.

[77] Because of construction problems, the siphon pipes start to vibrate dangerously when transporting 500 litres. In the first years of operation it could only transport 350.

[78] During the election processes of 2009/10, which I observed, there was a tension in the JUDRA between various groups about water allocation and distribution; between irrigators of the *parte alta* (before the tunnel Ichocruz-Chiara) which received water for 12 hours, and the irrigators of the main irrigation canal (*parte baja*)

were in charge of water user association's administration and certain management and maintenance tasks in PERC. The controversy over the inclusion of Socos seems settled. The question that can now be revisited is whether, or how, this process was democratic or not.

Technology democratized?

With water now flowing to Socos through, to recall de Bono (1971), "new channels", and no longer staying "the course" of dominant ideas that rejected this inclusion, the moment seems there to reconsider the two lines of thought regarding the normativities and politics of technology democratization that were introduced in the first section. To that end, I will look at matters of participation and what is just.

The first line of thought, that I connect here to "the course", considers the actions (or techniques) to bring diverse lay social groups into participatory contact with technology experts in a particular governance setting which to a great extent determines about which questions and controversies can be debated and be deliberated and what issues are illogical, unreasonable or absurd. It is founded on principles of dialogue and consensus, reflexive experts and the celebration of user participation. This is being cultivated in Peru and more particular in the study area for some two decades (cf. Oré, 2007). Based on that, and for an extended time, the majority of actors in the Ayacucho water setting would argue that the case of Socos was illogical, or *anti-tecnico*, as some would say. In that sense, the assignation of 500 liters and construction of the canal do not seem democratic. Nor do Socos practices seem very participatory.

The second line of thought, then, looks at the actions of excluded or marginalized publics to (re)shape technology (design), according to their views and interests and is about making "new channels". This angle, says Feenberg (1998, p. 4), "may provide a basis for calling certain technological controversies and creative appropriations democratic despite the fact that they do not appear representative."[79]

I imagine that those who stay "the course" would argue that the actions of Soquinos were far from good (participatory) practice. PRIDER engineers told me that water is not reaching the tail-end of the main irrigation canal in the district of Acocro. And although it is uncertain water otherwise would, I at least observe that water cannot be allocated twice and that the case does reveal the limits of a resource that the infrastructure is to facilitate - with consequent collisions between public groups. Still, one could argue it is democratic in the sense that in the technological system are materialized the efforts and ideas of more and different actors and social groups.

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which received continuous flow. In the weeks leading up to elections coalitions were formed and deals discussed by alta and baja blocs. At the day of election, by direct vote or *mano alzada*, representatives of the parte alta or main irrigation canal withdrew as candidates or were not elected. The result was a JUDRA board with four members that received water from Canal Suministro and one representative from outside PERC, including leaders from Socos and Rancha.

[79] For other Andean cases see Gelles (2000), Boelens (2008), Hidalgo-Bastidas (2019).

A conclusion might also be that Soquinos have re-shaped a multi-purpose hydraulic project from 'below'. But that would be foregrounding some technocratic (PERC) actor-world and not how the members of Socos enacted the Lateral Socos. They indeed realized it. If the focus is on the latter, like presented in this chapter, it seems like different PERC directors and engineers participated with Soquinos to bring a canal into being; as much or more than the other way around. Lateral Socos, is a canal constituted in/by different actor-worlds. It threatened hydraulic integrity to some actors, but secured water to others. What is good practice or what is just differs and is precisely what fueled the controversy about the inclusion of Socos.[80]

To "close a technological controversy", say Pinch and Bijker (1987, p. 44) "involves the stabilization of an artifact and the disappearance of problems". Differently put closure occurs when relevant stakeholder groups engaged in the design, construction and use of hydraulic infrastructure see the issue (artifact and problems with it) as settled (see also Marres, 2005a). However, the idea of closure, and thus of a controversy-free technology, like in this case the PERC system or Lateral Socos, is largely a myth of planners and managers. The multiplicity of water infrastructure helps to reveal that closure here, in this actor-world, creates or keeps up issues there, in another actor-world.

In the case of Lateral Socos, quickly after realization, the water scarcity problem was redefined, or better rescaled, to a conflict about the maximum reservoir storage and insufficient water availability region-wide (see also Chapter 5). *Afianzamiento hídrico*, or securing new water sources, overtook earlier infrastructural design decisions, yet, water security issues in PERC, and in Socos, remained. And while the affordance of the technological object (of the hydraulic infrastructure) did not shift - it was actually multiple and fluctuating all along - in a way the relevant or key public groups and actors did. New JUDRA boards are periodically installed and after regional government elections, a staff overhaul usually replaces key experts on past matters. On subsequent field visits after 2014, thus several years after water started flowing, the presence of Lateral Socos seemed both logical and valued.

New issues ⇄ new publics

Indeed, when I returned to the Ayacucho region in 2014, Socos was sort at the forefront of PERC irrigation. This was explained to me by the JUDRA officials I met in 2008 and who, by 2014, had a position with the government *Programa Subsectorial de Irrigaciones* (PSI). The program assisted water users with sprinkler irrigation and corresponding capacity strengthening. Socos was the area where this new technology was furthest advanced.

Their past experiences and skills needed to realize their canal, had helped the Soquinos in obtaining a large sprinkler irrigation project for their lands, the first of this magnitude in the

[80] It is not my aim to define *the good* in this chapter or thesis, but rather look at how this is done among actor-worlds and by actors through everyday practices; to see how success or failure is recognized and made sense of by people and how this can shift ideas of water governance (see also Law & Mol, 2002, p. 84).

region. As with the FIP, they had submitted a project to FONIPREL, a tendered fund that is oriented to provide basic services and infrastructure in areas of poverty in Peru, and were awarded more than 7.5 million soles for a multi-year project in 2010. Ironically governmental agencies now ally themselves with Socos to share in the accomplishment while also providing some technical assistance.

But with these successes came new issues and controversies that again destabilized a technological system. It reveals the complexity and even messiness of large hydraulic public works in mountain areas, where water seemingly flows uphill through siphons and new publics keep mobilizing.

For one, internal groups and communities in Socos, despite earlier reservations about the canal, upon seeing the water's arrival and effects, claimed a share. They appealed to the fact that water was for everyone in Socos and that municipal funds were used to realize the canal. There was a discussion about extending the canal from Maucallacta to Luyanta, which frustrated the members of communities who, for years, had invested labor and time.

Elsewhere, the expanding urban areas to the north and east of the city are complicating drinking water distribution. With new outskirts, like the urbanizing community of Huascahura, above the altitude of the existing water treatment plant, drinking water has to be diverted at higher altitudes. Since drinking water has legal priority, the supply for Huascahura is transported by means of the Socos canal, reducing the volume available for irrigation.[81]

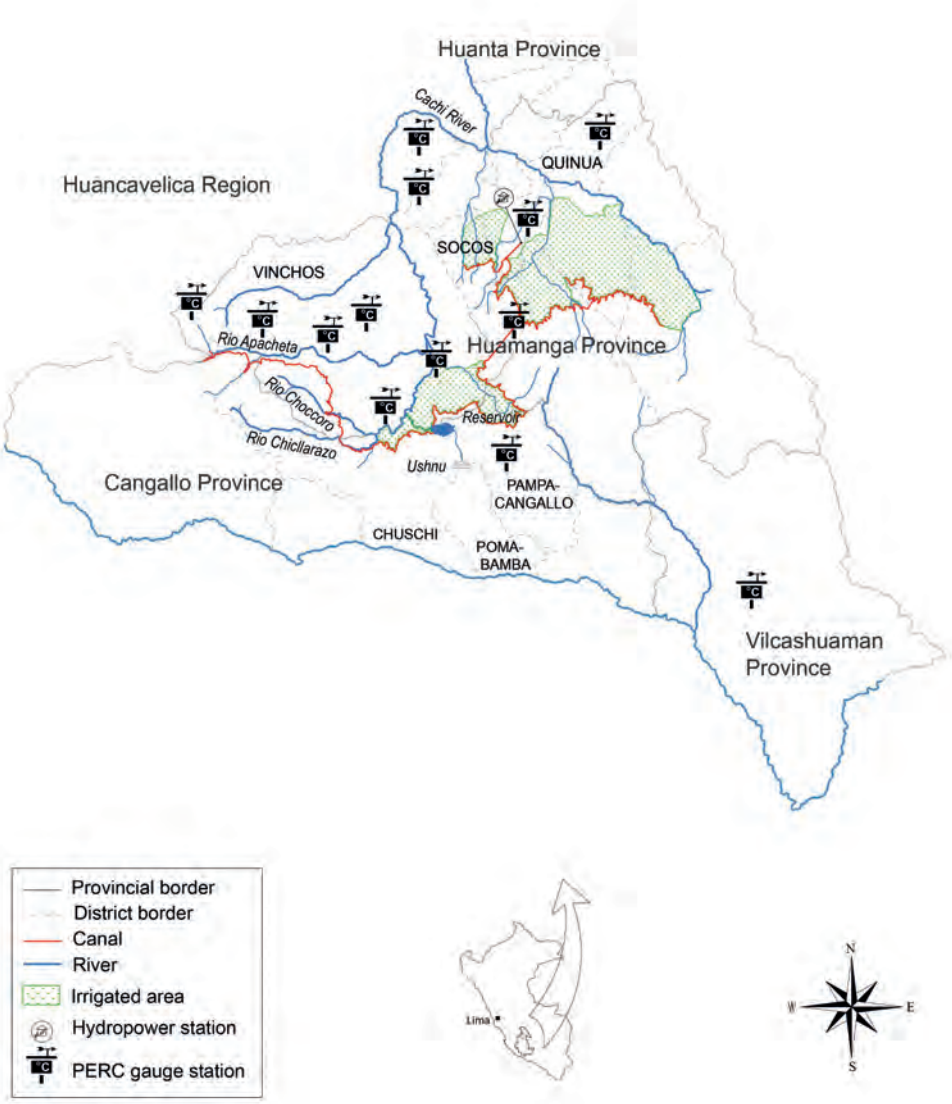
With new publics come new, contested, negotiations over water use and hydraulic property. In a way, the Soquinos find themselves in a reversed position, themselves now dealing with outside groups claiming water or infrastructural access. Some will insist that the Lateral Socos is part of and constructed and managed by PERC – and in part it is – Soquinos will emphasize it was their doing – and it is too. Lateral Socos is partially connected, more than a single canal, but less than many (Mol, 2002, chapter 3). In that sense, there can be no closure; technology is not uncontested. Instead, stability is enacted and transient. New holes are dug constantly, other interests and aims continuously bring (practice) new versions into being: a technology system in perpetual flux; it is the essence of democratizing hydraulic infrastructure and implicates the writer or researcher as some versions are described or documented and others are not.

[81] For the community of Rancha something similar occurred. After they invested labour, time and communal funds to help realize the Lateral Socos, communities further away, or down-stream, from Rancha made a claim. This was discussed at the asamblea where I was present (section 3.1).

5. Modern temples and sacred spaces:

Entangled water worlds in Cuchoquesera, Peru

Image 4: Piles of stones



Map 8: PERC and hydro-meteorological network

This is the chapter in which I explore the ontological tension of a patch of wetland in the headwaters of the Cachi River. A place called Cuchoquesera, which is today a site landmarked by a large dam. I focus on members of the community of Quispillacta and water engineers who are or have been PERC staff members.

Two vignettes, set in 1987, illustrate two particular ways of relating to water and wetlands. The first introduces the family of a five-year-old boy that lives in Cuchoquesera and treat environmental entities, like water, as being spirit-endowed, which should be conversed with and reciprocally cared for. The second vignette introduces a young agronomist working for the multi-purpose hydraulic project, PERC, that looks to capture and store water in order to relieve human suffering in the wider area. The two stories are tied to different realities (or water worlds) of the same water body: Cuchoquesera (section 5.1).

The area of Cuchoquesera is a place of overlaying territories, different markers and fluid boundaries in the Andean region of Ayacucho, Peru. After annexation by the Incas, it was occupied by the Kana peoples and the consequences of Spanish conquest meant that the area was under the control of hacendados until the community of Quispillacta bought back the wetland. Boundaries related to this place were fluid, while community members revered a mountain peak containing a step-platform or *ushnu*. For engineers and their development objectives, this fluidity and reverence needed to be fixed and rationalized to advance the dam project (5.2).

Section three centers on the realization of the Cuchoquesera Dam and the particular techno-scientific water world in which it is produced and which it helps to produce. In section four, I focus on how local community members make sense of and enact the Cuchoquesera waterscape and ushnu platform. In both cases, I consider the following practices and concepts: to identify water *sources*; to *survey* and map the site; to compose *shape and fill* of a water structure; and to respond to *seepage*.

To realize the dam and development scheme, PERC engineers set up a hydrometeorological network to measure the available water sources and relied on a grid of geodetic control points to make their design and determine the exact location of the dam. For economic reasons, the dam fill consisted of nearby resources (stones and sand), while attempts were made to reduce seepage (5.3).

To enact a sacred waterscape, Quispillacta community members embraced seepage to a watery underworld and used far-away stones and sand for reasons of forging bonds to a revered site. Water sources are "fetched", conversed and danced within ritual celebrations while, historically, markers (*huacas*) and sightlines were and are used to bring into being a venerated scheme (5.4).

These two water worlds differently enact the Cuchoquesera wetland area and cause ontological interference and friction. Different notions of boundary markers and access complicated mutual understanding and corporation. Notwithstanding community struggle and grief about dam construction, the entanglements of water worlds also create opportunities. In times of water scarcity and climate change, engineers from Ayacucho, realizing the limits of technical expertise, look to community practice of water care (*crianza de agua*) to help solve the tremendous challenges of water management in the region. Herein community members seek recognition and valorization of their ways of relating to water (5.5).

This chapter informs the question: *What are the irrigation and water practices and conceptualizations that help Andean communities to their secure wetlands and water worlds?*

5.1. Swamping a playground.
Dawn of a dam[82]

I first arrived at Cuchoquesera in March 2008. A public hearing was organized by the community of Quispillcata to discuss the slow progress of a number of mitigation projects that were related to the realization of the large storage reservoir on community land. It was about a month after the national agricultural strike (section 2.1) where this hearing was one of the protesters' demands. JUDRA officials had secured a seat for me in a colectivo, a minivan, contracted by the NGO *Proyecto KANA*. In the colectivo I met Oseas, founder of the NGO. In a much-too-cramped position on the back row, I listened to the impacts of large infrastructure and mining on Andean communities. Oseas explained everything, including my presence, with a sense of humor and there was much laughter. Upon arrival, we needed to walk the last stretch to the hearing site along the shores of the reservoir. There was now some apprehension among the approaching villagers, about me walking too close to the reservoir. They talked with Oseas and let me away from the water. Concerned, Oseas told me the villagers were worried for me. Something that, back then, I considered overly cautious.

Since that minivan ride, we developed a friendship and research collaboration. Years later and after many conversations together, I understood that worry differently, and appreciated it much better. Our conversations are the inspiration for this chapter, including the ones about his childhood, which are presented next.

The five-year-old boy

It was 1987. After his midday meal of potatoes and field beans, a small boy of five years ran outside to play. The small hut he appeared from could best be described as the family kitchen. A *fogon*, or stove, in the corner was used for cooking food, but also keep the small place warm and comfortable during the cold evenings of the Andean puna.[83] So, the hut was also more than a

[82] Image 4 (p. 115): Piles of stone (left & upper right are Saywas in Quispillacta; lower right is the marker indicating the limit of the reservoir). Source: Oseas Nuñez (left, lower right) and author (upper right).
The chapter was published as "Templos modernos y espacios sagrados: territorios hidrosociales entrelazados en Cuchoquesera, Perú" by Andres Verzijl, Rutgerd Boelens and Oseas Nuñez (2019). Apart from conceptual changes, the empirical parts are largely maintained. The material of this chapter was collected during several (field)visits to Ayacucho between 2009 and 2017. This included a key focus group held in 2009 with a dozen ex-leaders of communities about how they experienced the presence of the PERC hydraulic project. Importantly, knowledge about the reservoir, the controversy it brought in its wake, as well as understandings about crianza and care practices in the community were co-laboured with Oseas, a researcher and member of Quispillacta. These interviews were more like reciprocal conversations, about childhood memories, territorial relations, and much more. We visited the ushnu site in 2017 in his community and Vilcashuaman. Data on dam design and characteristics were mostly collected in 2012 during a series of interviews with five engineers with a long service record at the Proyecto Especial Rio Cachi (PERC).

[83] The puna (grassland) is considered as the ecological zone in the southern Andes where cattle and camelid herding are predominant, with little agriculture, located around and beyond 4000 m.a.s.l. (Baied & Wheeler, 1993).

kitchen. It was the place where his mother and father, at the end of the day, told the boy stories – taught him stories – of the protective mountains that surrounded them, and of how these beings command rain, and of the path rain takes when it travels to their lands. Sitting close together, on sheep hides and covered with blankets, his parents taught him how water was alive too, had feelings, and should be danced and conversed with.

Outside, the boy ran along several sheds and corrals that made up his family farm or *estancia*. He sought out his friends who lived in similar farmsteads scattered around the huge wetland area of Cuchoquesera. A small lake exists in this area, called Piñacocha (meaning wild or ferocious lake), which was fed by an underground source. A humanmade drain led this water to the Chahuamayo stream and divided the wetlands. The left bank, called Lliwapata, was the grazing area for his family and the neighboring estancias. To the right was the *empresa comunal*, the collective community farm. On the lakeshore there is a ruin of an old building, called Inkaraqay. The hewn blocks and small frogs make this a nice playground for the boy. But not today. The boy ran off in the opposite direction with his cousin, to a small spring called Chalabamba. Here water spouted out from inside the earth, like a fountain of half a meter high. The boys let it tickle their feet. It was forbidden, which made it more fun. Every time his mother found out she reprimanded him and warned him that the water from beneath the earth should be respected; if it did not approve of his actions, it could make him sick. Then she performed a ritual by burying salt and something of iron close to the spring.

One day soon in the warmth of the kitchen and before going to bed, the boy would be told of the water beneath the earth, of the ruins and the *ushnu* platform on top of the mountain-being that stands watch over his community. He would be taught how to care for them and be sensitive to how water and the mountains care for him in turn.

The young agronomist

Some 30 kilometers away, in the city of Ayacucho, a young agronomist was working into the night. He was a new staff member of the Ayacucho Regional Development Organization (CORFA) and very excited, because recently the Peruvian government had issued a decree that created the Proyecto Especial Rio Cachi (PERC). Although he was not himself from Ayacucho, he had worked and traveled in the region prior to his new position. He knew lands and people were suffering the consequence of a violent civil war at the time (Salvatierra et al., 2015; see also Stern, 1998). The new proyecto, or so he hoped and believed, would bring relief and eventually peace by providing water and electricity (Huayhualla, Torres, Aperrigue, Morales, & Castro, 2010).[84]

PERC envisioned, in 1987, connecting three upstream rivers to a network of canals and included hydropower plants. It also foresaw kilometer-long tunnels, that would transport water

[84] This project mission is mentioned in several related documents and design plans (see for example PERC, 2005).

beneath the earth and the mountains. To control and regulate this water, an 80 MMC storage reservoir was needed. The designated place was Cuchoquesera. For now, the PERC project was small: only the young agronomist and two others were assigned to start preliminary activities. However, come construction time PERC would employ thousands. The young agronomist was excited, because although the plans to bring water to the city had existed for decades, now the commitment and resources were made available to realize this "regional dream of Ayacucho" (ibid).

One day soon, he would travel to the cold puna and high mountains to initiate the works that would lead to a large dam construction – and subsequent controversy.

These two vignettes, of the boy and of the agronomist,[85] connect to two water worlds that enact the same place: a body of water known as Cuchoquesera; two actor-worlds that are shaped by and constituted through (power) relations among (non)human actors (Hastrup & Hastrup, 2015). In that sense worlds are not the mere backdrop or context in which actors do their thing, but are actively and continuously "produced" or brought into being through different practices (see also Asdal & Moser, 2012; chapter 3). This suggests water worlds that are not fixed, but are meaningful and dynamic (cf. Orlove & Caton, 2010). It also implies that a different configuration of actors would produce a different body of water. The next sections, then, demonstrate that a single waterbody, in this case the Cuchoquesera wetland, is done and made sense of differently by ways of different practices, technologies and stories (see also section 3.2): enacted by engineers, hydro-meteorological networks, surveying and geodetic points, dam construction and water regulation on the one hand; and enacted by communities, nurtured lakes, cognizing boundary markers and sightlines, creating a ritual structure and practices of care on the other. Entanglements and possible frictions between these two wetland enactments are easily imagined as one of them literally swamped the other.

5.2. Cuchoquesera
A fluid territory?

The topographical maps, which the young agronomist had at his disposal in 1987, showed that Cuchoquesera was a small natural depression with marshlands that drain in the Chicllarazo River. Geologically it was characterized as moderately sloping plains of sedimentary rock above 3,700 m.a.s.l. (although volcanic rock and alluvial deposits were also found). Dwellings were dispersed and located to the south of the marshlands, without any observable concentrated settlements. To the north, two rolling hills, known by these dwellers as Botijuela and Chuntalla,

[85] The childhood memories about the five-year-old boy are those of Oseas, with whom I collaborated on this chapter and who was one of the co-researchers that researched the election period of the JUDRA in 2009. I interviewed the young agronomist in February of 2012. He was, at that time, appointed by the regional government to supervise the activities related to the Rio Cachi (or ex-PERC) project. And worked as project engineer during the moments this controversy took shape, in the early 1990s.

demarcated this place. Three municipalities of Chuschi, Pampa-Cangallo and Vinchos converge here, as well as two provinces of Cangallo and Huamanga (see also maps 8 and 9).

The young agronomist also knew that several communities, hamlets and groups made use of this area, but their borders, unlike the hydrological and politico-administrative ones, could not be found on any map. A complexity of lived agreements, markers and fluid boundaries existed that could not easily be explained. Or mapped. It was of secondary importance, he thought, because this new Proyecto Especial Rio Cachi (PERC) would develop the entire region, including the local communities.

The appeal of multi-purpose hydraulic projects, like PERC, and large dam constructions was, and is, considerable in Peruvian water and agricultural sectors. These modern projects often embodied long-awaited promises of progress (Dominguez Guzmán, 2013; Oré, 2005). They integrate and provide: drinking water, electricity and irrigation at (sub)basin level; and were founded on "the engineering ethos that scientific knowledge and systematic rational planning could radically change society" (Molle, 2009, p. 487). It was a belief in technoscience to control nature and people for the sake of the nation, progress and development (Carroll, 2012; Scott, 2006b). In Peru, more than a dozen of these large projects exist in various stages of completion. Recently they are associated with modern agro-export (del Castillo, 2013; Oré & Geng, 2014) and considered as the apex of "*El Perú avanza*"; the electoral slogan used by Peruvian President Alan Garcia at the time I first visited Cuchoquesera. At one point, he ran out of superlatives to indicate one of these hydraulic megastructures in the north: a monumental work and an engineering miracle that would usher in development (Dominguez Guzmán, 2013, p. 111).

Garcia's rhetoric is not that different of that of then Indian Prime Minister Nehru, decades before him, who upon visiting one of his country's multi-purpose hydraulic projects, spoke famously of dams as "the modern temples of India" (Boelens, Shah, & Bruins, 2019; Khagram, 2004, p. 35; Molle, 2009). As metaphoric temples, dams were illustrious places that evoked admiration and awe. Places from where prosperity and rationality would spread. Before I describe how a modern temple materialized in Ayacucho, some historical details are needed about the locality from where the dam borrowed its name: Cuchoquesera, the homeland of a five-year-old.

The Kana Peoples

The boy's family was one of the first of the community of Quispillacta to come and live (again) in the Cuchoquesera area in the 1940s. These *Quispillactinos* were descendants of the Kana peoples, who prior to Spanish conquest, had lived in Cusco and were allied to and fought with the Incas (Muñoz & Nuñez, 2006). Some of the Kana ethnic group had been sent to Ayacucho, to the area that included Cuchoquesera, as part of the Inca *mitimaes*: an imperial resettlement strategy of relocating allies and adversaries to establish Inca rule. Close to the lands allocated to the Kana Peoples (and present-day Quispillacta) was the important Inca administrative and ceremonial center of Vilcashuaman, in the Pampas watershed.

Later, the Spanish colonizers divided the Ayacucho region in *encomiendas* (territories where the Indians living in it had to pay tribute to the new rulers) and *reduciones* (forced village resettlement schemes). These interfered with the previous villages and boundaries between the Kana and other ethnic groups and gave rise to one of the earliest recorded and longest territorial disputes in Peru, which lasted from 1558-1982, between the community of Quispillacta – including Cuchoquesera, and the community of Chuschi. A rivalry between them still exists today (Muñoz and Nuñez, 2006).

Over time, haciendas appropriated the moderately sloping plains, including Cuchoquesera, from the Kana of Quispillacta. These were excellent areas for cattle ranching and located in the Cachi watershed. To the contrary, Quispillacta comunera(o)s retained their territory in the much steeper Pampas watershed, where their main activity was maize cultivation (see also B. J. Isbell, 1978). During a focus group conversation with ex-*dirigentes* of the community of Quispillacta, the participants recalled the hacienda system as brutal and oppressive, but there were also exceptions and some smaller hacendados and the community formed alliances. The ex-dirigentes said that in the past, Quispillactinos could continue to enter the territory of haciendas from the Pampas side to travel to mountain peaks and perform their rituals, but they were not allowed at the lower grazing grounds. In the 20th century, because of growing human and animal populations, the community of Quispillacta struggled to purchase land at various locations in the Cachi watershed. The area of Cuchoquesera was bought (back) from a hacendado in 1944.[86] With some derision, the ex-leaders mentioned that hacendados did not even knew their exact borders in these higher parts. In contrast, the focus group participants and their ancestors knew every bog and boulder of this high puna land. And they navigated it by way of markers, such as *wamanis*, *huacas* and *saywas*, which serve as reference points.

Lived spaces, living boundaries

The wamanis (or Apus) are known regionally as sacred mountains (cf. B. J. Isbell, 1978), while huacas refers to (more locally) revered elements in the landscape, like lakes, outcrops and hilltops. Saywas are stone monuments, ranging from simple piles to stunning pillars (see image 4). All are also territorial signs or boundary markers – that is if you know how to read them (cf. Dean, 2010). And converse with them.

For many Andeans today, as for their (pre-Columbian) ancestors, 'conversations' with nonhuman actors is part of how they make sense of their environment. The material world is

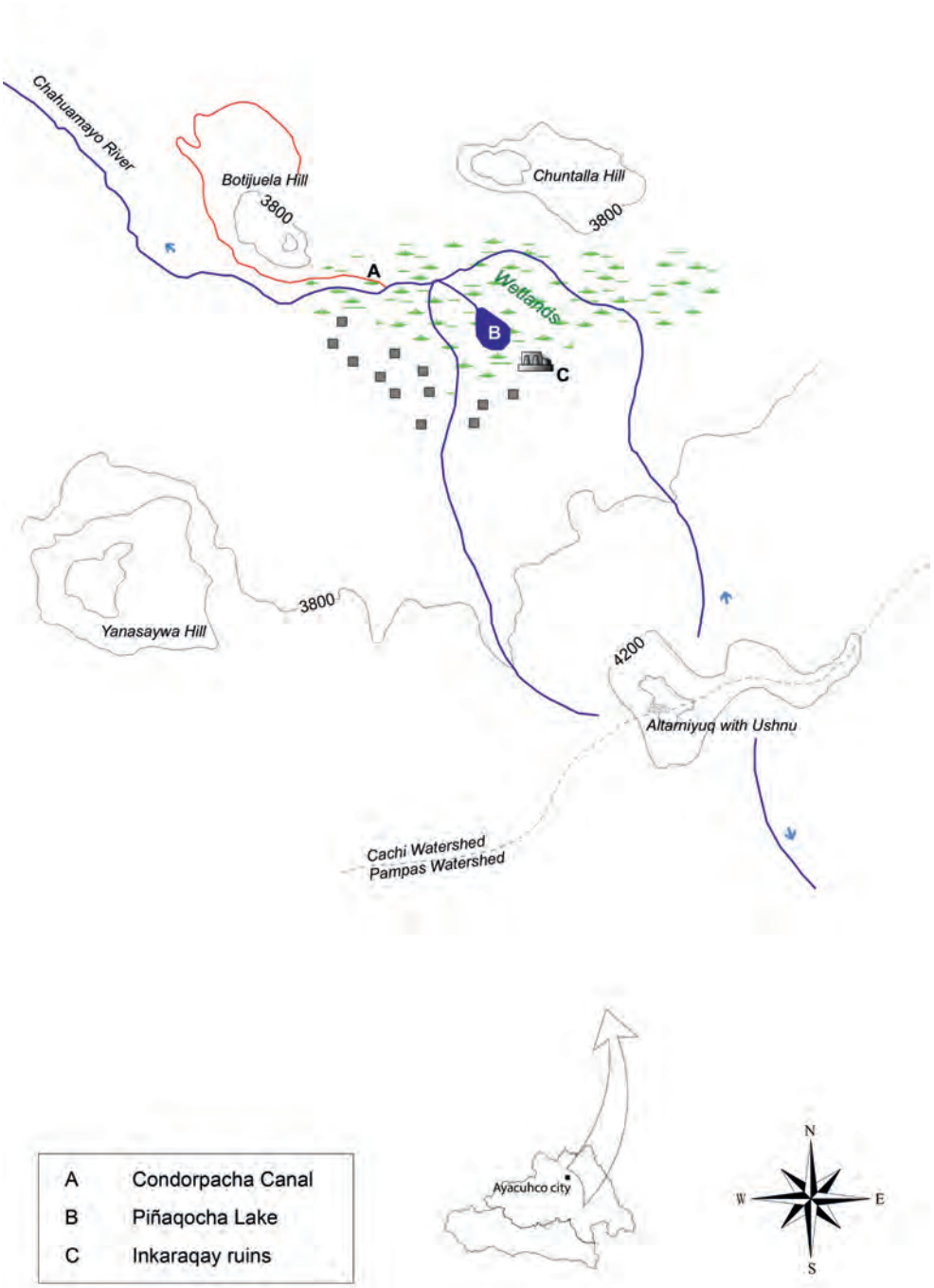
[86] Regardless, this landlord continued to invade and take fresh pasture. In response the community accepted and created a *cofradia*, as a territorial protection measure, on part of the purchased land. Cofradias are catholic associations of comuneros who allocate labour, land and cattle as service to the church (patron saint). During the 1970s the cofradias in Quispillacta were transformed into empresa comunal or communal enterprises. At the start of the PERC project in 1987 this empresa communal still existed in Cuchoquesera (see also Muñoz & Nuñez, 2006, p. 48).

"potentially alive and imbued with spirit [and] possesses a kind of personhood" (Allen, 2015, p. 24). In these cosmologies, humans are surrounded by animate beings, from mountains, lakes and water sources to seeds and mudbrick dwellings (ABA, 2014; Allen, 2015; Boelens, 2014). Rain and lightning are animate beings too (Staller, 2014, resp. see Stensrud, 2015). Each requires a certain amount of care and reverence as these beings, in their turn, take care of people.

The most powerful of these beings in the vicinity of the Cuchoquesera wetland area is the mountain wamani, Altarniyocc. On its summit there is a small *ushnu* platform that dates back to Inca times and served an important ritual function. According to families in Quispillacta, the personality of Altarniyocc was that of a mediator and it was intricately connected to the wetlands below[87] and the small Piñacocha Lake in it. This lake had its own, perennial, spring. Other streams that run through the Cuchoquesera area originate on the slopes of Altarniyocc, including the Chahuamayo stream, which runs on the south side of the two hilltop huacas of Chuntalla and Botijuela. The area between the hills and the stream is of free access, not only to members of Quispillacta who purchased the land, but also for certain pastoralist families of Putacca, a neighboring community. More so, during the period between December and April, basically the rainy season, this Chahuamayo stream acted as the border between communities, as it forms a natural barrier. After that period, the latter families were allowed to cross the stream, but not venture too far into the wetlands. How far is only known to the pastoralists of both Putacca and Cuchoquesera, and varied depending on time and lushness of the *bofedal*.[88] A third community, Condorpaccha used the water from Piñacocha to irrigate. For this, it had constructed an intake within Cuchoquesera territory in the Chahuamayo stream, between the two hilltops (see map 9). The five-year-old boy knew this intake structure well and played here frequently. During his childhood, the canal that emanated from it was too huge to jump across. People from Condorpaccha and Putacca often came to Cuchoquesera for work details or watering cattle and they exchanged drinks and food. For the PERC project engineers, this fluid territoriality, which is still present in other places (chapters 3 and 6), had to be fixed to be able to better negotiate and control it. Put differently, for design purposes, but also for compensation mechanisms, the engineers needed borders to be visible and indisputable. And mapped.

[87] It is highly unlikely that PERC engineers knew of this connection, despite the fact that their maps indicate the place as 'cerro husno'.

[88] There was a small stretch of land running parallel to the Piñacocha drain that was off limit to everyone and every animal. Here, only the bulls were allowed in the days around ploughing, to gain and recuperate strength. In September and October bulls at work could enter between 3 AM and 10 AM; in November these animals were allowed the entire day.



Map 9: Cuchoquesera wetland area

When analyzing the cases in this thesis, I consider that borders and boundaries, and thus territories, are 'in motion'. They are not fixed but fluid, and have to continuously be enacted by taking care of markers or sharing food and drinks in a particular way[89] (or for that matter by maintaining registers and title deeds). Fluidity is a term used to indicate that territory, but also access, is transitory, polymorph and multiple. While one can actually be physically present in the space that is Cuchoquesera, it means different things to different people because of people's connections to other actors and practices.

For those in Condorpaccha, Cuchoquesera was connected to irrigated crops; for the Putacca pastoralists, it was not. For the young agronomist, it was connected to development and water control; for the five-year-old boy, it was about growing up and water conviviality. One might say that Cuchoquesera does not depend on one defining feature, but on the existence of many actors and activities that are partially connected (the substance water or rock connected to sacredness or geological maps; to sightlines, H_2O or animated beings; connected to shamans, farmers or engineers – bringing multiple water worlds into being).[90]

In the end, the lived local boundaries submerged below the water table, as the PERC engineers forced stability on paper: once the potential water volume to be stored was determined and the place of the dam components set, the area loss for each community could and needed to be quantified: 393 hectares had now belonged to the community of Quispillacta; Putacca and Condorpacha lost 28 and 9 hectares respectively (Huayhualla et al., 2010). Areas that incidentally did not correspond to any municipal border registered.

5.3. Constructing a modern temple

Some techno-scientific challenges

The Cuchoquesera dam was the last of several major hydraulic works of the PERC project, which included three river diversions, a main irrigation canal and a domestic supply canal, a huge siphon, and a tunnel, Ichocruz-Chiara, of seven kilometers that connected the downstream city of Huamanga to the Cachi headwaters. Map 8 is a sketch of the PERC project, the hydraulic works and other important points and technoscientific networks; map 10 is a detail of the dam site. This section discusses that site, 'Presa Cuchoquesera' or the Cuchoquesera Dam, a feat of engineering that took 15 years to complete. For it was in March of 2002 that PERC's 'modern

[89] One example is the annual (ritual) practice of "lindraje" which is a festivity that involves tracking and parading community boundaries and markers to reaffirm identity and territory (cf. Radcliffe, 1990; Verzijl, 2007).

[90] Here I borrow from Law and Mol's (2001) discussion of spatialities and their inspiring notion of fluid space (see also section 3.4). Although 'fluid' used here differs somewhat from their conceptualization, I draw on their insights that entities are performed/defined in different spaces: in Euclidian space, defined geodetically; in network space, defined by actor association. At the same time it is fluid (defined polymorphically and intermittently) (see also Ingold, 2011, p. 86).

temple' was inaugurated[91] as part of a regional development scheme. But let's look back. To start, let's consider two things both essential and evident for construction and operation: the available water volume to be stored and the location of the dam. Both seem straightforward, but for techno-scientific hydraulic projects, they are quite complex.

Sources and surveys

By their own reports, PERC engineers stated that modern hydraulic projects are "required to rigorously define the water sources and their quantification" (PERC, 2005, p. 4), because exact data facilitates water control and informs about potential water storage. However, there were no rain or stream gauging stations in these headwaters prior to the project.[92] In earlier PERC feasibility studies, estimates were made by extrapolating (rain and runoff) from other 'comparable' watersheds. Yet, rain and runoff are highly variable and changeable in mountainous areas. It can rain in one place, but as soon as you a clear a ridge, or if you simply move uphill, it might be dry. More accurate, more local information was crucial.

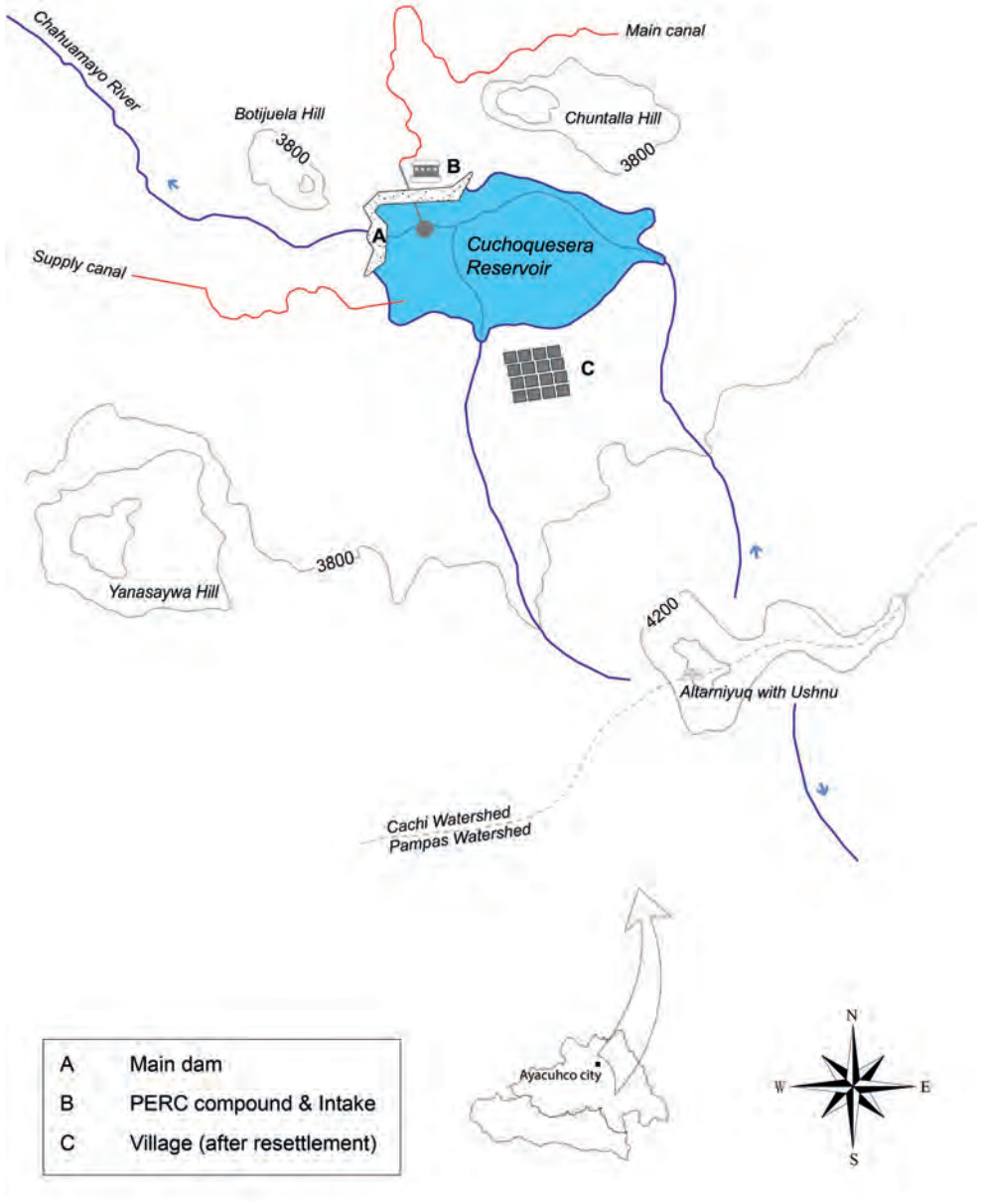
Therefore, in 1988, PERC engineers created their 'hydro-meteorological network'. They placed a dozen gauging stations at different locations to monitor precipitation in and runoff out of the different micro-watersheds of the project catchment. They also gathered meteorological data, like barometric pressure, wind and temperature. In their analysis, engineers included stations outside of the project area as well, because these had multi-year series predating the PERC stations by at least 20 years. But also, because climate and rainfall patterns in adjacent places and watersheds have an influence on the project catchment area. For that sake, they considered meteorological stations in, among others, the municipalities of Vilcashuaman and Quinua[93] (PERC, 2005, p. 33; see map 8). With this information, the potential water volume and capacity of the reservoir were calculated: 80 MMC (of course in this decision cost-benefit and other analyses were considered as well).

With the reservoir capacity fixed, a second techno-scientific challenge the engineers faced was the location of the dam. For to determine the precise placement of the dam – to know the position of each section and stone, in relation to, let's say, the entrance of a tunnel many kilometers away – was and remains and engineering challenge. Rugged topography and the curve of the Earth make Euclidian positioning complicated. That is why the PERC engineers' first step of hydraulic construction was to establish a grid of geodetic control points (Huayhualla et al., 2010).

[91] Due to technical procedure and social protest, it took another seven years to fill to its maximum capacity of 80 MMC in 2009 (22 years after the project started).

[92] Except one; a weather station existed in Alpachaca, where the regional university had an experimental farm (see also Gianotten & de Wit, 1983)

[93] These were two municipal towns that were important pre-Columbian administrative and ritual centres. Quinua was the center of the Wari culture (see section 3.1, box 3). Vilcashuaman was an Inca administrative station connecting Cusco and the coast in Tambo Colorado (Pukawasi), near the present-day city of Pisco. It functioned like a provincial capital of the Inca empire and collected (labour) tribute from the peoples in the Pampas and Cachi watersheds.



Map 10: Cuchoquesera dam site

Such points, which land surveyors call monumented markers in the landscape, are often pillars or metal plaques on or in a concrete block and serve as three-dimensional reference points in Euclidian space; exact coordinates from which maps and building plans and hydraulic public works are developed and constructed (see also Kuang, 1996). A classic geodesy problem, which I have been told also occurred with the longest tunnel in PERC (called Chiara-Ichocruz), is that construction begins on both sides and tunnel diggers don't meet halfway. To prevent this, control points are needed, which are connected by imaginary lines used to calculate horizontal and vertical positions of other elements in the environment relative to it.

In modern science, geodesy is the practice of measuring "the figure of the earth and the interrelation of selected points on its surface" (Smith, 1997, p. 2). A hierarchical division exists among these points, of different orders. First-order points are determined at a supra-national scale, calculated with the most accuracy and defined in relation to each other. There are second, third and fourth-order points in an area. These are connected to each other and also to a first-order point. Typically, each nation has an institute that manages a national geodesy network. In Peru, this is the Instituto Geográfico Nacional, which defines and registers these control points. It is likely that the geodetic control points of the PERC project were determined using earth-based surveying tools, not with GPS techniques. And that these were probably third-order control points (or lower) that connect to each other and hierarchically higher points in the wider region. Near Cuchoquesera, two control points could be found in between the hilltops of Botijuela and Chuntalla (see map 10). In relation to these points, the location of the dam, outlet and spillway structures were calculated.

Image 5: Cuchoquesera reservoir

A) main dam; B) right wing dam; C) left wing dam; D) Cuchoquesera village; E) PERC compound. Source: Oseas Nuñez

Shape, fill and seepage

With both capacity and positioning fixed, the construction phase could begin; and it did in 1999. Presa Cuchoquesera would come to consists of a main dam (with a crest length of 430 meters and a maximum height from foundation to crest of 46 meters) and two wing dams[94] (see image 5). It was created by forming a trapezoid-shaped mound that runs the course of the crest length. These dams consisted of different fills of permeable rock and soil types to support an impervious core.

Civil engineers classify this as an embankment dam, where the weight of the construction material counters the force of water pressing on it. Embankment dams are the most common large dams because of geological and economic advantages: They can be created in areas, like Cuchoquesera, with alluvial and pervious (peat or bofedal) foundations, whereas other (concrete) dams require hard rock foundations. Also, embankment dams are more cost-effective if the required construction material is close by (cf. Kutzner, 1997). Depending on sand and gravel material, embankment dams are categorized into two main categories of earth-fill and rock-fill dams. The choice mostly depends on the quality of material and distance to the quarry.

In the case of Cuchoquesera, a mixed dam was created of both rock and earth-fill. Six different excavations sites were used. Some near the dam, at the foot of the Botijuela Hill. Here rocks were quarried, roughly between 0,4 and 0,6 meter in diameter. Some of the finer earth fill was brought in from a place called Rosaspata, a nearly 20-kilometer journey. The finest material, Portland cement, for the concrete of the outlet structure and other works, came from Lima (PERC, 2005). In the end, the trapezoid mound - the cross-section of the dam – consists of four layers, called shells, of different soil types and rock layers. These shells have a drainage function and assure dam stability and protection of the impervious core.

As a final point, the seepage flow put PERC engineers to the test. Due to the marshy underground of mixed alluvial and peat material, the foundation was compromised. There was a risk water would surface at the downstream slope of the main and wing dams, or worse, cause internal erosion. Two preventive measures were taken. First, an area of almost 40 hectares at the foot of the upstream slope of the dam was concretized and made impermeable in order to prevent infiltration. Secondly, along the downstream slope over 60 relief wells were created. These wells are ducts or tubes that go into the earth through which water can be removed from the watery underground in order to control the water table.

Infiltration and seepage processes of reservoir water were not desired by the PERC engineers. In their perspective, it is a sign of water loss and of inefficiency. In this case it leads to instability as well. More so, (under)groundwater is less reliable and manageable, more unruly and wild. It is finally important to note that this engineer perspective implies a downward gaze from the dam and reservoir site. From here down, water can be allocated and distributed. In Peru, engineers

[94] Left wing dam with a crest length of 300 meters and maximum height of 32; right wing dam with a length of 1300 meters and height of 25,5 meters.

refer to this as '*el sistema regulado'* – the regulated, or controlled system. The focus lies on where water is going – instead of an upward gaze to the environment where wild (capricious and generous) water comes from, which is hence dubbed el sistema no regulado or the uncontrolled system.

It is obvious that this section has greatly simplified a complicated and dangerous work of engineering.[95] Indeed, several construction workers died on-site. According to PERC communication this was when, due to a technical mishap, part of the rock-fill embankment crushed into the Chahuamayo stream. It is not, however, my aim to give a detailed description of 15 years of design and implementation, of setbacks and victories. I have not touched upon the geotechnical analysis, nor the fact that several temporary, and smaller, dikes and diversion canals were created to make construction possible. Instead, this section is meant to give some insight into how the PERC engineers enacted this particular environment; through hydrometeorological networks, geodetic points, sand and stone construction material and seepage loss. I presented some of their less visible networks and very visible objects. And yet, the appearance of a large dam still somewhat surprised Cuchoquesera families. It is to their reality that I now turn, to how they enact and deal with their environment: one in which water and stones are not just resources to be stored or quarried but, first of all, animate beings or earthly spirits that protect, but can also punish (ABA, 2014; Boelens, 2014; de la Cadena, 2015; Williams & Nash, 2006). Families in Cuchoquesera converse or communicate with these beings, like water and stone, that are said to also dialogue among themselves (Dean, 2010, p. 1; McEwan, 2014, p. 37). That stone and water took half a dozen lives is something that underlines this and is not explained by shear-stress or gravity.

To describe the creation of a modern temple, I began with how water *sources* are known, followed by geodetic *surveying* to determine its location, how it is built through *shape and fill* and ended with controlling *seepage*. In describing the raising of sacred space, however, it is best to start with the concept of *seepage* followed by the ushnu *shape and fill* and the practices to make sense of water *sources*. After this, I discuss *surveying* and mapping of space through sightlines.

5.4. Enacting a sacred space
Some other-than-human encounters

The Cuchoquesera wetland (bofedal in Spanish, or *lliwa* in Quechua), was and continues to be part of a lived space that includes four hilltops, temporal ponds, and a mystic trapezoid platform that connects rain and faraway mountain beings to underground flows and downstream

[95] It was based on the techno-scientific notions of control over nature and user efficiency (Scott, 2006b; see also chapter 2). Normally multipurpose development schemes, such as PERC, are propagated by strong state-level expert agencies and are linked to progress and modernity. They would promote inclusion and participation only and always when they coincided with prevailing irrigation paradigms and dominant social and cultural values. For example, the FAO classification of soils, used by the PERC project, identifies the areas suitable for irrigation, but this did not include the communities and user groups in the Andean puna.

farmsteads.[96] This section discusses a sacred space in Cuchoquesera, a feat of ritual and cognizant mapping, centuries old. For it was in the 15th century that the ushnu platform was created, as part of a venerated scheme. To start, I consider two things, ostensibly inconsequential, but instrumental for understanding sacred space: the fountain of Chalabamba and the lakeside ruins of Inkaraqay. Both were part of the five-year-old boy's playground in 1987.

Seepage, shape and fill

According to Andean cosmologies, water originates in Mama Qocha (Mother Lake). This can refer to the ocean as well as a large highland water body[97] (see also Boelens, 2014; Dean, 2011). Through underground channels, water circulates (and finds its way) back to Mama Qocha. The "watery interior" beneath the earth (Allen, 2014) is known as Uku Pacha: the world of the ancestors below (or within) the earth. Kay Pacha is the world of people and other-than-human beings. Thus, places where water percolates, or seeps, into the (under) ground, like bogs and wetland puddles, or where "water breaks through the surface of the earth" (ibid., p. 75), like springs, are revered and should be carefully dealt with.

When the five-year-old boy played near the Chalabamba natural fountain (see section 5.1), the jettisoned water worried the boy's mother because of this connection to Uku Pacha and because of the moods that water coming from it might have. This water can cause diseases. The short anecdote on the Chalabamba source illustrates that the connection to Uku Pacha is alive in Andean communities. Wetlands (bofedales or illwa), such as those in Cuchoquesera, where water both surfaces and seeps into the earth, are places of special significance,[98] a connection between worlds.

This connection relates to the concept of the *ushnu*, described by anthropologist Tom Zuidema (1989, 2014). In ritual practice, he says, the ushnu is a "duct or conduit leading into the body of the earth" to convey liquid libations and burnt essences "that were led away by water" (2014, p. 6). The ushnu was part of important architectural structures, centrally located in Cusco, the Inca capital, as well as in other important cities, like Vilcashuaman. However, during fieldwork in the Pampas watershed, Zuidema consulted various actors about the ushnu who responded that it was also just a "place where water is sucked into the ground" (see also Zuidema

[96] In map 9 a sketch is presented of the wetland area with natural features and other important markers, map 11 offers a regional view of sightlines and mountain beings.

[97] Large highland lakes are often associated with origin myths. The Inca peoples came from the Titicaca Lake. The *paqarina* or place of origin for peoples in the Pampas and Cachi watersheds was Choclococha Lake (see also chapter 6 and 7).

[98] In 2007, when I did fieldwork in the Cusco area, the meaning of the word 'Qosqo' (=Cusco) was explained to me as an onomatopoeia. Qosqo is the sound that can be heard when a person walks on swampy or boggy terrain – when you plant your foot and lift it. Cusco, in the headwaters of the Huatanay watershed, used to be a wetland area. This would suggest that the Inca's built their capital on a terrain which had a connection with the watery inner world of ancestors and a connection to the Titicaca Lake, the place of the Inca creation myth.

& Quispe, 1968).[99] Seepage and places where water seeps into the ground, or so it seems, is something appreciated in Andean cosmologies.

This can still be observed. Since the 1990s, community members of Quispillacta raised dozens of small ponds and lakes in the headwater wetlands above Cuchoquesera for the purpose of "seepage" or permeation. This crianza de agua*,* as it is called (or the nurturing of water beings) implies to care for, converse and dance with water as an active member of the community. A relation of mutual care is enacted wherein water is allowed to seep into the earth and connect to other lakes and springs as part of a convivial environment (ABA, 1998; Gerbrandy & Hoogendam, 1998; Wilson & Inkster, 2018).

The importance of ushnu ritual practice in Incan times on the one hand, and the inconspicuousness of a 'duct in the ground' on the other hand, led early chroniclers, so says Zuidema (2014, p. 6), to instead associate the ushnu to other, more visible, elements.[100] Today, the ushnu is more commonly known as a stepped, trapezoid platform, located in Inca administrative centers[101] or scattered across the Andean puna*,* where they also acted as boundary markers (Meddens, 2014). One of these platforms exists on top of the mountain Altarniyocc, which on state topographical maps appears as 'Cerro Husno'. Local families know the platform also as Limaqawarina – place to look at (and converse with) Lima.[102]

Five kilometers away the ushnu, Inkaraqay is the old stone ruin on the shores of Piñacocha.[103] It formed part of the five-year-old boy's playground but used to be the seat of Inca nobility and included baths and drainage canals (Meddens, Branch, Vivanco, Riddiford, & Kemp, 2008). Most of the structures now lie below the water surface of the new reservoir,[104] yet these ruins hint at the significance of the Cuchoquesera wetland area. A link with Altarniyocc is still maintained today. To reach its summit from the Inkaraqay ruins and the present-day village of Cuchoquesera is a two-and-a-half-hour walk, mostly on *caminos de herradura* –trails or bridleways – created by

[99] Others refer to the ushnu as a ritual site in the Andean puna. A small hole, shaft or chamber covered by a flat stone that is opened once a year during the herranza*;* the ritual branding of camelids or cattle (Delgado de Thays, 1965 in Zuidema, 2014; Escalante & Valderrama, 2014; see also section 6.2). In contemporary Andean culture, says Zuidema (2014, p. 5), the concept of ushnu is used as "a connection to the underworld mostly by means of water".

[100] For example, the flat stone that covered the duct was interpreted as an altar and became known as ushnu.

[101] The most famous ushnu-platform is the step pyramid in Vilcashuaman, in the Pampas watershed, further downstream from Quispillacta.

[102] You can obviously not see Lima, over 300 kilometres away. But it indicates a spirituality and sense of connection that Zuidema (2014) also describes. He refers to a hilltop, where Tanta Carhua was enshrined. When people wanted to consult this woman oracle, they either visited her - or conversed with her from distant hilltops by looking into the direction of Tanta Carhua's shrine.

[103] People in Cuchoquesera say that it is possible that Piñacocha was part artificial as it had hewn stones on the sides and bottom.

[104] The foundations of one building can still be seen, yet most stones were *moved* to build the village primary school in the 1990s. The complex measured 300 meters across.

passing cows and sheep.[105] After passing some patches of Eucalyptus trees, the puna grasslands are revealed. During the walk partridges and *llejles*[106] can be seen. According to local families, these two bird species accompany the cows and sheep, respectively and share a spiritual connection with them. Moving further uphill, the ichu grasses get taller. Wind makes them sing. Occasionally a heap of rocks is found next to the trail. These *apachetas* are small shrines of piled-up stones (also known as cairns), created by traveling pastoralists to ask Altarniyocc for safe passing or protection of herd (B. J. Isbell, 1978, p. 59).[107]

On the top, at 4285 m.a.s.l., the trapezoid structure is revealed. The ushnu platform measures 20x8 meters, with 1,2 meters high stone walls that incline slightly inwards. It is located on a rectangular foundation that measures 35x25 meters. The short sidewall runs in a SE-NW direction. The stepped opening that leads to the top of the platform is located at the longwall such that you enter from the south-east. On the platform, a duct can be identified that leads into the earth where offering and libation rituals were performed.

An unfortunate incident gives some insight into the ushnu fill. In September of 2016 vandalism, of most likely local inhabitants left a large hole in the platform (see image 6). Separate chambers can be identified as well as interior rock walls, carved stone and exogenous soil types. According to those that observed the hole, the darker soil is not local, more readily found near riverbeds and somehow transported from far away up the mountain by the builders.

Image 6: Ushnu on Altarniyocc

Left) Ushnu platform on Altarniyocc; right) desecration of the ushnu showing its interior. Source: Oseas Nuñez

[105] Some families in Cuchoquesera also have horses, but no more than two. It is interesting to note that to guarantee their futures - and wellbeing of their pastures, wetlands – the community *asamblea*, in 2008, put a restriction on family herds. Each was allowed a maximum of 95 sheep; 25 cows and 2 horses (see also chapter 6 on similar community herd policy).

[106] A local bird species of which I do not know the English and Spanish name, here written down phonetically.

[107] They seem randomly placed, but if you know how to read these shrines you can note changes in the adjacent landscape like a dry riverbed or a change of surface with more sharp rocks and fissures below the ichu. In fact, closer to the summit, the environment becomes more treacherous; to the point cows can no longer graze.

The earth and rock-fill of the ushnu found in Altarniyocc seems to concur with other findings (Branch et al., 2014) and studies that discuss the transport of stone, sand and soil in Incan times. Here ushnu excavations show fills of carefully constructed layers of different materials and grain sizes from fine sand to pebbles (ibid.). Denise Ogburn (2014) suggests that the movement of materials embodies the intricate relation between (ritual) sites. As she points out, there was no economic reason to haul soil and rocks from afar. Hence these were not considered resources, like the Cuchoquesera dam fill, but materialities purposely brought together to forge a physical and symbolic alliance or bond with distant elsewheres[108]. In other words, fill, shape and site enacted a sacred space for worship of ancestors, waters beneath the earth and the mountain beings (wamanis) (Branch et al., 2014, p. 115).

Sources and surveys

The families in Cuchoquesera, I was told, although considering Altarniyocc sacred, were aware of the ushnu interior and its materials brought from elsewhere.[109] However, the idea of moving elements is not strange to them or Andean peoples. Denise Ogburn (2014, p. 97) also suggests the movement of water: people take a sample from a revered spring and pour it (and its being) into a new location.[110] (see also Ferreira, 2014). This mirrors contemporary practices in Cuchoquesera and Quispillacta. During the ritual of 'Paraqipiy', water and aquatic plants are carried, accompanied by music, from the lakes and bofedales in the puna to where water is needed. This might be community chacras or fields, but also a spring that ran dry. The concept behind it is that water invites other water (or rain). For many in Andean communities, aquatic plants, saturated peat, wet soil spots, damp rocks and dew on grass are all connected to one water being. Water, they say, has its *ayllu* – its kin or relationships of dependency and reciprocity (ABA, 2014; Muñoz & Nuñez, 2007). These aquatic plants used to be found in and near the Piñacocha Lake and the Chalabamba fountain in the Cuchoquesera wetland, as Quispillactinos worked to care for their water sources.

According to community members of Quispillacta, and also Condorpacha and Putacca, a bull lives underneath Piñacocha (the ferocious lake) kept in golden chains – not *in* the lake below the

[108] Relatedly, Boelens (2014) mentions Incas would bring sea sand to Cusco to symbolize mastering of the universe and simultaneously *bind* and control other groups and ethnicities.

[109] Although the idea that valuables might be hidden insight the ushnu seemed to have motivated some community inhabitants who desecrated the site; it might be that the recent academic attention regarding ushnus, and the visits of foreign researchers, maybe a factor. Regardless, it was considered a communal offense.

[110] The idea of moving water is observed by others as well. For example, Rutgerd Boelens (2015, p.102) writes about rituals that make water angry and ferocious as to make it rain: Water "from different sources is mixed in one river or lake. The reaction – the fury of water from the land and the sky – can be violent. In other rites, they 'exchange' Apus' male water from mountain springs with Pachamama's female water from lakes on the plains. (For a description of the latter see also Gerbrandy and Hoogendam, 1998; see also Ferreira, 2014).

water surface, but *underneath* the lake and the boundary of water and earth.[111] This bull needs to be contained, and there are four mountain beings charged with that task. We mentioned the two closest hilltops of Botijuela and Chuntalla located just to the north of the Cuchoquesera wetland. These are two, in this case female, huacas and used in the annual ritual practice of *herranza* or livestock branding.[112] A third hilltop, Jotolligua flanks the south-west of the Cuchoquesera wetland area and is a male spirit. Altarniyocc is the final mountain-being, and considered more revered and feared by pastoralists than the hilltop huacas. It is Altarniyocc who drew the constant gaze of the bull underneath the Piñacocha Lake. The animal fixed upon it (ABA, 1998, p. 91).

The sacredness of Altarniyocc is related to its height, distance and location in wild (*sayqa*) and treacherous terrain. Most importantly: Altarniyocc can converse with the regionally renowned Apus, the (once) snow-capped peaks and the most powerful of earth beings (Escalante & Valderrama, 2014; B. J. Isbell, 1978), who control, protect and punish. And who influence other nonhuman beings like rain (Choque & Pizarro, 2013, p. 58; see also Stensrud, 2015). According to families in Cuchoquesera, rain normally lives in the selva [or amazon basin]. It journeys to their lands, has its specific routes (ABA, 2014; Muñoz & Nuñez, 2007) and returns when lighting arrives in the afternoon (ABA, 1998, p. 30). During the festivities of *Yarqa Aspiy*, the ritual practice of irrigation canal cleaning, rain is present in the personification of the *Chunchu.* This is a red-painted creature with antlers that carries a bow-and-arrow and lives in the selva (see Muñoz & Nuñez, 2007).

From the ushnu platform, one can observe the selva as well as the movement of clouds and rain, which, for example, decided sowing dates in the past. It offers a 360-degree visibility of the region (see also Moralejo & Gobbo, 2015). A rugged mountainous skyline forms a horizon of markers, which must have had some calendrical function as the sun moved along it, rising and setting over different peaks as the year goes on.[113] This place itself was, and is, an important marker of boundaries and (tacit) agreements. Streams originate here and flow in different directions; it is located on the 'divortium aquarum' (that is the imaginary line that separates the watersheds of Cachi and Pampas) and is a border triangle of communities (and districts).[114]

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[111] In his novel 'Rios profundos', Jose Maria Arguedas (2002) mentions a bull living underneath a lake, it is an element of the circulation of water in Andean cosmologies (see also section 3.2); that represents the watery Uku Pacha (the world below or within the earth). See also Boelens (2014) for a discussion of the Andean hydro-cosmological cycle.

[112] During this ritual practice the new cows and sheep of a family are marked. Each family has a defining sign that is cut in the ear of their animals to make identification possible (see also chapter 6). The ear pieces are collected and ceremonially taken to the hilltops where these signs are offered to the huacas for well-being of the herd and for continued protection. Botejuela cares for the sheep, Chuntalla for the cows. This ritual coincides the time that bulls needed for ploughing were allowed on the exclusive patch of wetland to gain strength.

[113] Zuidema discussed how in Cusco 41 radial lines marked rising and setting points of celestial bodies on the horizon –these ceque lines had a calendar function and were linked to the origin of water sources (see for example Zuidema, 1978). See also Turnbull (2000) on the Hopi horizon calendar.

[114] Through the ushnu, it is also the boundary between this world (Kay Pacha) and the world below (Uku Pacha). Given its location 'on top of the world', the ushnu can be considered also the boundary with the world

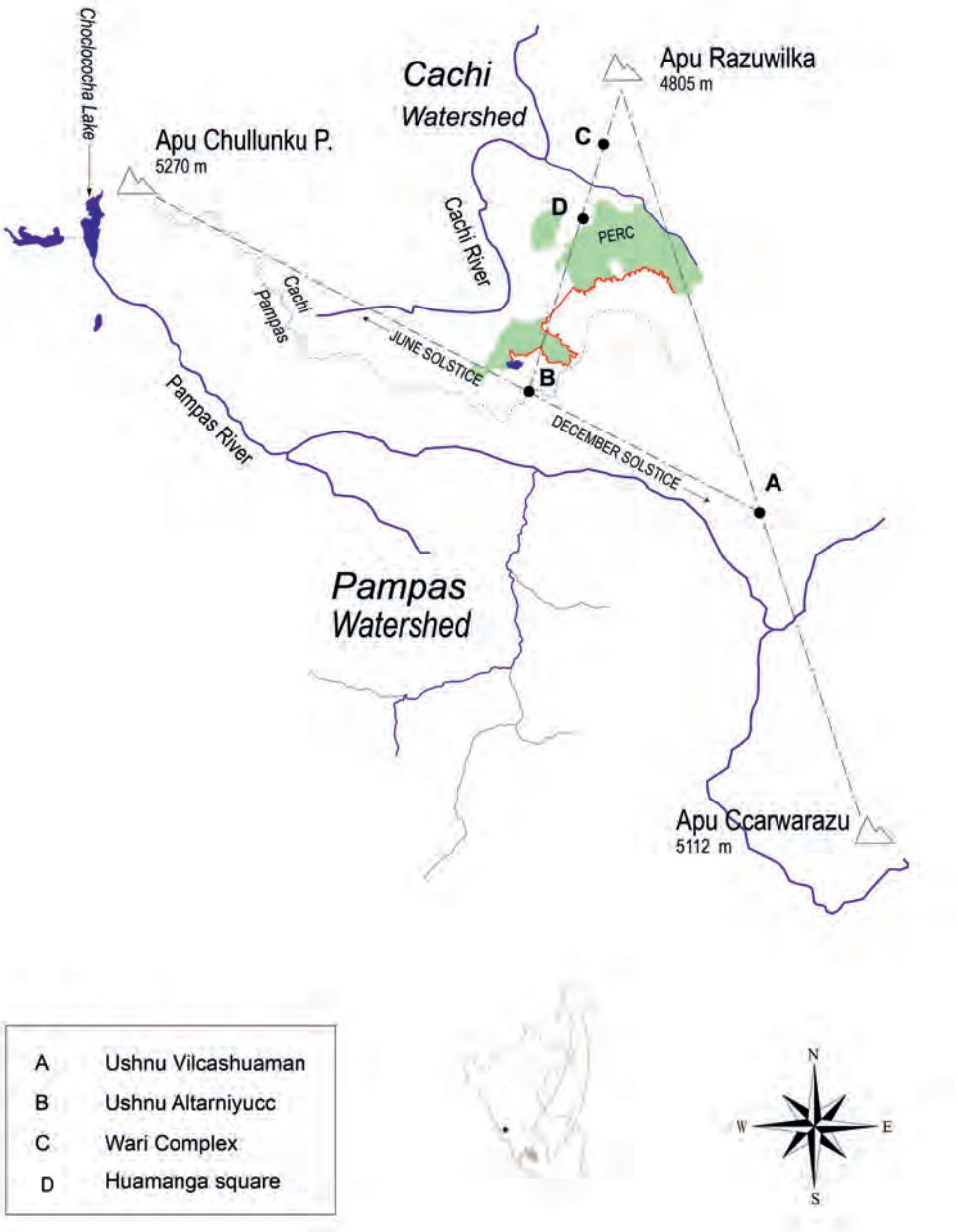
The platform is still visited by local shamans (yachaqs) who come here to converse with and make offers to the Apus and other animated beings. Altarniyocc resides over the subordinate huacas - and many more local, natural and humanmade, markers and saywas.[115] From here also, different (snow-capped) Apus, the most powerful beings, can be observed or 'looked at'. I mention the three most famous: Apu Razuwilka to the north, Apu Carwarazu to the south and the Apu Chullunku Patara which stands guard over the large Choclococha Lake to the north-east. Apus or wamani have strong personalities. Altarniyocc's personality of mediator or diplomat is because it mediates between these Apus and facilitates between them and the huacas it resides over.

Archaeologist Collin McEwan (2014, p. 39) presents a hierarchy of different order relational lines from and among Apus, prominent mountains like Altarniyocc, and down to huacas and settlements; a hierarchy that was more lived in Incan times than it is today when connections among earth-beings were "brought to life by seasonal pilgrimages to and from revered sanctuaries, and [...] prominent mountains lying beyond the limits of everyday experience" (ibid., p. 30). In these pilgrimages, participators walked in a straight line from a point of origin towards a place of worship, guided by well-marked monuments (huacas, saywas) along the way. Implicit, says McEwan, "is what in surveying parlance is conventionally described as a foresight and a backsight -the line of sight looking outwards towards a given place complemented by the reciprocal view looking back towards" towards the point of origin (ibid., p. 37). These lines and markers were an important instrument of Inca political and ritual organization and were linked to astronomical events.

Based on local testimonies, GIS tools and ushnu scholars (McEwan, 2014; Meddens, 2014; Moralejo & Gobbo, 2015; Pino, 2005), it is possible to infer a possible grand venerated scheme that ran, and in ways still does, through Cuchoquesera: The Inca administrative and ceremonial center of Vilcashuaman is itself located on the line that connects the Apus Razuwilka and Carwarazu. From here a straight line connects Vilcashuaman with the Apu Chullunku Patara; guardian of Chocolococha, a Mother Lake and paqarina (place of origin) of many ethnicities in Ayacucho and Huancavelica. This line goes straight through Altarniyocc, guardian of Piñacocha, with the opening of the ushnu platform aligned to its path (foresight). It coincides with the June solstice sunset (see also Pino 2005). In other words, on the shortest day of the year, one would see the sun go down in the exact direction of Apu Chullunku Patara. From Altarniyocc looking back, the sunrise of the December solstice is in the exact direction of Vilcashuaman on the longest day (see map 11).

above, or Hanaq Pacha; the world of rainbows and the river in the sky (milky way) (see Boelens, 2014). However, in the worldviews of Quispillacta families the concept of Hanaq Pacha does not play a major role.

[115] Additionally, sightlines existed with at least three other ushnu platforms at lower altitudes, in the Pampas and Cachi watershed (see also Branch et al., 2014). Zuidema (2014), in his discussion on the ushnu concept suggests that people communicate with ushnus from distant positions had they not the opportunity to visit directly, bearing a line of sight.



Map 11: Sightlines from Altarniyocc

Zuidema (2008) discusses ritual movements and pilgrimages in Incan times related to the solstices. In a nutshell, from Cusco ritual performers (priests) walked in a straight path through the mountains (along the line of the June solstice sunset) to the Vilcanota temple and the source of the Vilcanota river, while Inca rulers observed the June Solstice from a palace North of Cusco. After the solstice, the priests went back following the river course. The author suggests the meaning (or better, the aim of the practice) of the latter was to bring back water, for the start of the upcoming irrigation season (see also McEwan, 2014). It is possible something similar could have happened in the Pampas watershed (see also Pino, 2005, p. 143). From Vilcashuaman, ritual performers walked in a straight-line to Apu Chullunku, guided by Altarniyocc and other markers. They then followed the course of the Pampas river back, bringing back water – walking alongside and with water to the place where its care was needed. The rulers of Vilcashuaman possibly traveled to the Altarniyocc ushnu and Inkaraqay to watch the June solstice sunset. Moreover, Choclococha Lake, as Mama Qocha and place where water originates, also stood in contact through the watery world below, with the wetlands and springs, like Cuchoquesera and Piñacocha, that were vital for upcoming irrigation.

Today no such pilgrimages (of such extension) are done in the area, but I did observe, during the ritual of *Yarqa Aspiy*, that people walk in procession to their water sources one way, stopping at various established points to sing, drink and dance (see also Choque & Pizarro, 2013, p. 58). They perform a ritual at the water source and then follow the water (through natural and canal courses) back to their fields – as if bringing back the water (Muñoz & Nuñez, 2007; Vera Delgado, 2011). These and other practices of Paraqipiy and Herranza, and many more continue to re-enact a sacred space in Cuchoquesera. But it is a space under pressure.

It is obvious that I have greatly simplified a complicated, and intuitive, enactment of a revered waterworld. Many Quispillactinos nurture a deeply emotional relation to their chacras and the significance of water in everyday agricultural practices.[116] I do not aim in this chapter to give a detailed description of a lifelong intimacy of living with water, of setbacks and memorable moments. I have not touched upon the celebratory aspect of ritual practices, nor that individual irrigation practices are interwoven with the sharing of food and drinks with water beings. Instead, I wanted to give some insight into how community members and their ancestors enact and deal with this particular environment; through venerated networks, monumented markers, soil and stone as bond-creating material and significance of seepage. I presented some of their invisible connections and very visible objects, which were still mostly overlooked by PERC engineers.

It is to the entanglements of these two water worlds that I now turn, to how different practices, technologies and stories of water and stone that make up a scared space and a modern temple interact, frustrate and collide but also enable. In the next section, I show how that reshaped the community. And the PERC project as well. For that, I consider again the young agronomist and the five-year-old boy, who both were crucial spokespersons.

[116] It was based on notions of mutual care, liveable places and the farm with the aim of producing abundance, or rather, sufficiency. This has been resumed and revitalized in times of water insecurity, due to climatic factors and demographic pressure, but also in response to the failures of modern development in the area (ABA, 2014); increasingly considered as a possible alternative path

5.5. Entanglements
On converging water worlds

The sacredness of Altarniyocc is unconditional for people in Quispillacta and Cuchoquesera but they are continuously reflecting on its status, prestige and position. Mountain beings, as well as water sources, are changeable that way, as is their personality and mood. Community members mention that the bull underneath the wetland, during the realization of PERC, turned away from Altarniyocc to face the opening between the hilltops of Botijuela and Chuntalla. Already in the 1990s, before the dam was even constructed, this concern (ABA 1998, p. 91) and fear of casualties was expressed. Should the bull storm off between the two females huacas, it would destroy the right-wing dam and the fields in the community of Putacca. Despite fear and dread of losing wetlands, the dam had appeared, materially and symbolically, in the community water world.[117] I will briefly discuss these and other entanglements.[118]

The young agronomist

Before working for the PERC project in 1987, the young agronomist was employed by COTESU, the Swiss Development Agency. By his account, these were formative years for him regarding views on development, punctuality and reliability. He worked in the area of Cuchoquesera-Quispillacta, promoting rural development and realizing small irrigation projects. The dirigentes of Quispillacta remember him as a trustworthy person. "He accompanied us", they said; not in the sense of intervening but rather 'walking together' to improve rural life and liveable environments. Then the civil war of the 1980s suspended COTESU activities (and also led to the creation of PERC).

The young agronomist was welcomed back in Cuchoquesera as a representative of the PERC project. He was firm in his belief that the multi-purpose hydraulic project would benefit the entire region. After a few months in which the project was properly set up, he became director of PERC's Community Development Office. He explained the project in Quispillacta, but emphasized not the large negative impact, only how this would generate work and come with local development projects.[119]

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[117] This shows that water worlds are not fixed or static, but dynamic. They are constantly becoming (chapter 3). It shows that the world (or environment or institution) is the context in which things happen and people practice in. It is not the background but rather that what is enacted through actors' doings (practices). So, dams are part of the community water world while community members are part of PERCs reality.

[118] The term entanglement (from Sharp, Routledge, Philo, & Paddison, 2000) is used to indicate the complex and messy ways through which practices of struggle and collaboration, of dominance and coexistence, intertwine, inhibit and enable different worlds (Law, 2009; Omura et al., 2019); of the five-year-old boy and the young agronomist.

[119] This was expressed by the dirigentes in the focus group. Also, during my interview with the agronomist in 2012 (in which he reflected, and consider just, the community struggle) he emphasized PERC contributions, not costs.

Much later, in a focus group discussion that I was part of, many dirigentes said they felt misled by the young agronomist and other officials. Some claim they were never told of a large dam, while one of them partly blamed himself and his peers, saying that the project to take water to the regional capital city of Huamanga was explained, but they believed it to be impossible. Notwithstanding, in the first years of PERC several development projects were realized in the community. And although the dirigentes had their reservations, the idea of *acompañamiento*, of working together, and re-affirm mutual commitment and trust, was maintained in their eyes. This changed in the early 1990s.

A new general director took over and civil engineers replaced the young agronomist as spokesperson on-site. According to PERC engineers, compensations and commitments were honored by now, so construction could now begin. The project would go on to employ 1,500 persons in canal construction. From this moment onwards, the dirigentes felt increasingly pressured by PERC engineers to conform to their plans and rules. A first threat was that the people from Quispillacta, should they continue to object, would be excluded from the (well paid) construction jobs to build the supply canals above and main canals below the reservoir that in part run through community lands. Quispillacta conformed and accepted this, but felt mutual commitment and trust was no longer present.

Once the exact location and volume of the dam and reservoir were determined, the amount of land that would submerge was calculated: over 420 hectares from which 393 were territory of Quispillacta. The dirigentes long opposed construction, went to Lima in protest, but to no avail. By now the young agronomist had left the PERC project. In the end, the community decided not to sell, but to donate their wetlands to PERC in 1998: a deliberated tactic to keep some sense of claim over their wetlands; since certain parts of donated land were still accessible for certain parts of the year when water levels drop. The act of donation stipulated the land transfer up to an altitude of 3735 m.a.s.l. (to store 80 MMC in the Cuchoquesera reservoir).

To make this visible in the area, small stone piles were created at that altitude to figure as boundary markers. These markers looked very much like the saywas (see image 4), which guided Quispillacta families about territory and its fluidity for generations. In this light, they saw the shrinking and expansion of the area submerged by reservoir water. When the water retreats, they can enter that area without denying the donation of it. In a way similar to the arrangement that existed with the neighboring community of Putacca and its access (rights) to the Cuchoquesera wetland (see section 5.2). Still, the entire situation about the donated land was about making do with a situation that was gradually forced on them. A situation that implied not just loss of wetlands, but of a deeper connection to a place where water seeps into the underground.

Instead of fluid access arrangements, PERC engineers stuck more to the idea of fixed borders and trespassing. Additionally, to the land donated by the community, a *borde libre*, a free edge, circumventing it had to be respected by law, and no one was allowed on it. PERC settled and partially compensated families for loss of assets (dwellings, fences, agricultural investments) in the donated part. In addition, the Project proposed using the quarries of the community to build the dam, which generated legal complaints (and some illicit compensation agreements) for being

outside the area of donation, but which, apparently, PERC already considered as part of their property.

A flexible and graceful approach on how to relate to the delimitation of land and the different understanding of boundaries became inconceivable when in 2005 a crucial flaw in the act of donation came to light: 3735 altitude line did not correspond to a volume of 80 MMC (which would be 3742 m.a.s.l.): as far as I know a fault of PERC officials while drafting the document in 1998. It was not until well after the dam inauguration – as it was gradually filled to check the dam's integrity – that this caused a clash. PERC engineers insisted on 80 MMC; for the community the 3735 line and existing boundary markers were legit and had to be honored. Either way, it increased the tension that was already high due to a lack of commitment on behalf of PERC to realize the agreed compensation projects for the use of communal stone quarries. By opposing to the new boundary of 3742 m.a.s.l. and the 80 MMC storage the community also found themselves confronted by irrigation and drinking water sectors in the region.

The five-year-old boy

The five-year-old boy was sent to the regional capital by the age of 12 to receive his education. He went on to study anthropology at the Huamanga University and founded, together with other students from Quispillacta, an NGO called proyecto KANA, in 2006 (see also chapter 3). Their work was about the formation of indigenous community leaders, working with traditional authorities and defending collective rights in relation to the ILO 169 Convention on Indigenous and Tribal Peoples. The PERC project and dam controversy were obvious focal points of the NGO. Around that time, the community prevented the filling of the reservoir above the level of the stone boundary markers.[120] The tension was discussed at the public hearing in 2008, where I was present and was introduced to Cuchoquesera for the first time. The hearing led to the formation of a mixed committee of community and government representatives, called COTEM (*comité técnica mixta*), that tried to resolve the dispute. The five-year-old, now a KANA professional supported by his community authorities, took part in it as a representative of Quispillacta.

The settling of the controversy was long, complex and frustrating. Early COTEM meetings were edgy and even slurred, but after a while, government representatives grew more sympathetic to the vision of Quispillacta; all under the supervision of the mediator Altarniyocc. A crucial moment occurred in 2010 when their hydrometeorological network told PERC that the availability of water in the Cachi basin was below their estimates and decreasing. Something that the families of Quispillacta who live with the springs in the puna had already discovered two

[120] The matter of past agreements and compensation projects, however, was still unresolved, and was made more problematic by the deactivation of the PERC project in 2007 when the different offices were incorporated under branches of the regional government. Regional government initially dismissed all agreements stating these should have been dealt with during construction. In response the community increasingly threatened to prevent the reservoir from being filled.

decades before. Since 1994, they had been collecting rainwater in artificially and carefully created lakes in the area above the PERC infrastructure, not knowing of the dam issues to come. During this process, they were accompanied by a second NGO, called Asociación Bartolomé Aripaylla (ABA), founded in 1991 by professionals from Quispillacta.

These practices of water care (crianza de agua) involved dancing and conversing with water as an other-than-human actor and allowing oneself to be cared for by it. More than a hundred lakes have been raised and nurtured this way, restoring the wet-lands and augmenting community springs. These practices, which Quispillacta members had learned from their ancestors, were reintroduced and reshaped. It caught the attention of regional engineers and national authorities, after 2010, who referred to such community practices as water harvesting (*siembra y cosecha de agua*). They showed interest in incorporating this community practice of securing water in their programs that identify additional sources and climate change adaption measures. Then, Quispillaqta, with the accompaniment of its professionals and community leaders (in COTEM), proposed to the Regional Government of Ayacucho to use their approach of crianza de agua and implement it in the entire headwaters of the Cachi basin. The idea was to establish a protected natural wetland area and employ a mechanism of retribution for ecosystem services delivered. The services would benefit the irrigation and drinking water sectors that insisted on the 80 MMC. Notwithstanding several setbacks and conflicts with neighboring communities, this idea, led by Quispillaqta, was formalized in regional water policy.

For this to happen, the KANA professional traveled to the north of Peru to get information about such a scheme of environmental services' compensation. Initially, irrigation and drinking water sectors were opposed, but in 2015, after a law on the retribution of ecosystem services (D.L. 30215) was passed, a fund was created by SEDA Ayacucho to compensate for conservation practices in the Cachi headwaters. This fund, for the time being at least, endorses the practices of water care and seepage notions of the families of Quispillacta. However, not all communities and district representatives in the headwaters shared these ideas of crianza and nurturing waterbodies. Some preferred the fund to be used in a different manner. More so, in comparison to the headwater area and families living in it, the fund is relatively small, estimated at 6000 US dollars per month. This money would be for the services provided to the potable water and irrigation sectors that use the reservoir, and that insisted on filling it up to 80 MMC. However, this alliance (this connection between downstream sectors, funds and headwater actors) also raises some concern: in the future, the government or another stakeholder could press to quantify and monitor the water 'harvested' and springs 'augmented' for which water needs to be abstract from its surroundings – or *ayllu* – as to make it measurable. The means by which this will be done, could possibly restrict the care practices and water use of local families (see ABA, 2014).

When I last visited Ayacucho and Quispillacta in 2017, I was told that engineers and water professionals, occasionally, but more frequently than in the past, travel with community leaders and representatives of COTEM to the wetland area above the reservoir to observe the nurtured lakes and participate in a ritual to ask the mountain being's protection. A first trip that PERC engineers undertook in 2010 was cut short because of a hail storm and icy winds. The unexpected

weather conditions made the engineers decide to go back. A coincidence, they said. The wamani was communicating, said the community members[121] and was not ready to allow outsiders. It is true that in the midst of such expressions of telluric and aquatic fury by the wamanis (like landslides, cloud-bursts, storms or droughts), families contemplate the characteristics that make up sacred spaces like the ushnu platform in Altarniyocc: First is its location in the wild (sayqa); it has to be at a distance from and have little contact with humans and their chacras. A second point refers to its fierceness and unruliness. People used to be wary of going near it. Third, the condition of sacredness is linked to its communication with *nevados*, or snow-capped Apus, such as Razuwilka and Chullunku Patara.

But worlds are changing. Some in Quispillaqta say that Altarniyocc no longer causes fear; It has become docile and accepts everyone. For them, the wamanis are in a period of adaptation and transition, perhaps replaced by a modern temple that to a certain extent brought prosperity to the communities of Ayacucho, as well as materialities of citizenship (such as drinking water and electricity) to the capital of Huamanga and its hinterlands. Many others in Quispillaqta maintain that this sacred space still exists and that Altarniyocc and other mountain beings can regain their revered power and venerated position. Two practices were mentioned in this regard: to advocate and celebrate the conversations with mountain beings and to conduct pilgrimages to and from important places, like the ushnu platform. It is uncertain if such a procession would ever catch on beyond the community of Quispillacta.[122]

To conclude this section, one can say Cuchoquesera is partially connected to two worlds, and their entanglements have transformed both. I demonstrated that seepage in Cuchoquesera is approached in different ways – celebrating it versus preventing it – yet both are based on ideas of improving (efficiency of) water. But what is water? The shape and fill of the two trapezoidal structures, the dam and ushnu, showed a different relation to the shells or layers of soil and stone used to construct both; as raw material and bond-forging substance (build alliances among actors) respectively. This is mirrored in approaches to water: as a resource to regulate or as an entity for mutual care. Furthermore, elaborate practices exist to perceive and fathom water sources. Rains and rivers are measured quantitatively in gauging stations by engineers while community members and their ancestors observe rain from platforms, converse with water sources and nurture lakes. In both cases, waterscapes are mapped and surveyed either through geodetic points and cartography or a hierophantic scheme of natural and humanmade markers (points) and sightlines.

[121] It was not the first time that engineers assisted in ritual payments to the wamanis. During the construction of the dam they had contracted a Cuchoquesera yachaq (shaman) to ask protection and blessing for the dam. The yachaq explained that the wamanis demanded (human) sacrifice to please the mountains and keep the bull confined under the new lake/reservoir. The causalities during construction were seen as a sign from Altarniyocc's discontent. Mountain beings felt forgotten and disrespected (ABA, 2014).

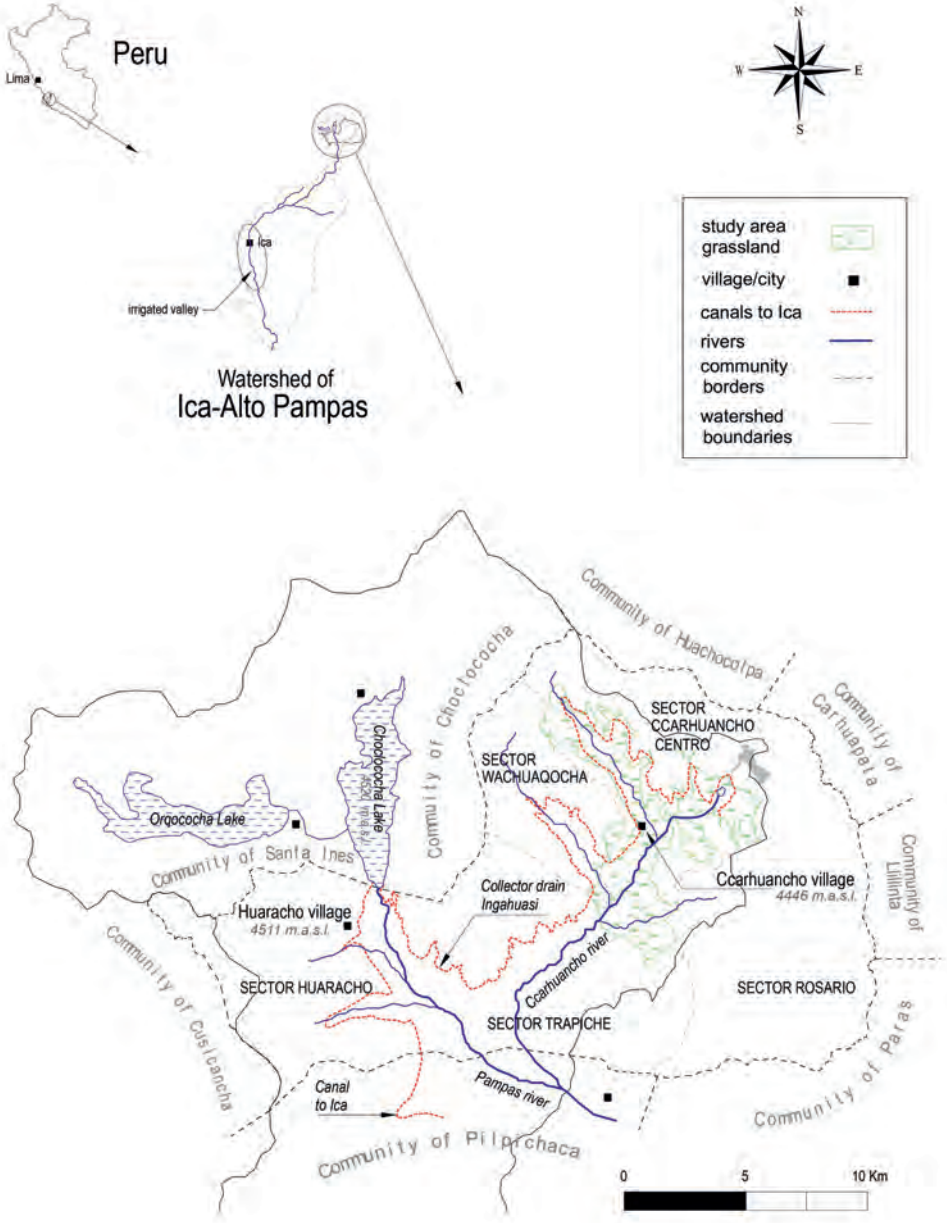
[122] Interestingly, PERC engineers, too, celebrate the infrastructure in Cuchoquesera. In their camp near the dam the virgin of Fatima is worshiped. Every year, in May, PERC workers carry the effigy of Cuchoquesera to the capital of Ayacucho and hold a procession in the city and a mass in her honour. The day includes a meeting with food and drinks, but the local community members are not present.

In many ways, these are, or can be represented as, contrasting worlds. Interference between them caused moments of grief and frustration, in which the families in Cuchoquesera have struggled materially and existentially. But there were also moments of rapprochement and a renewed appreciation for their ways of relating to water, and the community is actively seeking allies to support crianza de agua.[123] These include particular engineers of the regional government more closely related to the local environments and who, faced with water scarcity in their hydraulic system and erratic expressions of climate change, discover that the technical expertise alone does not solve the tremendous challenges of water management in the region. It appears that, far from technocratic strongholds of central government, far from the expert centers of techno-science and politics, it is this interaction that might garner insights for new water futures: the encounter between community representatives and field engineers, like spokespersons moving betwixt and between different Andean water worlds.

[123] And found these: the case of crianza del agua in Quispillacta was one of the principal cases in a national study on rainwater harvesting (siembra y cosecha de lluvia) program (MINAGRI, 2016). While it attracted the attentions of water professionals around the globe as a measure to combat climate change.

6. The system nobody sees:
Irrigation practices in community wetlands

Image 7: Amphibiotic space



Map 12: Community of Ccarhuancho

This is the chapter in which I explore intra-community water practices and relations, in this case about the management of, or care for, wetlands in the indigenous community of Ccarhuancho in the Huancavelica Region. The chapter, and title, are inspired by Robert Netting's classic paper on 'the system nobody knows' in the Alps where irrigation is done tacitly and locally without anybody having explicit knowledge of the whole irrigation system.

I start with an encounter between alpacas, their herders and myself, which helps to think about nonhuman 'agency' in daily pastoralist life. Not just the animals, but also rivers and the water in them, determine herder action. According to many community members, water practices and nonhumans (environments, animals, vegetation and local huacas), together with the pastoralist families, express what the community is; an actor-world – or ayllu, which in turn shapes supra-community associations and entanglements with other actors and worlds (section 6.1).

In Ccarhuancho, pastures, wetlands and water are held in common, comparable to a common property regime, yet boundaries between land and water or human and environment are fluid. A brief sketch of some historical moments for the community shows how they are continuously engaged with outsiders over resource struggles. In community views, however, wetlands, water and mountaintops are more than 'just resources'. They are animated entities that, like the animals, coexist with the herders, deeply connected in a relational world (6.2).

Having introduced Ccarhuancho and before elaborating on wetland irrigation practices, I introduce two ways of how water and wetlands might be enacted by water professionals and water users in Peru; two ontologies that emerge through different practices, technologies and stories. These are termed 'irrigation water' and 'environmental water'. Whereas the first is focused more on control, quantification and administration of water flows, the second is more about enabling water to flow 'freely' or unruly through the ecosystem. In a longstanding conflict over Ccarhuancho waters, these ontologies clash (6.3).

Surprisingly, irrigating wetlands is crucial in Ccarhuancho, more so with increased population (of humans and animals) and climate changes. Pastoralists ingeniously mobilize their local surroundings of streams, soils and animal traits to construct a system of irrigation ditches to retain (secure) water at certain places for certain times in order to maintain or extend their wetlands. Over time, the result of all this work is a constructed wetland in which human intervention is no longer visible (6.4).

The last section reflects on the fluidity and visibility of community boundaries and bofedales and on the problems (in terms of rights) of separating water from land from pastoralists in such amphibious and lived environments as bofedales. It is contrasted by the response of a national water authority that works to separate, make measurable and tabulate water and users. In Ccarhuancho, water cannot be owned. However, the responsibility of maintaining and restoring high-altitude wetlands begins – beyond the herders – with attempts to better understand and appreciate the interconnectedness of community-bofedal-ecologies (6.5).

This chapter informs the question: *What are the water and irrigation practices and ontological frictions that help Andean communities to their secure wetlands and water worlds?*

6.1. The care of alpaca

On human-animal relations and more[124]

I am standing in the estancia (farmstead) of the Malma family, high in the Andes (at 4,400 m.a.s.l.), in the indigenous community of Ccarhuancho in Huancavelica. I look around, shoulders raised and a little apathetic. It is dawn and freezing, while the air appears both thin and thick. Thin because of a lack of oxygen, thick because of constant humidity. Here, falling asleep itself is tiring.

There are several stone buildings on the estancia where the different family members sleep. A smaller building with a straw roof functions as the central kitchen. There are stone corrals all around. Above the estancia, called Aqowasi, I can see the dirt road by which we arrived the night before. To make the trip here, some Malma family members picked me up in the city of Ayacucho, in a truck filled with construction materials and small animals. The trip takes five hours. Women, children and researchers traveled in the body of the truck. I was offered a front seat, but declined. When we reached Ccarhuancho in the dark, I could see neither the entire estancia, nor the wetland valley, but all that was revealed the following morning. The wetlands in the valley are crucial for crianza, or care, of alpacas, especially during the dry season and in times of drought.

Long after that visit, I came to learn about the intricate details of wetlands and estancias. For example, I learned about one particular corral that has one of its openings aligned with the December solstice and another facing the hilltops above Aqowasi. There is a flat stone located against the corral wall that is used in celebrations to honor the many hilltops, or huacas, which protect and care for the estancias in Ccarhuancho and their alpacas. Here, ritual practices of herranza take place in June when alpacas come of age. As part of the ritual, their ears are marked with a particular symbol that connects them to a pastoralist family. Blood and these ear markings are then offered to the huaca connected to the family estancia. The hilltop-huaca where the Malma family practiced their rituals is called Qellokucho – their marking was that of *punqo* or door.

I was told that there is a hole in the ground in Qellokucho, an orifice of about 60 cm deep in which the offerings were placed. This was covered with a carved stone slab that mirrored the flat stone in the corral. Seats constructed from rock were created around the orifice and below the slab, a small water source emanates. Every two years, the mother of the family conducted the ritual; it was her family ground while their father was from outside of the community. Today, with both parents deceased and other members living in the city for a large part of the year, it is

[124] Image 7 (p. 145): Amphibiotic space (shows an estancia in Ccarhuancho with alpacas, pastures, bofedal, dwellings and earth-beings (in the back)). Source: Author.
Section four and parts of section two and five were previously published as: Verzijl and Guerrero (2013) "The system nobody sees: Irrigated wetland management and alpaca herding in the Peruvian Andes". These parts have been re-written for the purpose of this chapter and thesis.

no longer regularly performed, but other families maintain this practice.[125] The only time all the Malmas are on the estancia is in January and February, when alpacas give birth – it was the best time for me to visit.

Herding

As I was looking over the wetland valley, some 800 alpacas were released from the corral that protects the animals at night. Without being guided, the animals took a right turn and moved to a spot on the wetlands below the estancia; one female stayed behind. She was about to give birth. The Malmas left me to observe it by myself. For a second, I was surprised. "Are you not staying?", I asked pointing to the alpaca-and-a-half now visible. They had other work to do and saw already that it would turn out ok. Besides, they told me, in these days, at least five animals are born daily, often entirely without their presence. In less than an hour after being born, the *alpaquita* walked off with its mother to join the herd. I went back to the house and joined some of the family for morning Quaker. The herd, they say, does not need much guiding. They walk in the morning to a place where they start grazing and generally do not move around. The next day they walk to another spot and so on. The herder follows the herd.

I asked about herd migration and their other estancia, which was seven kilometers away on the opposite bank of the Ccarhuancho valley, and some 200 meters higher. Before the rains, in November, the herd moves to where we were, and somewhere in May, they move back to the higher estancia. At roughly the same time, other families vacate these upland pasture spaces and occupy land elsewhere; and some group of animals and herders move into the area the Malmas vacated. I tried to establish when they move, and which family moves first. "At what date...how do you know it is your turn?". This was up to the herd (behavior) and the river, they told me: "If the rivers are full what do you do? No date". Moreover, alpacas feel when it is time to migrate. In that period, "the matron of the herd decides one morning to make haste to the other estancia, the other animals follow and the herder ends up running after them. That is a chaotic day". The herd(ers) follows the matron.

Relationality and alpaca agency

The river that the alpacas cross is a headwater source of the larger Pampas river that eventually ends up in the Amazon. The purpose of my visit was to learn more about how herders live with their herd and wetlands; and how they irrigate the latter with water that is, controversially, also claimed by interest groups in the Ica valley, on the costa of Peru, for large-scale irrigation purposes. For those groups, water needed to be drained by a large catchwater

[125] The story of offerings on Qellokucho and the orifice covered by a flat stone bear resemblance to the ushnu concept described by Zuidema (2014) and practices observed in Cuchoquesera (section 5.4). However, the word ushnu was not used in describing this ritual and is not readily known among Ccarhuancho members.

drain, Ingahuasi, and stored in a dammed lake called Choclococha. This infrastructure would profoundly impact herd movement, wetland abundance and community life in general.

As noted, the way the herders relate to the alpacas was surprising to me. It is the latter who 'decide' where to forage, and when the family moves, or so the herders articulate. It is also the alpaca that mediates between human and huaca. And more. The human-animal relation determines how both are made to be (cf. Law & Lien, 2013; Singleton, 2010) – which in this case is not about the control of the herder over alpacas. Not by a long shot. It is, in fact, the fineness of their fibre – or how the mother nurtures the alpaquita through freezing cold – that shapes how the herder family fares. The camelids care for the community (see also Mannheim, 1986), a care that comunera(o)s reciprocate (Dransart, 2003). The idea behind crianza (see also chapter 5) is precisely this mutuality of caring. Both people and alpaca are actually an intricate part of the community, together with wetlands, mountain beings and more. Like the river, for example, which is also a caring actor, as it enables action; it influences herd movement and wetland lushness. In the view of many community members, these entities are not controlled, but part of a relational reciprocity network they refer to as their ayllu (de la Cadena, 2014).[126]

The notion of ayllu is associated with that of community, but extends it beyond clear-cut region topologies and anthropogenic terms. Family members that live in the city can still be – and often are – active community members, and in fact, enable new modes of mobilization that will be discussed in chapter seven. In this chapter, I discuss the ontological difference between two ways of relating to water in the Pampas headwaters: that of Ica interest groups on the Costa, and that of actors (working) in sierra communities (section 6.3). In sections 6.4 and 6.5 the irrigation practices of the community of Ccarhuancho and their relation to the headwater environment are further elaborated. First however, I will introduce the community in more detail.

6.2. Ccarhuancho
La Comunidad Madre

Ccarhuancho is an indigenous pastoralist community in the Huancavelica Region. Its mountain environment consists, aside from outcrops, caves and hilltops, of lakes, streams and boggy peatlands, together called bofedales – or high-altitude wetlands. Today, tens of thousands

[126] In much academic writing, the term ayllu is understood as community or form of communal social organization. Ayllu is a kinship relation referring to 'extended' family. It is well documented that an ayllu is (or at least was) not necessarily place-bound or site-specific (Spalding, 1984), it could be part in the Andes, part on the coast. What is less understood is that the concept of ayllu is very fluid and relational. Both humans and nonhumans have their ayllus or "familiar" relations; for example, water sources (Chapter 5) are related 'familywise' to a plant called Putaqa which is said to grow only in places where water is thriving. The ayllu of one of the co-researchers of this study, he explained, includes his village(rs), but also the mountains peaks and lakes we visited together and the godfather of his son who lives on another continent. Details on ayllus histories is beyond the scope of this thesis. I do however consider the concept ayllu and how it allows thinking in relational worlds of humans and nonhumans beyond the Andes; like actor-worlds. In the field, I have been amazed many times by how good community members are in explaining nonhuman agency and relationality (see also de la Cadena, 2010; Valderrama & Escalante, 1996), which has greatly served my analysis in this thesis.

of alpacas and some 300 families depend on it. Trout can be found in the streams and small lakes, while its hydrophytic vegetation attracts abundant birdlife and small animals (like the rodent-like vizcacha). Ccarhuancho families live in estancias scattered across the communally held grassland and bofedales. The pasture or forage areas surrounding the estancias are called *echaderos*. Since many families migrate with their herds, alone or in groups, many estancias appear unused for months. There are no fixed boundaries to echaderos, but they often follow natural markers such as mountain ridges, rivers, or vegetation lines. When echaderos overlap, families adjust the rotation of their herds on an ad hoc basis. Overlapping echaderos are separated by 'relative' time: when one herd moves out, a second one moves in. However, pasture areas nearest to a family estancia are considered exclusive to that family.

Families with access to multiple echaderos move together with their herds two times per year, usually in November or December (before the alpaca breeding season) and in May (after the rains). However, some herds move several times a year, which revitalizes the pasture ground they leave behind. Access to echaderos often rests on inheritance rights and on established family connections with forage areas and hilltops. There is a central village, overlooking the principal valley of Ccarhuancho, which includes a main square, small church and a *casa comunal* (the community building). All families have dwellings there. It is here that they gather for festivities and *asambleas*. Outside of those events, the central village of Ccarhuancho can appear deserted.

According to the herders, their ancestors arrived here, in the Pampas headwaters, at the beginning of the seventeenth century; they moved from Andahuaylas, a region on the right bank of the Pampas river, 250 kilometers downstream. They found evidence of earlier settlers, but think these were eradicated during early colonization and forced to work in nearby mines. Ccarhuancho lies in the triangle Castrovirreyna-Huancavelica-Huamanga. The first two were mining towns, of silver and mercury, respectively. The latter was the capital of the region and the Diocese, located on the major trade route Lima-Cusco-Potosi (Stern, 1982).

Due to the presence of nearby mining, herders indicate that for a long time, sheep (and mutton) were more commercially valued and more numerous than alpacas, though the latter were kept and locally preferred. The situation changed after the 1960s when some mines closed, accessibility to the remaining ones improved and the alpaca wool economy picked up. Today alpacas are favored and outnumber both sheep and llamas. The latter were traditionally used as pack animals. According to the Ccarhuancho herders, alpacas consume less pasture than sheep, despite their larger size. Their energy consumption and digestive system appear to be better suited to these altitudes and vegetation. Also, their cushion-like feet are less destructive to bofedales than the sharp hooves of sheep (Baied & Wheeler, 1993:149).

Chullunku Patara

Ccarhuancho received land rights in 1712. In an official title document, the Spanish Crown granted to "the community of *Indios* and their children: their lands, pastures and mountains, their waters and splendors enough to live from and herd their animals" (Guerrero Quispe & Pacheco,

2007). The land corresponded to about 50,000 hectares.[127] Originally, that area included the eastern shores of the Choclococha Lake as well as Apu Chullunku Patara, the revered earth-being that stand guards over the lake (section 5.4). Today the eastern shores are acknowledged as land of the community of Choclococha, that was created in the 20th century, but the Apu Chullunku still lies within Ccarhuancho and is the source of its main river and bofedales. A cave, near this source at the foot of the Apu, still holds spiritual importance. The bofedales and grassland in this part bear its name: Qatun-Machay (lit. Large Cave), and individual family herds do not go there, only the alpacas of the 'empresa comunal' (the community farm) are allowed.

The main river and largest wetland valley are located in the Ccarhuancho Centro sector. There are four other sectors (see map 12) that have been created by the community for internal organization and for approaching external programs and agencies. In the analysis of irrigated wetlands, Ccarhuancho Centro was chosen for detailed elaboration because it stands to be greatly affected by the proposed Ingahuasi project (see chapter 7); and because it was and continues to be intensively used. Here, for at least two centuries, herders have been redirecting small water flows and constructing canals to maintain and expand bofedales and improve forage lands. Current challenges such as climate change, but also population pressure (human and animal), make irrigation more important. More canals are being dug, and technologies such as sprinklers and small tanks are being introduced. Existing governance arrangements keep intra-community conflicts in check and enable the community to secure their lands and waters against (future) threats – either when interested outsiders appear, or when community glaciers disappear. The valley that I studied with a Ccarhuancho co-researcher covers some 3900 hectares of forage land, supporting 59 families and more than 11,000 animals. Table 1 lists the herds, estancias, and echaderos in Ccarhuancho Centro, showing herd composition, estancia occupation, exclusive pasture land, and movement between them. Map 13 gives a spatial overview of the case study area with estancias, echaderos, and migration routes.

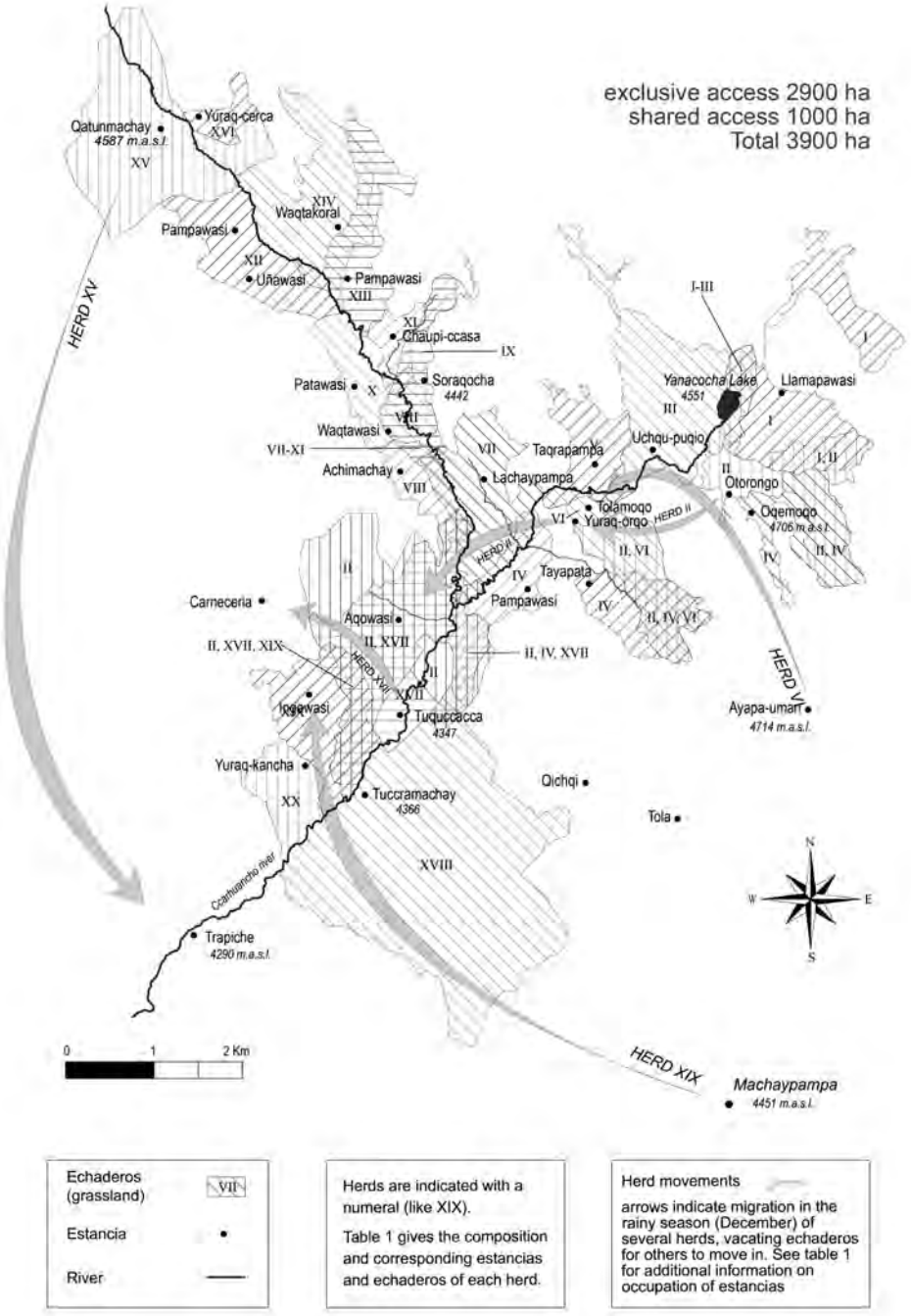
[127] Obtaining that title took the community, back then, almost two decades. For as far as could be traced back, in 1696, the Ccarhuancho herders, through their *indio alcalde ordinario* (leader) approached the bishop of the Huamanga Diocese because of a discontent with paying *diezmo* (tax) to the local clergy in neighbouring Pilpichaca. Eventually they bypassed clergy and approached colonial authorities that granted them the land in 1712.

Table 1: Herd composition in Ccarhuancho Centro

Combined herd(a)	Families	Alpaca	Llama	Sheep	Estancia (farmstead)	Echadero (grazing area) (ha)	Exclusive access (ha)	Occupation
					Llamapawasi	260	185	Dec–May
I	3	350	20	160	Pukamayo	Carhuapata(b)		May–Nov
					Aqowasi	490	60	Dec–May
					Yuraqorqo	140	0	Nov
II	4	650	4	241	Otorongo	210	50	May–Dec
					Uchqupuqio	290	245	Year round
III	6	550	60	220	Tola	Rosario		June–Aug
					Oqemoqo	130	45	c)
					Tayapata	120	50	May–Dec
IV	3	600	30	120	Pampawasi	130	65	Dec–May
V	4	288	6	40	Taqrapampa	110	85	Year round
					Tulamoqo	160	13	Dec–April
VI	3	480	53	196	Ayapa-uman	Rosario		April–Dec
					Laqaypampa	200	140	Year round
VII	1	180	17	76	Qello esquina	Same echadero		
					Aqchimachay	80	42	Year round
VIII	1	236	26	29	Llaqta (village)	Same echadero		
					Soraqocha	100	20	Year round
IX	2	305	35	100	Patahuasi	Same echadero		Aug
					Waqtaqasi	130	70	Year round
X	3	265	50	57	Soraqocha	Same echadero		Aug
XI	1	239	28	21	Chaupiqasa	70	36	Year round
					Uñawasi	160	150	Year round
XII	3	418	36	161	Cachipucro	Same echadero		May
XIII	3	450	60	150	Pampawasi	140	85	Year round
XIV	3	236	36	86	Waqtakoral	230	170	Year round
					Qatun-Machay	350	350	Jun–Dec
XVd)		500	0	0	Trapiche	Trapiche		Jan–May
XVI	1	203	11	67	Yuraqcerca	35	35	Year round
					Tukuqaqa	370	42	Jun–Dec
XVII	3	555	47	192	Carneceria	Wachuaqocha		Dec–May
					Tuqramachay	830	830	Year round
XVIII	7	860	75	365	Mollepunku	Same echadero		
					Ingahuasi	180	105	Dec–May
XIX	5	304	67	171	Machaypampa	Rosario		May–Dec
XX	3	450	25	40	Yuraqkancha	90	90	Year round
Total	**59**	**8119 (e)**	**686**	**2492**		**3900f)**	**2963**	

Source: Own elaboration. Based on the 2012 community livestock census, which is used to determine the tariff (50 centavos per head).

a) A combined herd consists of one or more private herds of different families that occupy an estancia.
b) Herds migrate out of the study area (such as the sector Rosario or another community).
c) Herders are too old to move to Oqemoqo and stay in lower estancias.
d) Community herd (used for covering expenditures or festivities).
e) *Crias* (newborns) and *maltones* (born the previous year) are not counted, so the real herd size is 30% bigger.
f) 3900 ha is not the sum of the echaderos (as these overlap) but the total study area. Carrying capacity, derived from e + f, is 3.75 animals per hectare.



Map 13: Estancias and echaderos in Ccarhuancho Centro

Chullunku Patara, in Quechua, means crumbling ice (lit. Ice Crumbling), and refers to a time when glaciers and snow-covered this mountain. There are stories of trade in ice slabs that were brought from Chullunku to the haciendas on the coast in the Ica Region. But glaciers and ice are long gone. Testimonies of Ccarhuancho herders explain that by the mid-twentieth century the weather changed (Guerrero Quispe, 2015). Historically, prolonged droughts and reducing snowscapes (that eventually disappeared) have always been a cause of great concern. At those moments the *Taytas* or elders "travelled to the coast to fetch seawater and take it back to the revered Apus and pour this water in all places. Likewise, they brought rock salt "yana cachi" to mountain springs" (ibid.).[128] Within the community, there was a belief that the disappearance of a glacier signals the end of time. As an elderly comunera expresses it: "When the snow is gone from the *Apu*, then the end of the world starts" (ibid.). According to the cosmovisions of the community members of Ccarhuancho and Choclococha, the end of the world would not come with "biblical apocalyptic episodes, but rather indicates the end of an era...and the beginning of times of hardship with limited...water and pastures" (ibid.). The last time these ritual practices by Taytas could be witnessed in these communities dates back to the 1970s and early 1980s, before the civil war.[129]

Chronicled past

Times have certainly changed. At the turn of the nineteenth century, only 20 families lived in Ccarhuancho. While this does not seem like a lot in comparison to the Indian reduction[130] settlements in the area, they were more autonomous – and privileged. Herders today still refer to Ccarhuancho as the *comunidad madre*, or the original (mother) community from which others sprung. Within its borders two mines existed and a mill (or *trapiche*) to process the ores. Ccarhuancho, back then, was as much a pastoralist community as a trading outpost. Old names

[128] This was to relieve the anger of the Apus and reestablish "*ayni*" reciprocity among the interrelated communities of runa (human, domesticated), sallqa (untamed, wilderness) and waka (revered beings, deities) when humans disrupted mutual care (see also Boelens, 2015a, chapter 3).
It is interesting to observe that this short account of an elderly women in Ccarhuancho mirrors the practices and rituals described in chapter 5. Here too, water fetched from one place and poured in another (see section 5.4) as well as salt being buried close to a water source (see section 5.1). These and all translations in this chapter are mine.

[129] Both time and the world seem to be understood by herders in way different from Western notions of these concepts. Differently put, the end of one world, and the beginning of another has to do with a drastic rupturing or tearing of the space that makes up a world . Actors and entities are mutated to such an extent or dissolve (or melt) completely that they are no longer considered to alter or *translate* and actor-world. It ends. And a new one is enacted.

[130] 'Reducciones de indios' were forced settlements created in colonial times to muster Indian labour, to work in mines, and facilitate central control (Stern, 1982). Ccarhuancho bordered one of the *reducciones* that today is known as the community of Llinta

of bogs and caves still bear testimony of this. According to local folktale, the village center was moved to its current location just before Peruvian independence in 1821. The story goes that Spanish miners, fearing wars of independence, took the village patron saint at night to the entrance of one of the mines, where it was found the next day by herders. They returned it to the village. After several appearances, however, they took it as a sign and built a new church on top of the mine entrance that stands until today. Incidentally, the new village, constructed around the church, was much more isolated and protected in comparison.

Two elderly women spoke about the border disputes of around 1870.[131] Their grandparents had to move around and occupy distant estancias to keep their claims on the land 'alive'. Still, their territory was vast and families were few. During this time, large stretches of land were assigned to *cofradias*, which are church-affiliated associations used in the rural Andes as a tool for Christianization, suppression and church tax collection. Yet, Ccarhuancho herders talked about how their grandparents consciously 'donated' border areas to a patron saint as a means to protect their community, their territory, against intruders.[132] Whether strategic marrying was also a topic of intra-community conversations and deliberations is hard to say, but near the end of the nineteenth century, several influential and literate families had married into Ccarhuancho. During this time, Ccarhuancho became an administrative outpost of the province of Castrovirreyna and controlled neighboring villages and the collection of taxes. The elderly women spoke of the abusiveness of the new administrators to fellow and neighboring villagers. However, the community managed border disputes and received a registered common property title in 1915, followed by recognition under the law of indigenous communities in 1942 (see also section 2.3); all of which deferred to a two-hundred-year-old document from 1712. Indeed, over the centuries, Ccarhuancho built an extensive archive to back up its territorial claims.

The impact of *Sendero Luminoso* in the 1980s was hard felt in Ccarhuancho: people fled, herds shrunk and a community leader was shot. The community alpaca wool processing plant was burned to the ground, as well as most of their archive, kept in a communal building. Scorched. A chronicled past destroyed. Several *Ccarhuanchinos* cast suspicion that the *senderistas* who burned the archives were of a neighboring community, with which they had a territorial conflict. These conflicts over land existed long before Sendero activities (see also section 3.2) and an interesting

[131] We, together with a co-researcher, attempted to reconstruct a genealogy of Ccarhuancho, a task made difficult because historic records were burned during the time of the Sendero Luminoso uprising. The women referred to persons that, in all probability, lived in the 1870s.

[132] By acting as good Christians, they actually secured parts of their ayllu – or resources. The Diocese and the cofradias were mobilized as allies – though not necessarily in a moral sense (see section 7.3); it can be considered an act of *metis* (see section 2.4), of disguise and foresight, both deliberate and strategic. There are similarities between Ccarhuancho and Cuchoquesera in using cofradias – or indeed *empresas comunales* – to protect their land and water (see section 5.2). It shows also the tension that exists between Andean communities and indigenous groups, and their actions to forge alliances with white colonizers (Stern, 1981). In that sense, I think, we have to consider the donating land (instead of selling) by Quispillacta to the PERC project; in terms of reciprocal *camino mutuo* to secure in some way the community interests (see also section 7.3).

testimony tells us how the most important records were protected. Unlike the neighboring communities where women wore typical *polleras*, homespun below-the-knee skirts, Ccarhuancho women, historically, wore floor-length skirts. They concealed important records under these skirts when suspicious outsiders arrived. Women, so was the reasoning, were less likely to get searched or taken. This was a perceptive but also perilous act that emphasizes the importance of keeping records in Andean communities.

It would take the community years to recover from this civil war and the fear is still felt today. During a conflict over water sources in 2007, to which I later turn, an envelope bearing the Sendero-symbol arrived at the community. It demanded the resignation of community leaders, threatening them to step down. Several did, not so much out of fear for a revolutionary movement, but because of local animosities. One leader acknowledged that they did not know who sent it. Speculations circulated that it could even have been a community member instructed by government officials, someone who feared losing his/her job as a construction worker at a canal rehabilitation program in the Pampas headwaters.

While not downplaying the traumas of a violent period involving Sendero Luminoso and government forces – a period of which community members say that "being alive was no longer living" (Salvatierra et al., 2015), it is the disappearance of *Nevado* Chullunku, its perennial snow, that marked the end of the world and the arrival of times of hardship that communities had already been anticipating for decades by intervening in their wetlands. From this, I carefully note the following: the transmutation of an earth-being like Chullunku is more painful to comuneros and comuneras and more disturbing to indigenous communities than can possibly be acknowledged by today's prevailing ontologies of modern water (see section 3.2).

This short overview revealed some interrelations and community practices to defend and secure their community – water and lifeworlds. Community members conned the clergy, were fooled by miners, outwitted arsonists and were intimidated by invisible men or women. This community reality and water practices (see section 6.4) contrast to another water reality enacted in the Pampas headwaters connected to a hydraulic multi-purpose project called PETAC and the irrigators of the desert region of Ica. I will contrast and compare these briefly in the following intermezzo.

6.3. Intermezzo on headwater realities

Irrigation development and wetland environments in the Pampas basin

The core of this paper is about Ccarhuancho alpaca herders (introduced in section 6.1 & 6.2) and their practices of irrigating wetlands (elaborated in section 6.4 & 6.5). All the same, 'irrigating wetlands' can seem paradoxical to proponents of modern water governance, particularly in Peru. Already the idea of diverting water to places of abundance is fuzzy business, let alone the implications of acknowledging the day-to-day presence of animated nonhumans in (water) governance relations and politics (cf. de la Cadena, 2010; see also Valladares & Boelens, 2017). I will forego that latter analysis for now, having touched upon it in the previous chapter. Instead,

I turn my attention to how water is enacted by different water users and professionals in the Pampas headwaters (and the connected Tambo-Santiago-Ica watershed). To show that the resulting friction with the herder communities has ontological underpinnings. There are two common takes on wetlands that this thesis challenges.

The 'economist' take on (high-altitude) wetlands is one of wastelands or *tierras eriazas*, with a harsh climate and difficult access, that are unfit for agricultural production (Hails, 1997; Ramsar, 2008). Viewed as an obstacle to progress, they best be drained for economic gain, mining, or hydraulic works (Boelens, Dourojeanni, Duran, & Hoogendam, 2002; Sosa Landeo & Zwarteveen, 2012); indeed a common occurrence in wetlands worldwide (Joosten, Tapio-Bistrom, & Tol, 2012; Zedler & Kercher, 2005). The 'ecologist' or 'conservationist' take considers wetlands as natural and pristine ecosystems, fragile (Messerli, Grosjean, & Vuille, 1997), but with great biodiversity. Wetlands are productive life-support systems, rich in natural resources and ecosystem services (Buytaert, Camacho, & Tobon, 2011; Hails, 1997; Ramsar, 2008). Human activity and livelihoods are considered separately, and often portrayed as an external threat to the continued existence of wetlands. Both takes ignore the fact that these high-altitude wetlands are humanmade and productive in their own terms; they are maintained with care, extended and created by pastoralist communities throughout the Andes, like Ccarhuancho. And there are professionals, programs and projects that perform and support this way of relating to water, as there are programs and projects that enact a water reality more closely resembling the 'economist' take.

In this section I follow Stephanie Lavau's thinking (2013) about the ontological distinction between flows of 'irrigation water' and 'environmental water' in a headwater or *cabecera de cuenca*. In this case these ontologies fuel a longstanding water conflict that involve Ccarhuancho and other pastoralists communities in Huancavelica (Chapter 7). Lavau's approach offers an interesting insight and enables the introduction to another site of the study area. To do so, I shift scales, from the Pampas headwaters, up above, to (include) the remote desert valley of Ica, down below. Here different stories about water and irrigation are told.

Irrigation water

The Ica coastal valley, located in the Ica Region, is sandy and dry. A desert. Rain falls, if it falls, in the highlands above. As a rule of thumb, the rainy season is considered to be between December and March, and agriculture without irrigation would not be possible in this valley. In fact, without it, nothing grows. Yet, by diverting the Ica river and inundating their *pozas* – diked fields, up to 1,5 meters high – Ica farmers turn(ed) the desert into patches of green (Bayer, 2015; Dominguez Guzmán et al., 2017; Llosa et al., 2009). Recently, transnational agribusinesses have colonized areas adjacent to the irrigated valley and also started to buy up land from smallholders, turning the Ica Valley and adjacent plains into Peru's most significant agro-export sector.

Importantly, it caused the overuse of freshwater stock (Hepsworth, Postillo, & Delgado, 2010; Oré & Damonte Valencia, 2014; Rendon, 2009).

In the Ica Valley, water scarcity was, and still is, part of daily reality. Already in the second half of the 19th century, *Iqueño* engineers began looking into how water from perennial sources elsewhere could be diverted to provide water to their coastal valley.[133] The idea was to divert water from the Choclococha and Orcococha lakes in the Pampas headwaters, mainly for commercial cotton irrigation. To make this happen, large infrastructural works were needed to guide and control the water, which for a long time were not feasible. Eventually, a law was issued in 1945 (decree D.L. 10253) that reserved water in the Pampas headwaters for the Ica Valley. In 1959, the Choclococha Diversion Project was inaugurated (Oré, 2005, pp. 63 & 116).

The project was intended as a modernist multi-purpose regional development scheme (much like the PERC project of the previous chapters). Its main infrastructure included a large dam and a canal to realize the inter-watershed diversion from the Pampas headwaters to the highest parts of Tambo-Santiago-Ica watershed (see map 15). The new dam raised the level of the then-existing Choclococha Lake; it stores 150 MMC of accessible water. The canal is 53 kilometers long, with a capacity of 15 m3/s. By means of a tunnel, Supaymayo, water is dropped into the Tambo-Santiago-Ica watershed, after which it follows a natural course down to the Ica valley (see map 13). For the *Iqueños* it was the realization of a dream that had been a century in the making[134] (Oré, 2005).

Indeed, at the dam site, water turned into a controlled substance – it became a resource that could be converted into property (Lavau, 2013). Water could now be distributed and supplied to the valley in months outside the rainy season with much greater reliability. An encampment was built near the dam to monitor and release predetermined quantities of water as well as to regulate and maintain the canal infrastructure. Water is measured again in the valley and transported to farmer fields. Government water authorities (and later the Juntas) administer water rights, tariffs and delivery performance to, and for, more than 12,000 users (see Oré, 2005). Spills and seepage are acted upon and engineers constantly seek to improve system-level and field level efficiencies. All these practices and technologies, enact a particular water ontology: "irrigation water", which has a distinct logic and related institutions (Lavau, 2013). Obviously, irrigation water is vital to

[133] First studies were made in during the government of Jose Balta (1868-72) according to a historical review attached to law proposal 4328/2010-CR. What stands out is the longstanding struggle to secure water by a coastal society. Ica is by no means an exception (see Dominguez Guzmán, 2013 on the case of Olmos; see also Guerra, Apaclla, Figueroa, & Hatta, 1993).

[134] There is an insightful story that quite possibly connects to that dream. The mountain known to Ccarhuancho herders as Chullunku Patara is commonly, in documents and on maps, known as Mount 'Palomo'. I was told that the name was given to it by Ica engineers that were surveying the Choclococha Lake and canal construction during the initial phases (mid-twentieth century). They found the shape of the glacier, of the crumbling ice, to look like a dove or *palomo*. It is ironic that this mountain was christened 'Palomo' at the time when Ccarhuancho herders indicate that weather patterns changed, marking a change in their earth-beings, and the beginning of the end of a world (section 6.2).

the valley and its inhabitants. Not surprisingly, studies, projects and visions of new hydraulic infrastructures, to capture and store more irrigation water in (or from) the Pampas headwaters and its high-altitude wetlands, have been ongoing since the moment the dam was completed (see also Oré & Geng, 2014). In 1990, a large multi-purpose hydraulic project, the *Proyecto Especial Hidroenergetico Tambo Ccaracocha* (PETACC), was created by INADE (Peru's National Development Institute) to give funds and follow up to these studies and their realization, which would allow more water flowing to Ica.

Apart from (planned) hydro-power generated after water is dropped in the Tambo-Santiago-Ica watershed, other, realized and future, infrastructure works include: the damming of Lake Ccaracocha and the construction of a catchwater drain to augment it (40 MMC, realized); the creation of the Tambo reservoir to store additional water collected in the Choclococha Diversion Project (50 MMC, being executed); and the realization of the larger, 70 kilometer-long Ingahuasi catchwater drain to collect and transport all runoff and small creeks flowing into the Ccarhuancho valley, transport it via the Choclococha Lake and Tambo reservoir onwards to the Ica Valley (52 MMC, future). By thus securing and controlling water, the PETACC hydraulic works and Ica irrigation water interfere with another type of water and flow – one to which I will turn next.

Environmental water

The PETACC hydraulic works are located in a difficult-to-access and empty area, at least so say irrigation engineers in Ica (see for example Lahmeyer 2007). The herders, as well as the water professionals that live, work and intervene here would not characterize it as such. This area, including the Pampas headwaters and the community of Ccarhuancho, is known as the *Meseta de Castrovirreyna*, a high plateau puna environment. Nowadays, it supports 1500 families, and over 200,000 alpacas, llamas and sheep: a valuable and complex sector in its own right, especially with the rise of the alpaca-wool economy (Orlove, 1977; Postigo, Young, & Crews, 2008; Urteaga Crovetto, 2014). The puna[135] is often considered a natural grassland environment located at, or beyond, the agricultural frontier. Throughout, there are patches of wetlands, known as bofedales. These are like pockets of peat saturated with groundwater and surface water. Bofedales are swampy, fragile ecosystems that arise when hydrological and geological elements combine favorably (Squeo, Warner, Aravena, & Espinoza, 2006, pp. 246 & 252). They are sensitive to climate variations and human interventions, such as mining and farming[136]. Rather than

[135] Demarcations of the puna ecological zone are often based on altitude (Baied & Wheeler, 1993; Lane, 2009). However, I follow Mayer (2002), who defines the puna in relational terms as the high, cold, and treeless areas in comparison to the lower potato and maize lands (quechua zone). Although cultivation of Andean tubers often occurs in the puna and drained wetlands (Zimmerer, 1991), in the region of this case study, the puna is more associated with animal husbandry, such as camelid and sheep herding (cf. Browman, 1974; Flannery et al., 2016; Orlove, 1977).

[136] In this, they resemble wetlands in lower areas (Zedler & Kercher, 2005) and the Ecuadorian páramo (Buytaert et al., 2011; Buytaert & De Bievre, 2012).

benefiting from perennial rain, bofedales flourish more when fed through subsurface flow coming from glaciers or snowmelt. These last two water sources, say members from Ccarhuancho, began to vanish in the second half of the twentieth century, and are now gone.

The size of bofedales varies from less than 1 ha on slopes to several hundred hectares on plains. Their peatland vegetation is determined by four main ecological factors (Squeo et al., 2006, p. 251): water quantity and seasonal availability; temperature and incidental frost; water quality, including pH balance, nutrients, and toxic elements; and biotic factors, such as seed dispersion by animals and grazing (see also Zedler & Kercher, 2005, p. 49). Unlike the previously mentioned economists' take on wetland environments or the engineers' view of irrigation water, who make these wetlands appear as wastelands; and unlike the conservationists who see the wetlands as 'natural' and pristine ecosystems, both the alpaca herders and the professionals that intervene on the *Meseta* know, and have always known, that wetlands exist because of, and need, constant care. Especially today, assuring an acceptable influx of water with a required quality is arduous work. Communities like Ccarhuancho have been doing this for ages. More recently, NGOs like DESCO, Huancavelica government branches, and bilateral programs like PRODERN have turned to that task as well. These latter actors assist communities with pasture management programs or rainwater harvesting technologies (see also chapter 5), like infiltration ditches, lake conservation and pond construction (cf. Llosa et al., 2009; PRODERN, 2018). The water they enact, as Stephanie Lavau observes, appears in several domains (environmental policy, watershed management) as "environmental water": it is the water that comes into being – through practices, technologies, treaties and associations (2013, p. 424) – as sustainable, supportive of biodiversity, extensive livestock farming and pastoral societies, and that is crucial to the upkeep and preservation of healthy ecosystems. It is less regulated and more variable or fluid than economists' or engineering waters: rather than being measured and distributed, it is allowed to flow freely. Practices that make it happen are less about control, and more about care.[137] Because of this, however, environmental water is also less tangible and visible than irrigation water.[138]

By distinguishing and contrasting irrigation water and environmental water in this way, my intention is not to suggest there is no sustainability thinking in the former, or that there are no development initiatives in the latter. Nor do I consider these two waters as mutually exclusive

[137] I do not want to suggest or introduce another dichotomy here. After all, Andean communities are often involved in longstanding struggles over territorial control and sovereignty of community actors, including water entities – while hydraulic engineers often use lots of care in their design and calculation efforts (Dominguez Guzmán, Verzijl, Zwarteveen, & Mol, 2019). Rather, I think, these are different logics or different ways of relating to water wherein prominence and value (about what is 'good') is given to performing control and management on the one hand, or nurturing care and mutuality on the other (see also Singleton, 2010).

[138] More so, the image that "irrigation water is... productive in relation to environmental water" (Lavau, 2013, p. 417) is very persistent in Peru. Ica actors too, consider the inaccessible wetlands as empty and inhospitable wastelands that best be drained of valued irrigation water. However, in recent years and as a response to climate change, the number of institutions working on and with attention for Andean puna environments is increasing (see for example MINAGRI, 2016).

and rigid general categories. I instead use the distinction to reveal a possible ontological tension, one that may occur when the two waters overlap – as they clearly do in the Pampas headwaters. In a way, the distinction between irrigation water and environmental water resonates with the observation of the Huancavelica water professional referred to earlier (see box 5) that there are different water realities. Far from just a rhetoric statement, the statement refers to how different waters emerge and indeed are in different practices, technologies and stories. It is a warning against an attempt to explain one water in terms of the other.

The engineers in Ica responsible for an environmental impact assessment recalled finding abandoned settlements, sparse and scattered populations, barren lands, and no local infrastructure in the upper valleys of Ccarhuancho. The assessment argued that the few people in the area would welcome the labor opportunities resulting from new hydraulic projects, like the Ingahuasi catchwater drain (Lahmeyer, 2007). This visualization of the environment and evaluation of the wetlands, and indeed this enactment of water, has the effect of hiding the complex array of irrigation practices and pasturing arrangements present in Ccarhuancho – of hiding other waters. This is the system that nobody sees, including the Ica engineers. It is to that system of irrigation that I now turn.

6.4. Irrigating wetlands.
From paradox to paramount

Bofedales are paradoxical in that they are wetlands in an arid or semiarid environment: rainfall in the study area averages 800 mm,[139] with 90% falling in the six months between October and April (Lahmeyer, 2007). Its vegetation is a valuable grazing resource, that is increasingly imperiled because contributions from snow and glacier melt have disappeared in recent decades (Boelens et al., 2002; Vuille et al., 2008). The importance of these wetlands to the Ccarhuancho herders is underlined by their continued attempts to secure water sources, both in terms of defending and protecting (Chapter 7), as in terms of preserving and keeping it in place. Today, the carrying capacity in Ccarhuancho Centro is 3.75 animals per hectare (Table 1), higher than the average estimate for puna grasslands in Peru (see also Browman, 1983). Key to maintaining a high carrying capacity, as the alpaca herders know, is the continuous care for the wellbeing of their wetlands. Somewhat oxymoronically, irrigation is a necessary element of this care – now even more than ever. Most studies do not associate transhumance with irrigation: herders are acknowledged to generally rotate the puna grasslands (Ochoa, 1979; Postigo et al., 2008), but are not thought of as concerning themselves with activities such as canal construction and irrigation field application. In Ccarhuancho herds do indeed move around (explained in section 6.2), but community members also provide necessary year-round attention to irrigation and bofedal care, linked to specific canals or echaderos.

[139] Going south towards the Atacama Desert in Chile and Bolivia, bofedales are found when rainfall drops to less than 200 millimetres.

Creating wet-land

In Ccarhuancho, bofedales are often found naturally where groundwater appears at the surface via a spring, and where flow assures a constant influx of water into the peat material. If these naturally occurring spring and flows are altered, it can takes years to revitalize dried-out wetlands or to develop new ones from parched peatland (Orlove, 1982; Palacios Rios, 1977). In an inventory I made with a Ccarhuancho co-researcher, bofedales ranged from less than 3 until 60 hectares to reach a total of 770 hectares in Ccarhuancho Centro. There is an additional 605 hectares with significant human improvements, in which a vast network of canals turned dry peat into lush wetlands. These canals differ in length from several kilometers to 100 meters or less, and in width from 0.8 m to the size of a *sapa-pico*, a shovel with a 0.15-meter-wide blade. Inventory data is presented in tables 2 & 3 and visualized in map 14.

There are a few observations that can be made about the improved bofedales and those that can be found naturally. First, I do not want to suggest that there is no tinkering in the latter or that the former would not exist without human intervention. What I do contend is that the improved bofedales would be severely degraded without continuous herder care and without a secured inflow of water. Second, I note also that these areas are estimations that serve to visualize the extent to which herders intervene in upkeep and expansion. It also serves to make visible to others that bofedales are neither pristine nor empty wastelands. However, such a delineating activity also captures things that, when walking in Ccarhuancho, are hard to observe. Obviously, borders are organic and fluid and bofedales mesh with their surroundings.

In creating wetlands in Ccarhuancho, at least 3 types of canals can be distinguished. The first are those that are constructed parallel to the border of an existing bofedal, several dozen meters away, to irrigate the area in between. Once this extended area is in production, which can take years, the procedure can be repeated. Bofedales operate like huge sponges, so once the peat is saturated, maintaining it requires only a percentage of the water stored in it and an even smaller part is used for evapotranspiration. Most of the irrigation water flowing in, flows out. The second type of canals are those that run through the larger bofedales and that are used to irrigate areas that have a lower retention capacity or to which the underground flow is blocked. These canals are found in the plains that flank the Ccarhuancho River. They are used for upkeep rather than extension. With the disappearance of snow and glacier melt, the increase in torrential showers, and the erosion of the riverbed, these 'maintenance' canals are vital for wetland sustainability. The third type of canal is used strictly to transport water, without extending or maintaining bofedales along its course. Examples are the main canal to the village or the closed conduits that transfer water from newly constructed tanks or ponds.

The irrigation practices associated with these canals go unrecognized in many debates on Andean wetland management, partially because of the new satellite and remote sensing technologies used to analyze these, often vast, areas. Land Satellite data, with a resolution of 30 m (Otto, Scherer, & Richters, 2011; Postigo et al., 2008; Quiroz et al., 2001), are too crude to

reveal these canals and thus help create an image of wetlands as natural expanses.[140] Another reason that nobody sees these systems of irrigation canal is that, over time, it becomes hard to distinguish between peatland produced by human interventions and those that occur naturally. This is because, once new canals are constructed parallel to the bofedal, older ones become nearly invisible and can lose their transport function. The history of a bofedal is known only to those who care(d) for it.

The example of the 7-ha Uchqu-puqio bofedal, with current and old canals, is highlighted in map 14. This bofedal pertains to a single estancia within the larger echadero of the same name. Upkeep and extension are undertaken by the corresponding families only. In the process of amplification, the bofedal and its canals have become interconnected with other canals and bofedales, for instance, in the areas below Uchqu-puqio. In the past, these canal sections were shorter and maintained by the families from 4 estancias. However, the herders indicated that, in the future, the area that stretches from Uchqu-puqio to the valley floor might become one large bofedal (of potentially 60 ha) with a shared water distribution. For the upkeep of larger wetlands, the families might look to the practices on the valley floor below. Here, bofedales up to 100 ha can be found. The intensively used Ccarhuancho bofedal in front of the village (103 ha) consists of canals constructed and maintained during collective faenas or workdays. This bofedal is old and was, in part, formed naturally, but it requires upkeep: the families that have access to this bofedal must maintain it and invest in it. They do not migrate like their neighbors downstream. As populations of both animals and herders are increasing, villagers indicate that this bofedal is under the most stress from overexploitation and conflict.

Table 2: Bofedales found naturally in Ccarhuancho Centro

Bofedales		**Size (ha)**	**Access**	**Source**
N-a	Chaka punko / Chacanniyuq	31	I, II	Surfacing groundwater
N-b	Corralpata / Aleluya	61	I, II, IV	Surfacing groundwater
N-c	Aqeña	2.6	II, IV	Spring
N-d	Añazo	2.7	IV	Spring
N-e	Patahuasi / Qapupata	48	II, IV, VI	Spring
N-f	Portachuelo alto	22	III	Stream
N-g	Chuchullo	7.3	VII	Lake
N-h	Yanaqocha	28	I–III	Stream
N-i	Huertaqucho	3.3	III	Spring
N-j	Taqrapampa	2.9	VII	Spring
N-k	Urunwasi	17.3	IV	Spring
N-l	Yuraqcoral	13.2	II, IV, XVII	Spring
	Total	239.3		
	Total Ccarhuancho Centro	770		
	Total improved bofedales	605		
	Total bofedales (natural and improved)	**1375**		

Source: own elaboration

[140] More than 100 canals have been identified in Ccarhuancho Centro, with a total length of more than 36 km. Map 14 presents the visualization of canals and bofedales in the middle part of Ccarhuancho Centro. Although it is difficult to give an approximation, the location of canals and the topography suggest that more than 40% of the bofedales in Ccarhuancho Centro would be degraded or destroyed without these canal networks.

Table 3: Improved bofedales in Ccarhuancho Centro

Improved bofedales①		Size (ha)	Access②	Canal/source③		length
A-a	Ranraqasa	27	I, II, III	a1	Canal Ranraqasa	310 m
					Spring	
A-b	Lamapa wasin	8.7	I	b1	Canal Llamapawasin cucho	90 m
					Surfacing groundwater	
A-c	Qatunsura	2.2	IV	c1	Canal Qatunsora	120 m
A-d	Qollpawaqta / Patupa wachanan	5.9	IV	d1	Canal Qollpahuaqta	425 m
				d2	Canal Occemocco	35 m
A-e	Otorongo	3.8	II	e1	Canal Otorongo	325 m
A-f	Pukalloqlla	2.2	III	f1	Canal Ccochachakin pequeño	55 m
A-g	Uchqu-puqio	6.9	III	g1	Canal Pucalloqlla	440 m
				g2	Canal Uchqupuqio	500 m
A-h	Iskay-qocha	9.6	III, V	h1	Canal antiguo Iskay-qocha	870 m
					Several smaller canals	500 m
A-i	Portachuelo bajo ④	5.2	V	i1	Canal Chuchullo	175 m
					Several smaller canals	350 m
					Stream	
A-j	Taqrapampa	5.6	V, VI	j1	Canal Portachuelo	200 m
A-k	Paqcha-pata	4	V, VI	k1	Canal Paqcha-pata	540 m
A-l	Tulamuqo	9.9	V, VI	l1	Canal Tulamuqo	765 m
A-m	Laqaypampa / Qello-esquina	8.8	VII	m1	Canal Qello-esquina	190 m
				m2	Canal Tukumachay	330 m
				p2	Offtake Vinopacana-chaka	105 m
					Several smaller canals	300 m
A-n	Botijapampa / cerqo-qucho	7.2	IV	n1	Canal Paqchawayqu right	85 m
				n2	Canal Vinopascana	730 m
A-o	Pampawasi	16.8	IV	o1	Canal Pampawasi alto	430 m
				o2	Canal Pampawasi bajo	550 m
				o3	Canal Paqchawayqu left	90 m
A-p	Vinopascana ④	10	VI, VII	p1	Canal Laqaypampa	320 m
				p2	Canal Vinopacana-chaka	860 m
				p3	Canal Vinopasacana-pampa	260 m
A-q	Urqun-wasi ④	11.4	II, VI, VII	q1	Canal Qollpa	200 m
				q2	Canal Urqunwasi	150 m
A-s	Ccarhuancho Centro ⑤	103	VII-XI	r1	Main canal Ccarhuancho Centro	3100 m
					Other canals left bank	2600 m
					Other canals right bank	3300 m
A-r	Pantion-ukun	6.7	II, VII, VII, XVII	s1	Canal Pachachaka	350 m
				s2	Canal Pantión-ucun	280 m
	Total	254.9			Total	19.5 km
	Total in Ccarhuanco Centro	**605**			**Total Ccarhuancho Centro**	**36 km**

Source: own elaboration

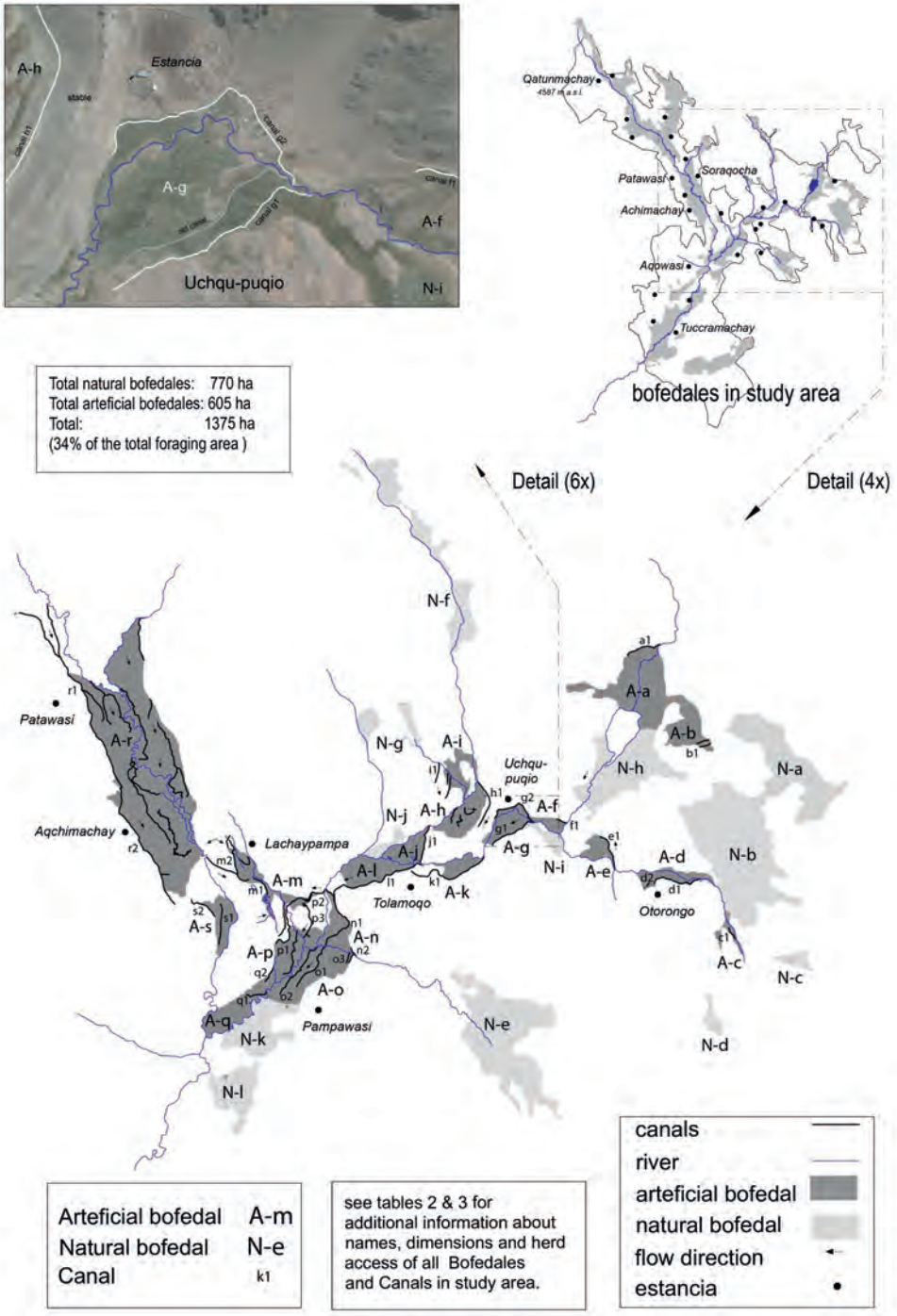
① Human intervention in bofedales in this study implies that significant efforts are put into its upkeep or extension.

② This refers to which herds have access to a bofedal (see Table 1, which links herds to families, animals, and estancias.)

③ A source is considered a canal if it is the principal source sustaining the bofedal in the dry season.

④ Bofedal is at risk due to drop in water retention capacity.

⑤ Bofedal at risk due to overexploitation.



Map 14: Bofedales and canals in Ccarhuancho

Bofedal irrigation practices

Community canal construction and maintenance are often considered activities that happen in small-scale mountain irrigation systems (Crook & Jones, 1999; Verzijl, 2007; Vincent, 1995). Yet, they resemble to what Ccarhuancho herders do to construct and maintain their bofedales and to distribute their water. This section further explores the irrigation practices that are important to bofedal conservation.

In Ccarhuancho, there is no central management of the network of canals, springs, and rivers. It has no recorded water rights, and many conflicts are settled in situ between stakeholders. Much like the Swiss mountain irrigation system described by Netting (1974, p. 69), the Ccarhuancho system appears to run itself. Netting states that "central control and direction of work is unnecessary if upkeep is minimal and routine" (1974, p. 73). Whether upkeep is indeed minimal and routine in Ccarhuancho is questionable. Palacios Rios (1977), for instance, states that bofedales need constant upkeep and abundant water; and Ccarhuancho herders mentioned that operation and monitoring of bofedales can be quite complex. I say more about this later. First, I discuss the two principal ways to irrigate wetlands. Both involve partially blocking a canal with a flat stone, called a *tranqa*, or a piece of turf, which is placed at the tail end of a ditch, causing water to spill over the edge (see also Netting, 1981, p. 45).

In the first method, when the water has inundated the area, the tranqa is removed, and others are placed at different locations along the canal to control overflow points. Because canals are often hundreds of meters long, stones are normally not carried but left along their course. In the bofedales on the valley floor, the canal water spills over on both sides, submerging part of the land. This method is used mostly in the second type of canal, as discussed earlier, to prevent existing bofedales from drying out. Whereas in traditional irrigation systems control stones have to be removed after a couple of hours depending on the irrigation rotation, in Ccarhuancho stones can stay in a single place for much longer. Image 8 shows irrigation techniques that use tranqas.

The second method involves several stones placed in the canal to divide the flow so that part of it flows onward and part flows onto the bofedal, guided by small cut-outs in the peat. These stones remain in place more permanently and are used to revitalize peat dried up over a long period. An alternative to this method is to have several smaller canals redirecting water over a designated area.

Such structures, which do not require frequent attention, may give the idea that no monitoring is needed. Yet, over-irrigation can also be a serious problem in Ccarhuancho. It encourages the growth of the unfavorable *Cuncus* grass (*Distichia muscoides*) in the vegetation that alpacas eat. According to herders, the increase in temperature, torrential downpours, and loss of snowmelt have allowed Cuncus to outcompete other vegetation. Careless irrigation enhances Cuncus growth, as water is being supplied from above rather than from underground. Although it is difficult to balance flows, removing Cuncus by hand is nearly impossible. Another solution

being tried is to leave a group of alpacas overnight for a week on a Cuncus patch. Their excrement kills the Cuncus, after which more desired vegetation flourishes.

Monitoring is also needed as torrential rains bring rocks and mud (*lodo*) into the canal system that might bury wetland meadows under a layer of debris. This could destroy a bofedal, which is why during the months of heavy rains, the canal intakes are closed. The consequences of transhumance and irrigation mean that community members must cooperate and trust one another for monitoring and maintenance. This is also important when, for example, a herder moves into an echadero and bofedal maintained for months by other herders who have now moved on. Moreover, herders rotating through their pastures might make adjustments to a canal to which they will not come back for maybe a week. If changes are needed, they rely on those moving in after them to make the changes.

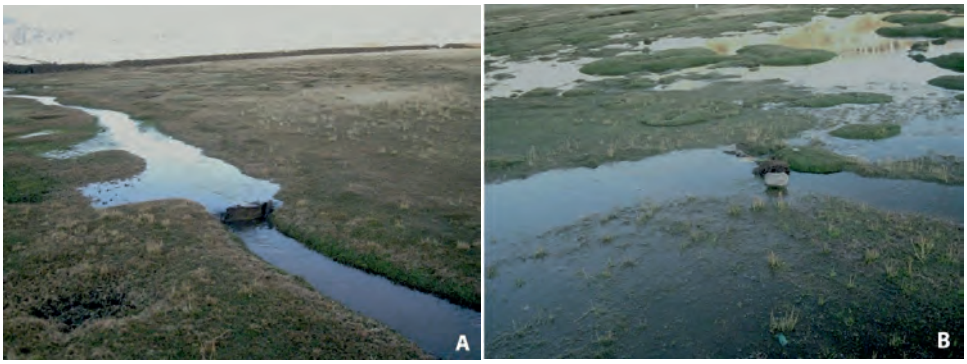


Image 8: Irrigation using tranqas
Source: Silvano Guerrero Quispe

Although these activities are not centrally managed, the role of the community assembly is increasing with current changes in climate and population. Historical data about population are difficult to obtain, but herders indicate that in the 1960s some 20 families lived in Ccarhuancho Centro with 80–150 alpacas per family. In the 1980s, the communal assembly agreed to ban the keeping of pigs, and today the community is phasing out sheep because these animals have a more negative impact on the wetlands than camelids do. These regulations are strictly enforced, and penalties are applied if individuals or families do not comply. Community authority also exists with respect to the human population. Presently, there is a waiting list of community members requesting an estancia. Meanwhile, people migrate to the city for work, or several families reside on a single estancia. In the latter case, fewer animals per family can be kept because forage land is the constraining factor, and many families combine herding with non-pastoralist work.

Because of these pressures, the need to take care of water and improve and extend wetlands is becoming an ever more communal issue. Plans to harvest more water are discussed in the assembly, as are conflicts relating to water allocation that cannot be resolved by the users. The last decade has seen the introduction of technologies to harvest water, such as the construction

of small tanks and pressurized systems, and with them new water-related conflicts are emerging. Conflict resolution is less often handled in situ than in the past, and the assembly intervenes, seemingly following an egalitarian principle. It would, for example, demand the demolition of a recently constructed tank today to assure water availability for downstream users who wanted to retain the option of developing their wetlands tomorrow.

Beyond the community, there is also a growing interest to look at ways that high altitude wetlands can be preserved or revitalized. In light of glacier retreat and erratic rainfall brought on by climate change, the bofedales and 'environmental water' receive increased attention for both carbon storage and river regulation purposes. Differently put, bofedal irrigation practices have impacts that reach much further than just the headwater communities. Taking care of these wetlands is paramount. Whether bofedales are and/or could be considered in regional water governance is what I will turn to next section, which also serves as a prelude to a longstanding interregional water conflict that will be dealt with in the next chapter.

6.5. Fluid property?
On necessary ambivalence

Inter and intra-community boundaries are enacted in several ways. Herders maintain, narrate and refer to *hitos* and natural markers (similarities exist to what was discussed in section 5.2). Sometimes these seem straightforward and clear, for example, in the case of a cliff or outcrop. In other times they are more fuzzy, for example, when the border is the river or a stream in a bofedal that constantly 'moves'. When such places make up the border between Ccarhuancho and the community of Choclococha, families and estancias in that area often have strong kinship ties in both communities. I found something similar in the border area between Ccarhuancho and the community of Carhuapata. From the family that has their estancia here, the man's family is from Carhuapata, the woman's from Ccarhuancho. Their herd can seemingly cross the border between communities, or better the lived border is not a line, but the place where that herd roams.

Internally, the echadero boundaries tend to shift according to herd behavior, as well as because of local negotiations. Villagers indicate that if a person's herd becomes smaller, so automatically does the echadero that person accesses; when the herd becomes bigger, so does the grazing area. If a herd becomes too big, and would claim too large a grazing area, the community assembly urges that family to reduce the herd. While echaderos and bofedales in Ccarhuancho are shared and fluid, animals are private (family) property and are counted. Yet, they are subject to communal authority; for example, pigs are no longer allowed and the number of sheep a family can have is being reduced per community policy. After all, pastures and bofedales, affected by animal activity, do fall under collective decision making. So, the condition or wellbeing of wetlands that are difficult to delineate is connected to the measurability of livestock property; 'qualculated' not by scientific method but by other ways of judging (Callon & Law, 2005). While the Ccarhuancho asamblea seems aware of a mutuality about what can and cannot be counted, elsewhere resource property, under such fluid conditions, is tricky. Something

as ostensibly simple as an entitled wetland already poses complications for state legislation, at least in Peru, where land titles and water rights are seen as legally detached and are registered and measured separately.

Watery rights

Water property rights, though not exclusively, are more present in "irrigation water" enactments than in "environmental water", even more so if water is – or can be – volume-related; that is, if it can be measured and fixed. Hydrologists, who calculate meticulously the irrigation water requirements of crops or water footprint of companies (cf. Dominguez Guzmán et al., 2017), prefer to stay clear of the fluidity of bofedales. This is not only because of a view of wetlands as wastelands, but also because its unruliness cannot be (easily) calculated or made mensurable.[141] Instead, "environmental water" tends to define rights more in terms of the water needed to maintain bofedales and livelihoods. Herein, water is less regulated, but flows more freely. Environmental water needs, I hold, allows the presence of actors, like vegetation or earth-beings, without having to automatically fix, define or (ac)count for these; it allows for uncertainty or ambivalence (and other ways of judging, like the community's livestock strategy). The challenge of mensurability then, does not only pertain to the difficulties of separating water from land, but also to separating water from these other actors. Some waters are thicker than others, it seems.[142]

More things are vague or odd when thinking about rights and irrigated bofedales. Typically, irrigation rights involve 'withdrawal and use' (Verzijl, 2007; Boelens, 2015). Differently put, part of an available flow is subtracted and used for plant growth. On the other hand, use without subtraction is not linked to crops or vegetation, but refers to, for example, washing in or navigating canals or reservoirs. In the section above, I explained that bofedales operate like huge sponges where freshwater needs to flow *through* to maintain the needed water quality. It does not withdraw water but needs it momentarily, and so the question of irrigation as subtractive use becomes fuzzy. Put differently, all sorts of complications would occur if this kind of irrigation would have to be integrated into water legislation and management. Some of them I have already touched upon, like the property-rights-needs discussion above or the limits of new satellite and remote sensing technologies used to analyze these wetlands. It is proven (too) challenging to measure, calculate and regulate wet-land irrigation water. And thus, to convert it into property. More so, in the system that nobody sees, it becomes hard, over time, to distinguish between peatland serviced by irrigation and that produced by natural processes. Canals morph into the

[141] And even if they could determine precise water volumes and exact land surface against time, they would still miss the trout in the streams, the outcrop boundary marker, the invading grass species and alpaca excrement or the cave (rincón) that provide shielding; all these together with earth-beings and rotating herd(er)s enact the community bofedal.

[142] The political consequences thereof can already be witnessed; as nonhumans beings entered the "equation", like mountains (de la Cadena, 2010) or nature (Valladares & Boelens, 2017), calculation and matters of property become more difficult and complex.

bofedal, its history known only to who care for it. Still, all of the herders, in Ccarhuancho and elsewhere in the Andes, who invested in caring for and securing bofedal environments, including through rituals related to herds and earth-beings, create not water property (as in 'irrigation water') but the sense that "the water belongs to the mountains and the territories of which they are guardians and therefore to the people living in these territories [it] gives legitimacy to the claims of fluid ownership" (Stensrud, 2016, p. 68). It is only right, normatively, that the herders look after the water that takes care of them. Belonging is not to-be-property-of, but a mutual relation.

Increasingly, headwater pastoralist communities engage other water sectors to discuss "reciprocal payments" for these efforts (ibid; see chapter 5). However, says Stensrud in connection to a study in Arequipa, "the ANA [National Water Authority] engineers reject the possibility of a water payment to the highland provinces: water cannot be owned because it is part of the hydrological cycle and not stable in the ground" (2016, p. 67). The irony, if not injustice, of this ANA claim is that the "environmental water" in the Andean puna can apparently not be owned, or belongs to none, while hydraulic infrastructures in the puna that are endorsed by ANA to stabilize water, turn it into *licencia* or de-facto ownership rights elsewhere. Rights that are watery indeed.

The above reveals the controversy that feeds into the longstanding conflict between Ccarhuancho and other pastoralist communities of the Pampas headwaters on the one hand, and PETACC and Ica irrigation interests on the other. For more than a decade, the communities' water rights – as needs – were not, or could not, be properly addressed (see chapter 7). No-one calculated how much water was needed for the upkeep of a wetland. This despite a proverbial army of engineers, lawyers and other professionals working on this water conflict. Instead, options put forth to acknowledge communities and their bofedales seem to forego such calculation; these include plans to make the headwaters a protected area or the introduction of a retribution scheme for ecosystem services (similar to what is discussed in section 5.5; see also Bleeker & Vos, 2019).

While attempts are already underway to model, gauge and account for water quantities of such schemes in Andean punas (ABA, 2014), I observe in both instances, as well as in ANA logic, that the efforts to measure and quantify water invariably "rests upon and within that [space] which cannot be so enumerated" (Law & Mol, 1998, p. 30). There is a relationship of "necessary ambivalence" (ibid.) in that fluid space is needed for making things mensurable, for example, to create property, but it also inhibits the ability to do so.[143] Here an engaged ethnographer can make strange what others might consider a certainty, that property rights to water are co-defined by the fluid, by what it cannot delineate, calculate or see – and thus de-facto exclude.

[143] For everywhere, so argue Law and Mol (1998, p. 30) "in the attempt to make mensurable, there are resistances… [that] …refuse delineation and demarcation… [for]… that which may be defined and specified always makes its limits". What this translates into is that "irrigation water" logic or enactments are constituted by and harbour sites of unruliness and fluidity. Here, in this case and that of the previous chapter, this was the puna beyond the regulating infrastructure.

Crianza of amphibiotic space

I take here a moment to also reflect on the reversal of the argument above – that the fluidity of, for example, environmental water is needed for making irrigation water measurable. Turning the point around means showing that mensurable is needed for making the fluid (Law & Mol, 1998). I have described the fluidity of the human-bofedal environment (in the last two chapters) and have come up with an attempt to visualize that environment (in the previous paragraph). Indeed, this was done with the hope of securing or defending a particular version of it that was, and is, at stake in a larger water conflict. There are inevitable reductions involved in mapping such environments, fluid entities are fixed and other entities omitted to make a point (at a certain risk): that herders have a great hand in caring (crianza) for wetlands that hold great value.

What was absent in my visualization attempt of the bofedal environment were the relations, often spiritual, with nonhumans in their community and the ritual practices that involve water and mountain beings through which such relations are celebrated and enacted. As my conversations with herders prolonged, I became more aware of the importance of these relations; as constitutive of the 'system' that nobody sees. A revered and amphibiotic space. To talk about this 'system' is fraught with a necessary ambivalence, for to enact what cannot be seen there is a need to mobilize (delineate or describe) actors that are visible – such as the corral with specific openings, the alpaca earmarks, the flat stone on top of the spring (section 6.1). "So the mensurable is necessary to fluidity … but it also subverts it" (Law & Mol, 1998, p. 26). Making visible what nobody sees is at once a risk and a necessity to defend community wetlands from supra-community contestations, for only what exists can be protected. Or so I believed, together with community representatives. It is needed because it can be used for the *interessing* (captivating or attracting) and *enrolling* of allies, for example, water justice platforms, but also certain environmental (government) agencies. It is also dangerous because visibility and legibility give others the means to capture and regulate it. For example, a beginning can be made to calculate water requirements or charge fees per unit of wetland (land and/or water), or express the number of alpacas in monetary terms to be contrasted with other values generated by the same water, or with values of water elsewhere. Despite the challenges (of rights, population and climate), the Ccarhuancho herders are confident that, through "the ingenious use of their resources", they can sustain their amphibious lifeworlds (Fals Borda, 1984, p. 165A); that is as long as they succeed in securing and protecting their water sources. In the human–bofedal–animal–water interactions, practices of revering, caring and infrastructuring are key and constitute (or enact) the ecology of high-altitude wetlands.

In pastoralist communities like Ccarhuancho, community actors, animals, waters and other beings are interwoven in a reciprocal web of mutual care or (see also ABA, 2014; chapter 5).[144]

[144] In the city of Ayacucho, I spoke of the bofedal irrigation practices to representatives of the NGOs ABA and Kanas (see chapter 5). To them, my story of Ccarhuancho herders was an example of crianza, of caring or nurturing of wetlands and water sources that in turn take care of herders and community. The term itself I did

Herein land and water are more than resources that can be made measurable or treated separately. In these amphibiotic environments, bofedal irrigation practices enhance the quality, spatial coverage, and incidence of vegetation to support the alpacas that (are) care(d) for (by) herders; the constructed canals (amphibious technology on their own) combined with family huacas and a strong communal authority means that these amphibiotic environments often remain invisible to the uninitiated (see also Jensen, 2017; Morita, 2016).

There are thousands of communities like Ccarhuancho with similar peatlands and peatland potential in the Andes (Postigo et al., 2008). Aside from local use and conservation, as shown in this chapter, bofedales or peatlands have the ability to store and purify water, regulate regional hydrology, and capture carbon (cf. Zedler & Kercher, 2005). This is recognized in other mountain areas as well, such as the Ruoergai plateau in the Himalaya (A. Chatterjee et al., 2010; Joosten et al., 2012; Zhang & Lu, 2010), where, as in the Andes, scientists and "restorationists" ally with local pastoralists to halt peatland degradation (Zedler & Kercher, 2005, p. 60). Such recognition, however, often does hardly appreciate existing local efforts at community care, and governance of amphibious environments and maintenance. Recognizing pastoralist knowledge and wisdom cannot be done in existing ecologists or hydrologists' terms; it also involves a broader understanding of governance than one that is based on generic institutional arrangements and blueprints for individual or common-property entitlements to pastures, land, or water rights.

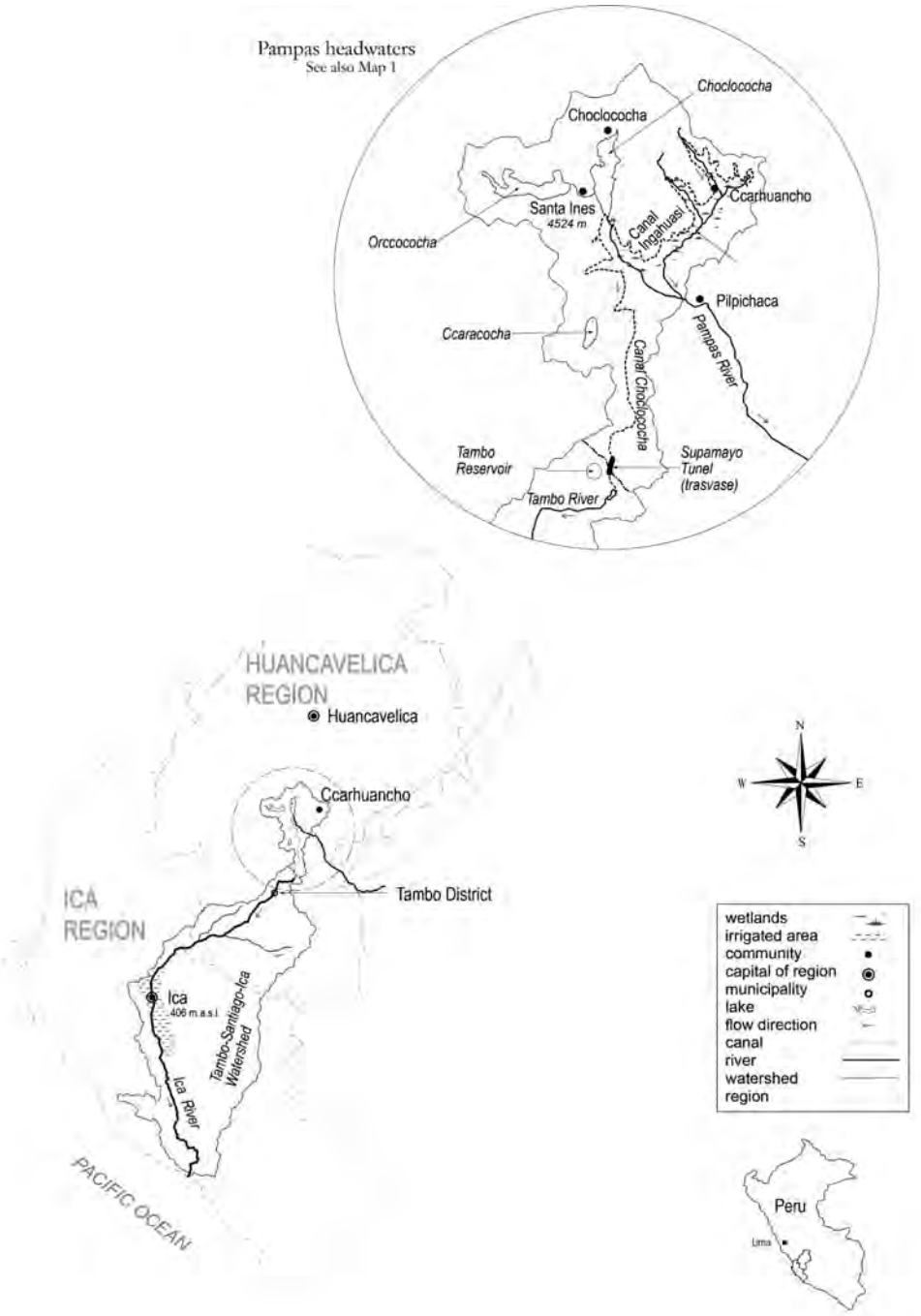
Critical to this is seeing how, in the agroecology of bofedales, actors are deeply interconnected and in flux: canals "melt" into the bofedales, which diffuse into the surrounding pastures, and all have interdependent relations and spiritual connections with herd behavior, herders and earth-beings. Instead of unraveling biotic and abiotic components or separating units of a 'natural' environment to which a community might have access entitlements or property, I propose, like Orlove (1977, p. 80) to treat this reciprocal web of interconnected (non)human entities as a community; an amphibiotic space wherein the fluid and the visual disrupt and depend on another continuously, forming a centuries-old body of sustainable governance or of mutual care.

not hear associated with water in Ccarhuancho, only with herding. The crianza approach and (cosmo)vision however, I felt in stories and observation of the herders collected since 2007.

7. To defend our wetlands:

Solidarities and scale-making in an Andean water conflict

Image 9: Public gathering in Cajabamba



Map 15: The Pampas headwaters & Tambo-Santiago-Ica Watershed

This is the chapter in which I recall the different practices and strategies the indigenous community of Ccarhuancho undertook, and the various actors and allies it has mobilized, in order to defend their wetlands and water. Unlike other accounts of an interregional water conflict, it particularly focuses on the community actor-world and on the ways in which community members build allies and manufacture scales.

An observation of a press conference, in which Ccarhuancho and other Huancavelica communities presented the verdict of the Latin American Water Tribunal, serves to reveal the scope of their actions and my involvement with their cause. The principal points of the appeal were the cancellation of future hydraulic projects and a sharing of the control of existing water infrastructure. The press conference also reveals the unease of actors and institutions that considered themselves the experts or leaders of a water governance domain (section 7.1).

The Ingahuasi catchwater drain is the envisioned water infrastructure that is most contested. Following the installment of subsequent regional governments in Huancavelica and Ica, deals were made, funds assured and decrees devised to see the construction of this infrastructure through. The objections and protests of mainly Ccarhuancho and communities in the Pampas headwaters stalled the process, resulting in a momentary shelving of Ingahuasi. Each time realization seems less likely (7.2).

Ccarhuancho does much more than protesting, though. In their defense, community leaders are actively and constantly forging and fostering alliances. These alliances, with either government agencies, NGOs or action-researchers, have to be seen in terms of mutuality. This is at least how Andean comunera(o)s tend to see them. They materialize in, for example, breeding programs, platforms or writings. Also, nonhuman allies are often mobilized by the community to strengthen their position (7.3).

Through such networks of connections and alliances, Ccarhuancho not only maintained its position, but also sought to reshape categories and scales such as that of indigenous community or watershed boundary. Important for community members was to not get roped into a hydrological unit of management, of Ica-Alto Pampas, without guarantees about their water rights and shared control of hydraulic projects. Together with allies, they, in part, succeeded whilst dealing with scale-making practices of their adversaries in the Ica government (7.4).

At the initiative of Ccarhuancho and communities in the Pampas headwaters, a roundtable was installed at the *Presidencia del Consejo de Ministros* (or Prime Minister's Office) to mediate a dialogue among involved stakeholders. After initial friction, the communities deemed the talks constructive only to be put on a side-track by an agreement amongst regional politicians. Still, the outcome of the agreement and roundtable, itself partially the product of countless community mobilizations and transformations, saw the termination of the Ingahuasi project and shared control, between regions, of the hydraulic project. A success, though by no means permanent, for the Pampas' pastoralists (7.5).

This chapter informs the question: *how do Andean communities and water user groups shape large scale hydraulic infrastructure (plans) to secure (either procure or protect) a water source and what are the impacts hereof.*

7.1. A pastoralists' press conference
Disseminating an ethical verdict[145]

On the 27th of October 2007, leaders of four small Andean communities held a press conference in Lima. The venue was the building, or *casa communal*, of the association of people from Huancavelica, the region to which the communities of Choclococha, Pilpichaca, Santa Ines and Ccarhuancho belong administratively. Their aim was to disseminate the verdict by the Latin American Water Tribunal (TLA) that was issued earlier, at a public hearing in Guadalajara, Mexico. In Guadalajara, representatives and spokespersons of the four communities had presented the case of the encroachment of their water rights in the past, and had demanded formal acknowledgment of the impacts of the construction of new hydraulic works - mainly the Ingahuasi catchwater drain - on their lands. Invitations had been sent out to regional and national media, the Huancavelica government, NGOs and other stakeholders from the Peruvian water sector. The community leaders had also officially notified the parties they had denounced: the national government, the government of the Ica Region and PETACC.

The turnout at the press conference was a bit disappointing. Water engineers from Huancavelica that had previously assisted the communities were pressured not to attend.[146] Politicians from both regions, including regional presidents, were also absent. From the locally affected communities, only six persons participated. They were accompanied by a handful of civil society representatives from the area. Others present included water activists, members of national water platforms and universities, and other interested actors that remained ambiguous about their function when asked about it. I was there too, affiliated with a Peruvian NGO, Centro Bartolome de las Casas (CBC), and connected to an inter-Andean action-research project, *Concertacion*, that was coordinated by researchers of the Wageningen University. In a way, I would have liked to be there as an observer, but that was not entirely possible, since I had traveled with community representatives to the Latin American Water Tribunal (TLA). And had offered support where I could.

Latin American Water Tribunal

The Latin American Water Tribunal (TLA) is an international and independent court, based in San José, Costa Rica, that strives for environmental and water justice. Its resolutions have a moral and ethical character and are not binding, but refer to international treaties that are signed by

[145] Image 9 (p. 175): Public Gathering in Ccarhuancho (held on the village square). Source: Silvano Guerrero. Material for this chapter was previously published as Verzijl, Hoogesteger and Boelens (2017) "Grassroots Scalar Politics in the Peruvian Andes"; Guerrero Quispe, Verzijl and Vos (2018) "Espacios de Diálogo: Antagonismos, agendas y acercamientos en el conflicto hídrico birregional Ica-Huancavelica, Perú"; as well as Hoogesteger and Verzijl (2015) "Grassroots scalar politics: Insights from peasant water struggles in the Ecuadorian and Peruvian Andes". A short overview of the conflict was published as Guerrero Quispe and Verzijl (2015) "Struggle and Success in an interregional water conflict in the Peruvian Andes"

[146] Especially those from local branches of national institutions. Interview with the ATDR Hcva, 20-10-2007.

states and denounced parties (cf. Maganda, 2010; Mirosa & Harris, 2012). Periodically, the TLA organizes public hearings in different cities in Latin America, during which cases are presented of human and water rights violations. A panel of seven judges, who are experts on environment and international law, analyze the complaints and give their verdict. In 2007 a public hearing was held in Guadalajara.

When I was told of their cause, the appeal of the four Andean communities had already been accepted by the TLA. They were invited and needed to gather the funds for their trip. At CBC, I received an email about this by one of the community leaders of Ccarhuancho. He asked the coordinator of the NGO's water education program for general support, including financial backing and help with finalizing the appeal. In the end, CBC and Concertacion, together with Diakonia (the Swedish Development Organization), put the funds together that allowed a party of three – the communities' spokesperson who was from Ccarhuancho, their legal advisor from the NGO CEPES and myself[147] – to go to the TLA in Mexico.

The communities' appeal was scheduled on the 8th of October. The denouncing party was the *comunidad indigena de Ccarhuancho*. The hearing was held in the auditorium of the Guadalajara University. It was a solemn room, high, with teak-like wooden walls and Doric columns. On a raised stage, below a marble arch, there was a lectern and a judges table, both from mahogany colored wood. Behind the table, there was an impressive 30 feet-high mural that depicted a people's struggle against their authorities. It seemed a bit pompous as well as befitting. Unfortunately, none of the involved authorities, none of the stakeholders but us three, would see the room. Or hear the appeal. The TLA organization had notified the denounced parties – the national government, the government of the Ica Region and PETACC – and had invited them to rebut, but they declined. Instead, a PETACC lawyer has sent a letter explaining that the appeal should be annulled because of a violation of due process. This was overruled by the TLA judges.

And so, the Ccarhuancho spokesperson, representing his own and three other communities, took the stage. He was one of the few with a PowerPoint, but that did not detract from the fact that he was a natural speaker, with the grace and gestures of that come with years of speaking publicly in community *asambleas* – or so I thought. He explained how, since the 1950s, hydraulic works had existed in the territories of Ccarhuancho, Choclococha, Pilpichaca and Santa Ines. These works, that transfer water to Ica, had negatively impacted community livelihoods and ecosystems without these communities receiving any form of compensation. The hydraulic works had led to village inundations and displacements, human and animal causalities, and the disruption of grazing patterns and herd rotations due to canals lacking proper crossings. Without

[147] My support was modest. In Lima, I took care of certain logistics, like arranging flights, and I helped the community spokesperson get a last-minute visa after it was initially denied. In Guadalajara I made photos and video footage and was a sounding board before the messages about the TLA and appeal were communicated to newspaper and radio stations back home. Also, I assisted in honing the wordy PowerPoint slides of the community representative; but mostly I learned, through conversations, about the water conflict and the pastoralist way of life that was being threatened.

water, hundreds of hectares of the valuable, yet vulnerable bofedales had already been lost (see also Pacheco, 2010)

Currently, he continued his plea, PETACC is planning a catchwater drain, Ingahuasi. This drain will accumulate all water sources and runoff above it, to channel these to the Choclococha Lake and onwards to the Ica Region. He explained how his community stands to be affected the most by this transfer of water, as it will further destroy bofedal wetlands. He posited that the drain constitutes a breach of their human rights, of ILO Convention 169 concerning indigenous and tribal peoples, and of the RAMSAR Convention on wetlands. More so, PETACC actions are in conflict with the Peruvian constitution, the recent decentralization laws and the general water law 17752.[148]. The communities' demand entailed compensations for past damages and the retraction of two legislative decrees, in order to dismantle PETACC and annul the reservation of 52 MMC of water-born on community territory for the future Ingahuasi project.[149]

Three days later, on 11 October, the judges unanimously ruled in favor of the communities. They held PETACC responsible for the destruction of wetlands and reprimanded the governments for not fulfilling national and international obligations. One of their recommendations was for the denounced to stop the advance of Ingahuasi. Others were about compensating the communities for past damages and for providing environmental services; to review the legislative decrees; to execute an EIA (Environmental Impact Assessment); and, based on these resolutions and recommendations, design and implement a comprehensive watershed management plan.[150]

A success story, it seemed to me. And a big reward for the Ccarhuancho leader and CEPES legal advisor, who spent countless days gathering the legal and historical documents to back-up their case. Feeling victorious, they traveled back to Peru to spread the news.

Freedom to press?

At the scheduled start of the press conference, none of the – officially notified – denounced parties or national media were present. After waiting for about half an hour, the communities' representatives decided to begin. Their idea was to give the same presentation as in Mexico, followed by a clarification of the verdict and questions from the attendees. Around the time that the communities' representatives started to talk, a group of about twenty persons entered the room. They were PETACC engineers, leaders of Ica water user associations, officials of the Ica government and news reporters from the Ica media. After they took their seats, PETACC's head

148 A detailed explanation of all legal stuff and breaches was presented by their legal advisor – who did use the lectern.

149 Text for this subsection is based on and adapted from the presentation given in Guadalajara and their (Guerrero Quispe & Pacheco, 2007) appeal: 'La Demanda de la Comunidad Indigena de Carhuancho'.

150 For verdict see: http://tragua.com/wp-content/uploads/2012/04/Caso-Carhuancho.pdf (accessed 29-03-2019).

engineer demanded a time slot after the community leader and legal advisor had given their presentations. In the exchange that followed, he verbally bullied a spot for himself on the main stage, overpowering the somewhat flabbergasted organizers.

During his talk, the engineer downplayed most of the negative impacts that appeared in the appeal and verdict. He ignored other ones and instead insisted that PETACC stimulated local development and the economy by offering work opportunities. He also said that the construction of Ingahuasi had not even started and that he could not be blamed for something that was still in a design phase, mocking the TLA judges for this oversight. Finally, he stressed that he had written agreements – waving documents around – with all four communities endorsing the project, claiming that the trip to the TLA was an individual act of someone against progress. After his talk, several of the six delegates from the communities appeared to shrink back and remained silent, others passionately dismissed his comments. After some arguments back and forth, the meeting was ended. The engineer's retort downplayed a sound presentation and case of the alpaca communities. In the end, some independent journalists did their interviews. There were no cameras to be seen, no professional photographers identified. The Ica newspaper that evening stressed that water users of the irrigation system in Ica were the victims, and that the Ingahuasi project would continue one way or another, but now in consultation with the communities.

The actions of the head engineer were remarkable. He stormed the stage, something he would probably not have done if politicians had held the conference. It is also doubtful whether a pastoralist would have been allowed to ask a critical question, let alone given time to speak, at a press conference announcing government funding of hydraulic works deemed prestigious. Had the press conference been held in Ccarhuancho's village square, the head engineer probably would not have come either because he could not have been be bothered – or because he would have felt intimated. This goes to show that the communities' mobilization of the material world matters, and sometimes comes with unwanted consequences. The episode also revealed something about the relation between an Ica engineer and Huancavelica pastoralists at the time. To the engineer, it was clear who the rightful spokesperson of the water sector was, and who was backward. The verdict, ethically or not, would not be adhered to. Still, (and regardless of its nonbinding character) the verdict of the TLA was considered a huge moral victory by those in Huancavelica, and Ccarhuancho in particular. It helped to strengthen the communities' resolve and position vis-à-vis both allies and adversaries and was one of the decisive actions undertaken by Ccarhuancho community members to defend their water and wetlands.

The following sections will provide more details about some of the other practices of communities, showing how they have shaped an interregional water conflict. I purposefully attempt to trace these practices and community views in order to demonstrate their entanglements and influences in a partially connected water sector. Key in that regard is the Ccarhuancho presenter of the TLA appeal. He is the spokesperson who championed the defense of bofedales and community water rights and with whom I co-researched issues that pertain to

securing wetlands. From the time we traveled to Guadalajara together, we had numerous conversations about the (material) allies that were enrolled in Ccarhuancho's defense. We also discussed about the opposing actors who resisted this by insisting on the realization of the planned hydraulic works. To this, I will turn first.

7.2. The Ingahuasi imperative.
Perpetual promise, persisting protest

Following the press conference, the newspaper reporting about the Ingahuasi continuation was a typical response of Ica actors when some obstacle rises that put 'their' hydraulic works in jeopardy. For decades, the Ingahuasi catchwater drain had been hailed and promised as the answer to water problems in the desert valley. Sure, part of the infrastructure in the Pampas headwaters had already been realized in the 1950s and brought precious water to the Ica Valley, but since the agro-export boom of the 1990s, water scarcity was felt increasingly by both surface and groundwater users (Oré & Damonte Valencia, 2014; Rendon, 2009). Over the years, no matter what new water availability studies, evidence of feasible pastoralist economies, international legislation and treaties, dialogue initiatives, or emerging stakeholder platforms presented themselves as obstacles, the Ingahuasi drain had to be realized *"si o si"*. At least according to actors in Ica, some of whom recall a law dating back to 1945, which stipulated that water in the Pampas headwaters was to be allocated to Ica (see also Dominguez Talavera & Chiong Ampudia, 2018).[151] Public discourse about water shortage in Ica was one of catastrophe and confrontation: "Ica is dying of thirst" and "winds of war blow from Huancavelica" are headlines associated with the Ingahuasi project (see also Urteaga Crovetto, 2014). At the same time, this infrastructure, as part of the larger development scheme, received repeated backing and funds from Ministries and the national treasury.

Meanwhile, the pastoralists in the Pampas headwaters lived the negative, sometimes disastrous, effects of large infrastructure: the Choclococha village was inundated by the dam and subsequent water level rise of the lake; large canals cut migration routes and echaderos; while animals, fell in the canal and drowned. On top of that, the infrastructure caused several fatal accidents among the pastoralist families who made sporadic, and fruitless, reclamation attempts, but were never honored. The conflict that mostly laid dormant since the 1950s, flared up again in the years following 2003. This was connected to the installment of regional governments in Peru. With every new four-year period, it seems, Ccarhuancho and other communities are faced with new actions, decrees and resources that result from recurring electoral promises in Ica to make Ingahuasi happen.

[151] To contrast this historic claim and mobilization of law decree D.L. 10253: the community of Ccarhuancho mobilized a document dating back to 1712, stating that the land they occupied, and resources on it, where allocated to them and theirs by the Spanish Crown.

Decrees and decentralization

A firestarter, according to the Ccarhuancho spokesperson, was D.S. 021-2003-VIV issued in November.[152] This decree transferred the *Proyecto Especial Hidroenergetico Tambo Ccaracocha*, or PETACC, from the National Development Institute (INADE) to the regional government of Ica. And with it, substantial funding from the treasury was transferred as well. It was one of the decrees that the Huancavelica communities emphasized in their TLA appeal. This happened when regional governments had only just been installed as part of Peru's decentralization process,[153] which included the transfer of social projects, poverty alleviation programs and hydraulic infrastructure projects (*Proyectos Especiales*).

All transfers were coordinated by the National Council of Decentralization (CND) and corresponding implantation legislation[154] stated that project transfer will happen "in function of the management capacities of each regional government". Given that PETACC is a multi-purpose hydraulic project with a planned hydropower component and new infrastructure all within Huancavelica territory, in high-altitude environments, the transfer to Ica was not uncontroversial. Oddly, in the decree[155] that issued the transfer of the national project to Regional Government of Ica, "Huancavelica" was not mentioned at all. The new regional president of Huancavelica protested against this and went to the CND to discuss the matter, but to no avail.

Years later, when he was preparing the appeal for the TLA, the Ccarhuancho spokesperson heard that the regional president had accepted – or was made to accept – a compensation for not pursuing shared, bi-regional, control of PETACC: 1000 vicuñas to set up a prosperous wool economy in the Huancavelica puna.

The second decree that the communities wanted annulled by the TLA, was the D.S. 039-2006-AG, which reserved 52 MMC of water for the construction of the Ingahuasi catchwater drain (see map 10). It was issued in July, only months before the second regional elections in Peru. When Ccarhuancho authorities got word of the decree, they took a number of measures.

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[152] It was not until rehabilitation works started on the old Choclococha Canal, sometime after 2003, that communities became aware of this decree and the transfer of PETACC. The project brought machinery and dynamite to the four communities and contracted peasants as cheap labour. Two of Ccarhuancho's leaders, board members, went to the PETACC office in Ica, demanding that the project would '*stop blowing up mountains, destroying bofedales and using campesinos as slave labour*,' but their plea went unheard. Several weeks later, the machinery was damaged. The perpetrators of this sabotage were unknown, and PETACC solicited the arrest of the two Ccarhuancho leaders. This fuelled the conflict further for the communities; and might be considered the beginning of the conflict for actors in Ica.

[153] Regional elections are held every four years. First regional governments were inaugurated on 1/1/2003. Elections are held in October or November of the previous year and generate a lot of debate (and electoral promises) about hydraulic infrastructure.

[154] See decree D.S. 036-2003-PCM, article 2

[155] See (D.S. 021-2003-VIV)

PETACC workers were denied access to the community[156] and, since the drain would impact members from Ccarhuancho the most, they also organized a public gathering in September 2006 (see image 9). This gathering was held on their village square, overlooking the bofedales that would be affected by the decree.[157] It worked. Ccarhuancho's cause got attention from Huancavelica water professionals and public officials. One of the outcomes of the gathering was the agreement that a delegation of Ccarhuancho pastoralists would assist in a public water forum held in the capital of the region, a month later, to discuss the encroachment of Huancavelica water rights (see also section 7.3).

In Ica election campaigns, Ingahuasi was high on the agenda and connected to the promise of national President Alan Garcia to realize pending hydraulic works to augment irrigation. Shortly after the installment of the new regional governments in 2007, Garcia appeared in Ica and pledged 30 million US dollars to advance the catchwater drain. The news sparked a series of protests in Huancavelica. There were also talks of occupying the dam and close its sluices. After this unrest, the newly installed regional presidents from Ica and Huancavelica were summoned to the *Presidencia del Consejo de Ministros* (PCM). Mediated by the Prime Minister, a deal was struck: Huancavelica would receive an equal financial contribution of 30 million from the Treasury, for reforestation in the area of influence of PETACC and for water development programs elsewhere. In return the president of Huancavelica had to approve Ingahuasi and decree D.S. 039-2006-AG. Once alerted to this deal, pastoralists and the general population and civil society organizations in Huancavelica were outraged. What followed was an explosive protest that paralyzed the city in July of 2007. Hundreds of communities members, who stood to be affected by PETACC, joined between 8,000 to 10,000 other people in the mobilization by. Walls were painted with slogans about water theft by Ica, shops were closed and the power plant was taken. The electricity to the city and also to part of the Ica region, was cut off. The regional president, who fled the city, backed out of the deal. Mere months later, Ccarhuancho and the other communities pleaded their case in Mexico.

After that protest and the TLA verdict, the situation around Ingahuasi can be described as less tense. First dialogues were held and PETACC agreed to work out a PAMA (*Programa de Adecuacion y Manejo Ambiental*), a program to settle the negative impacts of the existing infrastructure, before advancing an Environmental Impact Study (EIA) of the Ingahuasi catch

[156] They did so by written notice. At one time Ccarhuancho community members stopped a car – and asked for identification and who the car passengers worked for. When there was no answer, they took the plans and ID form the passengers and handed these over to the *fiscalia*, reporting trespassing on their lands. In Ica media and newspapers this was reported as harassing of PETACC personnel (story obtained from my travel companions during our stay in Guadalajara, 09-10-2007).

[157] Some 500 people attended; participants included pastoralists from the neighboring communities, municipal authorities of adjacent districts, NGOs and Huancavelica government officials. Finally, a handful of Ica representatives also arrived, upon invitation, but the PETACC chief engineer waited at the edge of the community, having made himself unpopular due to arrest warrants and earlier visits.

water drain. More so, big changes were happening in the country's water administration: a national water authority (ANA) was installed in 2008, and water professionals believed that a new national water law[158] would create further space to dialogue.

It is my guess that the Ica government and national governmental agencies figured that, through workshops, dialogues and compensation, the communities would eventually approve to the Ingahuasi project and the realization of the catchwater drain. Perhaps with good intention, but still *si o si.*[159] Nevertheless, communities were fully aware of such a strategy and could not be swayed, even when welcoming some of the benefits.

Of national interest

In 2011, a third group of elected regional presidents took office. And within days, a new decree, *decreto de urgencia*[160] was issued, which declared the Ingahuasi catchwater-drain as a project of national interest. The decree included other prioritized projects throughout Peru to be realized through private sector involvement (Dominguez Talavera & Chiong Ampudia, 2018). Two of them were also about getting water to the Ica Province: the Tambo and Polverada Reservoirs. The latter project would divert water from the adjacent Pisco River to the Villacuri plain in order to recharge groundwater reserves (see map 15).[161] This entire infrastructure project is located in the Ica Region, while water originates in Huancavelica. On the other hand, the Tambo Reservoir, with a projected capacity of 55 MMC, lies in Huancavelica, in the district of Tambo. It connects to the other hydraulic works in the Pampas headwaters, but is itself planned in the uppermost part of the Tambo-Santiago-Ica or TSI Watershed. The Pampas communities, in particular Ccarhuancho, follow the Tambo reservoir developments skeptically. Since the reservoir has no catchment area, its feasibility is tied to water coming from elsewhere. This would mean, as I once discussed with the Ccarhuancho spokesperson, that the realization of Tambo would increase the legitimacy of Ingahuasi. Certainly, the construction of the Tambo reservoir is in the interest of

158 See D.L. 29338.

159 Interests and influences behind these infrastructural projects are powerful and often embedded in the spaces that are created to negotiate and dialogue – thus pre-setting accepted outcomes (see also section 4.1). Regardless of social, economic or technical opposition such projects moved ahead, seemingly unstoppable (see Dominguez Guzmán, 2013; Flyvbjerg et al., 2003). Ofcourse, outside of these dialogue spaces, beyond community involvement, interests and influences behind these infrastructural projects are pushed forward (see section 7.5).

160 *See Decreto de Urgencia* D.U. 001-2011.

161 Unlike the Ica River – and most Rivers on the Pacific coast – the Pisco River has water year-round. Various sources refer to a volume between 80-120 MMC for the Polverada reservoir. The aquifer underneath the Villacuri Plain, for which the Polverada water is destined, has no natural surface water recharge. It connects to the Ica Valley Aquifer. Hydrogeologists say there is a net waterflow from the latter to Villacuri and it can thus also be replenished by water diversions from Pampas headwaters in Huancavelica.

the irrigators of the Tambo municipality or district, since they are the first who can utilize this water (Guevara-Gil, 2014). There is, therefore, a tension between these irrigators from Huancavelica and the pastoralists that, according to Ccarhuancho's spokesperson, Ica actors are trying to exploit (see also Oré & Geng, 2014).

The three projects of national interest (Ingahuasi, Tambo and Polverada) underline the importance given by the national government and Ica actors to get more water to the area where agro-export is booming. A *decreto de urgencia* means that normal legal processes, like, for example, an approved environmental impact assessment, can be circumvented. It also means I have been told, a possible further criminalization of social protest. The new president of Huancavelica was not against the proposed hydraulic projects, but he would only agree to these if there was no opposition from the communities in the Pampas headwaters. And there was. Seemingly, Huancavelica institutions, municipalities and officials were also opposed, but for reasons of affiliation and/or possible prosecution, they remained more silent. Still, while certain legal constraints could be removed, moving ahead without some form of community consent would complicate matters for those interested in the realization of the hydraulic works of national interest.[162]

In response to the *decreto de urgencia*, a public hearing was held in April of 2011 in Tambo. This was the district where the reservoir with the same name was envisioned and was to be realized. Representatives of different Huancavelica municipal governments were present, as were Ccarhuancho and other communities of the Pampas headwaters and regional government agencies. Since consent and cooperation with regard to the Ingahuasi catchwater-drain was difficult to achieve, the hearing was about the Tambo reservoir only. A delegation from Ica, including the Regional government, PETACC and Ica water user associations, pushed for the signing of an agreement that would move reservoir construction forward. There was talk that a compensation of 2 million soles (approx. 730,000 US) was negotiated with the community of Santa Rosa de Tambo.[163] After a tense hearing and debate among stakeholders, including heated discussions[164] between communities from the Pampas headwaters and municipal districts and

[162] The matter of how to deal with community consent (the ILO 169 Free Prior and Informed Consent, or FPIC) or *consulta previa* of indigenous communities was very topical at the time in Peru. This was in response to the violent Bagua conflict in 2009 that left dozens dead (Bebbington, 2009). Consultation processes with indigenous communities, like Ccarhuancho, were both a must and sensitive. Interestingly later in 2011 Decree D.L 29785 was adopted that recognized the right to FPIC. However, also in this law the national government is able to overrule indigenous communities for the sake national interest (see also Flemmer & Schilling-Vacaflor, 2016) – which would then constitute a breach of ILO 169, signed by Peru.

[163] Because the reservoir was to build on the territory of the community of Santa Rosa de Tambo. Like in the case of Socos the biggest community and the municipality carry the same name and overlap in a lot of affairs. Matter of land and territory, however, appear handled by community authorities.

[164] community members in the Pampas headwater and Huancavelica municipalities in the Tambo-Santiago-Ica watershed often have ties with cities close by – for example for education and secondary income – and, while living in these cities, they often retain active or sleeper rights in the community as well as familiar relations and

communities in the upper part of the Tambo-Santiago-Ica or TSI Watershed, the decision was made not to sign an agreement that day (see also Ore and Geng 2014). An important reason was the unclear status of the Ingahuasi project that Ccarhuancho and other communities wanted cancelled since 2006 and that was now elevated to something of national importance together with the Tambo reservoir.[165]

Later that year the *decreto de urgencia* was translated into an official law, D.L. 29777. Ingahuasi was no longer mentioned. Furthermore, a deal was suggested to Huancavelica's president that the project 'Sierra Exportadora' would implement programs of tara and maca cultivation in the Tambo-Santiago-Ica watershed if the Huancavelica regional government would agree to then just do the Tambo reservoir project. The promise of Ingahuasi seemed to fade. Momentarily.

The Ica electoral campaign of 2014 was again fixed on the promise to deliver water. Ingahuasi also re-appeared on the agenda. Some candidates claimed to have community consent (*licencia social*) to start the construction of both the Tambo reservoir and Ingahuasi. One candidate launched his idea of "agua grande": the realization of hydraulic projects through private sector involvement and ProInversion, Peru's Private Investment Promotion Agency. He had had firsthand experience working in *Proyectos Especiales* with private operators in the North (del Castillo, 2013; see also Dominguez Guzmán, 2013). And he won the election.

Shortly after the inauguration of regional governments in January 2015, a series of déjà-vus followed each other rapidly. Both presidents from Ica and Huancavelica met with the Prime Minister, herself *Iqueña* and national president Humala. The outcome was a support for hydraulic projects that favored Ica and promises to invest in pasture management and alpaca breeding programs for the Andeans in Huancavelica. The Ica president hinted at having community consent. Also, the national president Humala appeared in Ica and confirmed his support, together with a 750 Million Soles pledge (250 Million US). Encouraged by the Prime Minister, the Ica president and the Minister of Agriculture and Irrigation (MINAGRI) established the "Alianza por el Agua para Ica"[166] in which the latter vowed to remove any obstacle or administrative obstruction in order to advance infrastructure investment. This essentially bypasses, similar to the decreto de urgencia, certain legal prerequisites; in this case, most likely, the necessary installment of Watershed Boards to approve infrastructural projects (see 7.4).

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a house and land. In this case the Huancavelica municipalities tend towards Ica because of easy access (there are even branches of municipal offices in Ica). More importantly perhaps, they are affected differently by PETACC hydraulic works and can potentially benefit from water diverted from the Pampas headwaters.

[165] Interesting detail, according to community members from Ccarhuancho, is that during the day of the hearing – and with Ccarhuancho's most outspoken representatives in Tambo, prominent persons from the Ica water sector travelled to Ccarhuancho to speak with those left behind and obtain their signed approval. To no avail. This kind of signatures were also waived by the PETACC engineer during the press conference (section 7.1). Never however are these matters agreed upon by community asamblea – which is their acting authority.

[166] See convenio de colaboracion 002-2015 MINAGRI-DM

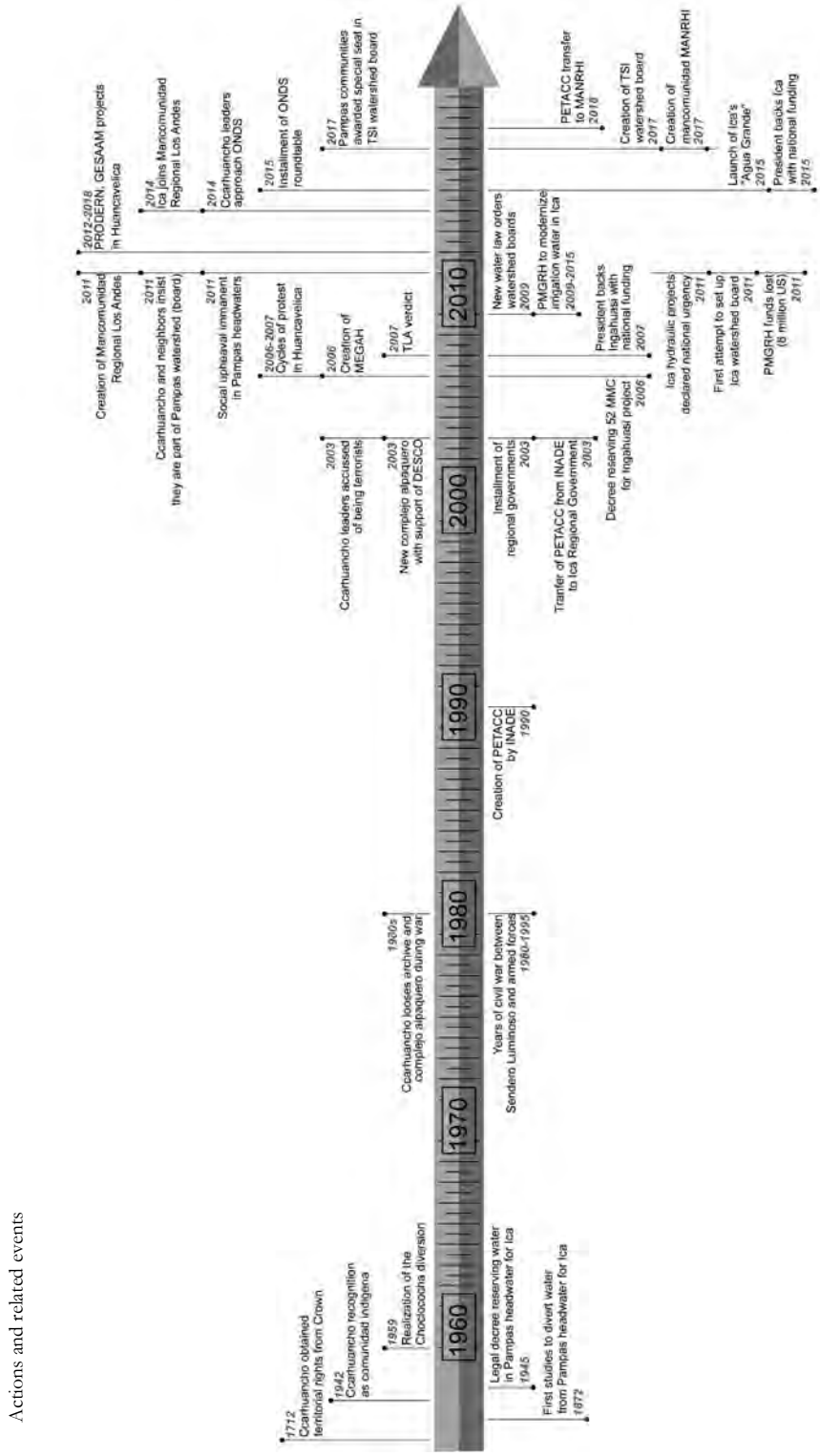

Figure 3: Timeline Ccarhuancho

Actions and related events

Again, Ccarhuancho, and the other communities, responded quickly, mainly to rectify the false claim that communities had consented to the projects (signatures were perhaps collected from individual community members separately, but a formal 'asamblea comunal' had never given permission or consent). Additional fuel to the fire was the suggestion that a promised 49 million Soles (19 million US) investment fund, for improved and beneficial access roads in Huancavelica, would somehow balance the amount awarded to Ica. Indignant, Huancavelica actors considered the roads as much or more a necessity for construction trucks to bring building material to the Pampas headwaters. Two days after President Humala's visit to Ica, the Pampas communities held an emergency meeting (asamblea extraordinaria). They contacted media outlets, painted walls and streets to signal their discontent. Ccarhuancho and Pilpichaca denied PETACC entrance to their territory. The situation was grim and the president of Huancavelica, fearing the social upheavals that community leaders warned him about and that were witnessed elsewhere in Peru, insisted that the hydraulic works be suspended. He would not sign and backed a community initiative to install a roundtable (section 7.5).

Later, when Ccarhuancho representatives and other authorities from the Pampas headwaters met with the president of Ica, Ingahuasi was shelved once again. But for how long? The *si o si* mentality seems a persistent one among actors in Ica and national government officials. Persistent because it is anchored in a strong sense that this water somehow belongs to them, or is not needed in Huancavelica. This is evidenced by the deals negotiated by regional presidents and national politicians since 2003: vicunas, forestation, tara plantation, alpaca breeding or pasture improvement programs in exchange for water; all without addressing, in any real way, the matter of co-administration of hydraulic works or of the water rights and needs of Huancavelica communities.

Combining all the legal decrees, high-level commitment and funds that backed up and enabled the Ingahuasi project, it is in many ways remarkable that so little advancement has been made. To appreciate this better, the next two sections will look at how Ccarhuancho forges allies and manages scales. An overview of Ccarhuancho's actions and related events in the water conflict are presented in figure 3.

7.3. Supra-communal solidarities
On ally and *ayni*

Historically, Andean community members, in this particular part of the southcentral Peruvian sierra at least, have always been skilled alliance builders. This is in part because here, different interest groups always competed over ecological niches and labor tribute. These interest groups were initially different (often previously displaced) kinship and ethnic groups and later included Spanish colonizers and feudal haciendas. In this web of actors, alliances were crucial (Stern, 1981). Today, actors like extractive industries or hydraulic projects, but also those with real-estate interests, continue to claim or obtain land and water held historically by Andean communities. Through time, these outside threats compelled these communities to cement bonds of mutuality

and commitment (ibid) by interchanging services (e.g. labor and time) goods (like preparation of food) and even chacras, often vertically dispersed in a mountainous environment. Such an interchange is known as ayni (cf. Boelens, 2014) and is often written about in a way that depicts them as part of a harmonizing, reciprocal, agricultural life. Yet, it can be considered to be much broader. Regardless of its degree of harmony, reciprocity underlies, until today, many relations among human and nonhuman actors within and beyond Andean communities, for example between leaders and other members of a community, or between persons and animals or a water source; but also between families of different communities;[167] or between community members and revered earth-beings, or even outsiders (see also Mannheim, 1986, 2011).

The suggestion of work in ayni was mentioned to me, an outsider, several times in different manners while doing research in the area. Sometimes it was mentioned as recompense: like a needed repayment for the information I was getting for my work (ibid), which in turn could give a nasty spin to a conversation. Other times, people, more appreciative, coined ayni when they heard of co-researching endeavors with community representatives. According to Bruce Mannheim (1986, p. 268), humans "live and work, … think and fight in a universe governed by reciprocity," and this reciprocity is not necessarily harmonizing.[168] I will not scrutinize that premise here, but the principle of ayni, its give-and-take relationality, is analytically insightful for looking at community allies. It suggests a relation between two actors wherein both shape and are shaped by the other. More practically, it lays bare that, according to many actors in Andean communities, the notion underlying a relation with an external actor is, to a certain extent, one of mutual obligation and care, not one of unilateral development or instruction,[169] or of either resistance or co-optation.

While there are obvious important connections among communities, like those between Ccarhuancho, Choclococha, Pilpichaca and Santa Ines, in the remainder of this section I describe

[167] Certain Ccarhuancho families, until recently, could cultivate potatoes on fields in a community near Socos. In exchange they would give wool or perhaps a share of the harvest. This can be seen as kind of a constructed kinship between the families of two communities. The community in Vinchos (near Socos) is located on a trueque route: the route Ccarhuancho community members took with a caravan of lamas to exchange goods. Another route, to collect coca and *choclo* (corn) goes to Huamanguilla (see chapter 3). Today such trueques are sporadic, often for reason of cultural heritage; in the past it helped to forge supra-community allies.

[168] Ayni is said to be morally ambivalent and used for "notions of recompense and revenge" as well (Allen, 2012; Mannheim, 1986). As Steve Stern (1981) showed, the colonial period saw the rise of a patchwork of tenuous and fluid alliances between the *encomenderos* and Indian community leaders that was often uneasy, but thought of as, at least temporary, helpful.

Though not necessarily deemed 'good', such alliances continue to be mentioned by community members - for example between Socos or Quispillacta and hacendados, or between Quispillacta or Ccarhuancho and cofradias. These alliances were made to defend their community. Today, such alliances include many actors like NGOs, governmental agencies and research networks, but also international treaties, climate adaption discourses and even mining companies.

[169] This can be witnessed when, and how, Andean community leaders talk about these relations; like in chapter 5 where it was talked about in terms of mutuality or of "walking together".

particular alliances with external actors – like NGOs and Governments, local professionals and visiting researchers – that have, intermittently, 'walked together' with Ccarhuancho in moments of reciprocity or solidarity, but that were often far from harmonious.

Precious passing partnerships

At the time when the PETACC project was transferred to the Ica Government, the community of Ccarhuancho had just inaugurated its *complejo alpaquero*; a place to collect and asses the quality of alpaca wool.[170] It was constructed through communal work and funds of the Regional Government of Huancavelica and with the help of the NGO DESCO. There are only a few of these alpaca compounds in the area. What they do is to cut the middlemen, since classification of wool is done by the herders themselves. At the same time, they are sites where the community enables DESCO professionals to learn about and monitor alpaca breeds and test medication. Every year, DESCO alpaca experts are present at Ccarhuancho's anniversary to cement that bond and to judge the animals that are cared for best, or to assess whose wool is finest. The compound stands in the middle of the bofedal area that would be affected by the Ingahuasi canal. Both DESCO and the Regional Government of Huancavelica are allies of Ccarhuancho in the sense that the legitimacy of their actions is materialized by the compound and its performance. Their aims and interests and those of the pastoralists align. And there is sympathy with Ccarhuancho's cause.

There are many organizations and programs; like DESCO, NGOs, but also regional government agencies, development organizations and individual professionals and researchers that are connected to Ccarhuancho in this way. They are allies. One of these early allies was the Huancavelica Water Platform, called MEGAH (or Mesa de Gestión de Agua de Huancavelica), set up in 2006 to defend the water rights and needs of Huancavelica communities. It was chaired by the director of the Natural Resources and Environment office of the Regional Government. This was Rodolfo, one of the confidants of the then-sitting regional president. Other members were DESCO and the NGO CEPES, whose staff member was part of the delegation to the TLA in Mexico. It also included decentralized branches of national agencies, as well as the Huancavelica University and international development organizations. Many professionals of these organizations assisted in the public gathering organized Ccarhuancho (section 7.2) after which the community also became a member.[171] When new regional governments were installed

[170] A first compound was constructed in the 1970s, during the regime of president Velasco. That indeed Ccarhuancho was chosen for such a compound could imply alliances between the community and governmental agencies that would have to be researched. Unfortunately, during the period of political violence and Shining Path presence, the first alpaquero compound, like the community archives, was destroyed.

[171] By way of *asamblea* the community had appointed the head of *el comite de asuntos comunales* (committee of communal affairs) to represent them in MEGAH. He would become the spokesperson that travelled to the TLA. The committee is something Ccarhuancho came up with as an astute ploy to send a delegate who does not hold an official position, like community president; this was done to shield this person (the president) from

in 2007, however, the MEGAH lost traction and slowly withered.[172] Despite the fleeting character of MEGAH, its members were crucial in the period leading up to the TLA appeal and, sometimes on a personal level, several long-lasting solidarities were cultivated.

I will share two examples. First, Rodolfo, the early chair of MEGAH, became the regional coordinator of PRODERN,[173] a program about conserving puna environments that ran from 2012-2018. The activities of PRODERN in the Pampas headwaters focused on strengthening the capacity of pastoralists, to improve their competitiveness and rescue their ancestral knowledge (PRODERN, 2018, p. 38). Like DESCO, PRODERN can be seen as an entity involved in community strengthening. However, they also needed the communities and wetland systems to legitimate their actions and objectives. PRODERN adheres to what is described in the previous chapter as 'environmental water'. The same can be said about a second program called GESAAM which focused on climate change adaptation of communities in the Pampas headwaters and the watersheds of Tambo-Santiago-Ica and Cachi (from 2014-2017).[174] In Huancavelica, its activities are coordinated by CEPES who contracted the Ccarhuancho spokesperson as an expert on community water in the area, thus tying the program and international donors to community wetland defense. This spokesperson, with whom I co-researched wetland security, was in charge of conversing with communities on climate adaption measures and, during that time, wrote a report about the stories of shared ancestral practices and climate change adaptation by Huancavelica communities located on the Andean puna (Guerrero Quispe, 2015). The report was sanctioned by the Regional Government of Huancavelica, reinforcing mutual alliances that are fluidly maintained for more than a decade.

I think such auto-ethnographies of shared community practices are important for better understanding the ontological differences underlying the water conflict, particularly since most (academic) documentation linked to the conflict are viewed from the water-scarce irrigation sector in Ica and/or have a rather technocratic management perspective (J. Carrasco, 2014; Dominguez Talavera & Chiong Ampudia, 2018; cf. Hepsworth et al., 2010). Over the course of the water conflict, however, the number of (academic) voices *for* and accounts with voices *of* the community have been increasing, which I will briefly elaborate next.

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criminal accusations (which continues to happen in the area. This also meant that Ccarhuancho could continue to send the same spokesperson to meetings about the water conflict, while the position of community presidents usually rotates (elections are held every three years).

[172] It was sort of replaced by an advisory body called GTRAH, which subsequently obtained recognition by Regional Ordinance 145-GOB.REG.HCVA-CR-2009 (MINAM, 2013). GTRAH (*Grupo Técnico Regional de Agua de Huancavelica*) was more a government institution with limited participation of communities and NGOs and would prove to be more durable than MEGAH, which was more of an civil society initiative (see also Lizana & Cabrera, 2018).

[173] PRODERN is a bilateral program between Peru and Belgium, from 2012-2018, working with local districts in the southcentral Andes on environmental sustainability, ecosystem services and the creation of protected conservation areas (see section 6.3). One of these districts was Pilpichaca, where the communities affected by PETACC are located.

[174] The program brought several NGOs together and was funded by the EU and Diakonia

Engaged ethnographers

When I first traveled to Ccarhuancho, one month prior to the TLA, I did so by way of the cities Huancavelica and Ica. I stopped in Ica to meet with an American action-researcher, David. A retired but inexhaustible champion of social justice and fair water distribution in the area, it was he who first reported on the issue, in IUCN's policy matters (IUCN, 2007, p. 7). This was before Ccarhuancho even went to the TLA in Mexico. It was actually David who suggested the Tribunal as an option. Being present at the public water forum that the MEGAH had organized in 2006, he had shared his thoughts and contacts. Important was his membership of IPROGA, the national water platform where water institutions, but also individual professionals, looked into all sorts of water matters from efficiency to equity. IPROGA, together with the NGO CBC, was in charge of several water education and capacity building programs in the southern Andes of Peru, in collaboration with Wageningen University in the Netherlands. This was the trail by which an email of the Ccarhuancho spokesperson reached me. In fact, through such successive programs (WALIR, Concertacion, Justicia Hidrica), among others, relations grew among national and foreign water researchers and professionals, and community representatives, cultivating a kind of a (trans-local) solidarity network (Routledge, Cumbers, & Nativel, 2007) that backs this community's struggle until today.

I stayed a few days with the American action-researcher during which he explained the water problems in the two regions and helped me get into contact with actors in Ica. He spoke about the ILO 169 and indigenous rights in Peru and explained what he expected from the TLA: different tiers of Peruvian government would have to honor the verdict, he maintained. We became good friends and I would come back to visit and discuss the conflict with him in subsequent years. I was always impressed by how he mobilized the media, or politicians in his own country, to defend interests of marginalized communities. He was an outspoken activist, a position I myself was not very comfortable with, despite the fact that we both identified with the community cause. It left me wondering how to align politically with Ccarhuancho – since I acted as a community ally, having worked extensively with their main spokesperson, but did not think of myself as an activist. Not like David.

Anthropologist Charles Hale, who himself assisted a Latin-American community to an international ethical court, talks about "having dual loyalties – to academia and to a political struggle" (2006, p. 100). The latter entails a method in which the researcher converses with community members about the research topic, data and results; a matter of co-creation which, according to the former, hinders the quest for analytical wholeness and sophistication (Hale, 2006). Given the research approach I developed in the early chapters of this thesis, I do consider that I acted in solidarity with the community cause; I am an ally who considers the possibility of an outsider view to reach wholeness in the analysis of a water conflict (or any other phenomenon) to be problematic and not feasible. I am deeply conscious of how the act of writing is imbued

with ontological politics (see chapters 2 & 3). This, I believe, allows for a type of engaged ethnography that co-produces knowledge through a reciprocal relationship of a researcher and community representatives on matters about which both feel concern and compassion. One of them was to show the wetland or bofedal complexities of Ccarhuancho, presented in chapter six. Another was to create and disseminate a community's account of their efforts and struggles in the interregional water conflict. The first was a response to (PETACC) engineers who consider bofedal wetlands as empty wastelands in 2007, the second was a response to the commotion that arose, early in 2015, about private sector involvement in the financing and construction of Ingahuasi.

The latter turned into a paper that I co-labored with the Ccarhuancho spokesperson, writing from Huancavelica and Amsterdam and presented by the Ccarhuancho spokesperson at a *Justicia Hidrica* conference in Cali, Colombia, in the fall of 2015.[175] At this venue, academics and activists, focussing on water injustices in the Andean region, dialogued about the opportunities of those whose rights and voices are encroached upon or kept silent (Vila Benites & Boneli, 2017). Here Ccarhuancho debated and publicized their struggle and made useful connections with other actors and possible allies. The core of that presentation is the basis for the next two sections.

7.4. Relational-scalar politics.
On making contexts and managing scales

Writing about community actor-worlds, and making those central in the analysis of an interregional water conflict, makes strange the notion of scale. From the (protesting and networking) encounters above, it seems weird to consider that a particular local community is nested in or operating under some large regional actor. Instead, space and scale ought to be understood as the products or achievements of actor-worlds (chapter 2; Blok, 2010). It is not up to the analyst, says Latour (2005, p. 184), to assume an absolute scale, since it is the actors that are defining relative ones. So, scales are practiced – tinkered with, eluded "as well as taken for granted... [They] are claimed and contested in cultural and political projects" (Tsing, 2005, p. 58). In other words, during the controversy, the Ccarhuancho representatives were the ones to mobilize the Peruvian constitution, global climate, indigenous rights or protected headwaters to defend their community. They actively maintained networks and alliances with differently

[175] To obtain the funds to travel to Cali was troublesome, much like the time to the TLA in 2007, and we looked for funds together. One of the things that impressed me very much back then was the commitment and organizational capacity of the Ccarhuancho *asamblea*. I was present in 2007 when funding was not fully secured and the community assured to cover the costs of the representative to Mexico as a final back up. This was not needed. In 2015 securing the costs for travel, lodging and conference fee was again troublesome. In the end CBC (who coordinate part of the event), CEPES and the community each contributed similar sums for the representative to participate.

situated actors, from neighboring pastoralists to visiting researchers. They astutely strategized to bend existing scalar constructions or narratives:[176] they made and make context.

This I observed ever since first visiting Ccarhuancho, one month prior to the TLA in 2007. I was introduced as a foreign expert that would accompany the community spokesperson and set out to film testimonies about the impacts of the Ingahuasi catchwater drain. In a group of nine, we walked to points where the bofedales, or damages to them, could be observed. Against that backdrop, several peasants introduced themselves, the community and the impacts of Ingahuasi. The first one stated: '*we are here at the indigenous community of Ccarhuancho…principal community of alpacas in Huancavelica…never being compensated for the damages of the canal going to Ica. The new Ingahuasi drain will cut off all water sources and the bofedales below us will be destroyed*.' He further mentioned the poor labor conditions at PETACC and the pressure on them by PETACC to agree to the Ingahuasi project. The second introduced himself as a '*member of the peasant community of Ccarhuancho*' and was corrected by the others. He cowered a bit and looked as if he had been caught making an error. He asked if he could start again: '*I am a member of the indigenous community of Ccarhuancho*.' He would make the mistake twice more. In the end, the testimony looked staged, and the man sat down, visibly displeased with himself.

It is true that many of the members and leaders of the community maintain that Ccarhuancho is indigenous. Ccarhuancho is '*la comunidad madre*,' the oldest community in the area, a claim that is backed by documents dating to the 17th century. However, it was only shortly before my arrival that the community assembly decided to no longer to refer to itself as a *comunidad campesina* (peasant community), which is common in the Peruvian Andes since the agrarian reforms of the 1960s, but instead use the term *indígena.* This strategic decision would help to more strongly associate Ccarhuancho, at least in the eyes of other stakeholders, with ILO 169 and the indigenous rights they claimed.[177] Both in Mexico and in the press conference in Lima, Ccarhuancho thus empathetically presented itself as an indigenous community.

The change later materialized in banners[178] and the official letters which Ccarhuancho sent to institutions and organizations. Herein it uses a codification that begins with a sequential

[176] Elsewhere we have called such strategies and practices grassroots-scalar politics (Hoogesteger & Verzijl, 2015; Verzijl et al., 2017), a conceptual political move to demonstrate that scale making and managing is also done by communities, NGOs and advocacy groups; but is often overlooked. The grassroots metaphor to me also suggests the base of a society (roots) and a possible hidden part (roots are underground). It thus also has an a-priori hierarchy implied. For analysis in this thesis, following Anders Blok (2010) and section 2.3, I adopt a kind of relational-scalar politics instead. One that tells there is not a national or global level but that many versions of the national or different globalities are being enacted.

[177] Such strategic ethnic identification is common in Latin America. As Baud et al. mentioned (2019, p. 276), in particular also to build rural-urban grassroots alliances 'from multiple ethnic angles': "[...] as high-lighted by an urban neighbourhood leader: "We need the rural area communities as partners to enforce Convention 169. Because our rural brothers and sisters are more easily recognized as indigenous".

[178] The community banner that was displayed during its anniversary (in 2007) still read 'comunidad campesina'. However, when I came back two years later, a new one emphasised I was in an indigenous community.

number and ends with a year annotation. The middle part indicates the institution. In Ccarhuancho's case, this had been JDC.*CCC*-P-HUAY-HVCA, standing for *Junta Directiva Comunal de la* C*omunidad* C*ampesina de Ccarhuancho, distrito Pilpichaca, provincia de Huaytara, region de Huancavelica*. This was changed to JDC.*CIC*-P-HUAY-HVCA: *Comunidad Indigena de Ccarhuancho*. Such material-semiotic practices of scaling and contexting (see also Asdal & Moser, 2012), are continuously being discussed and deployed by Ccarhuancho at supra-communal arenas and sites to further their interests. I will go on to describe other examples of scale-making from Ccarhuancho, followed by a response from Ica-based actors that do the same.

Boards and boundaries

In 2009, as mentioned previously, a new water law (D.S. 29338) came into effect. It required, among other things, an institutional restructuring, including the mandatory formation of prescribed *Consejos de Recursos Hidricos en Cuencas* (CRHC) or watershed boards. These boards were, and are, promoted by water authorities as dialogue platforms where different stakeholders including communities, civil society and different levels of government, can discuss, negotiate and decide on matters of water allocation and distribution.

To facilitate the restructuring and to strengthen GIRH or IWRM-related institutional capacity, nationally and in watersheds, the National Water Authority (ANA) implemented the *Proyecto de Modernizacion de Gestion de Recursos Hidricos* (PMGRH). Funded by the World Bank and the Interamerican Development Bank, it ran from July 2009 until December 2015 and selected six (at a certain moment only three) pilot cases to focus on. Activities included training and capacity building of organizations dealing with water. On the other hand, emphasis was placed on creating a modern information system for which new hydrometeorological stations and measurement structures had to be installed. One of the six (and prioritized three) pilot watersheds to realize these activities in was the compound watershed of Tambo-Santiago-Ica, including the Pampas headwaters, or the Ica-Alto Pampas watershed in short (ANA 2008). For this, a sum of 8 million dollars was reserved and the condition for releasing these funds was the formation of a CRHC; a deal that expired during the second half of 2011. It is important to observe that at the start of the PMGRH, ANA water professionals considered Ica-Alto Pampas as a single hydrological unit and one of the (economically) most significant ones in the country. To integrate everything and everyone in that unit and to have consensus on that significance was the aim of water authorities. Watershed boards were seen as the fair and logical means to that.

Ccarhuancho, together with other actors in Huancavelica, remained skeptical about this restructuring. With their allies, they thus reshaped what ANA and Ica actors envisioned as hydrological boundary and watershed board.[179] They were informed about the mandatory

[179] What was also reshaped was the time frame for such a process. In September 2010, ANA released a document, *Resolucion Jefatural* 575-2010-ANA, with guidelines to create the *Consejos de Recursos Hidricos en Cuencas*

creation of the CRHC in the early months of 2011 when engineers from ANA and PMGRH came to the regional capital to give workshops and training about the process. A first step was to set up a task group, or *Grupo Impulsor*, and since the hydrological unit Ica-Alto Pampas encompassed both Huancavelica and Ica, each region needed to set up their own. The task of this Grupo Impulsor was to identify stakeholders and particular characteristics of the watershed and put forth possible watershed board candidates. The Ica task group was formed by March of that year, while Huancavelica actors did not show any interest (Oré & Geng, 2014). More, they were suspicious about it.

That feeling of suspicion was fueled during the Tambo public hearing the following month (see section 7.2) and the continued attempts of PETACC and the new Ica government to move ahead with the Tambo reservoir. Ongoing sensibilization workshops about the watershed boards and small (non-water related) development projects in Huancavelica gave some *huancavelicanos*, including members of GTRAH, the impression that there was a divide and conquer strategy at play. Such projects were seen as attempts to "buy" their approval for large hydraulic infrastructure without the safeguarding of in-situ wetlands and pastures (Oré & Geng, 2014, p. 167) and without addressing past damages and commitments from PETACC or the Ica government to mitigate these. There was deep-seated distrust among Huancavelica pastoralists because of that, but also because in all decrees and funds made available their interests, rights and water needs were denied. Furthermore, communities felt they could not get clarity on how the 8 million dollars, meant to modernize water management and coupled with the creation of the watershed board, would be spend.

ANA and PGMRH professionals reasoned that the watershed boards are the space to deal with these matters. To leaders of the Pampas communities, on the other hand, it seemed more logical to first resolve pending issues before any talks about joining a platform that might marginalize their interests could go ahead. By the end of 2011 the urgency to formalize the board and obtain the 8 million was high. The bare minimum prerequisite for the latter were the signatures of the two regional presidents of Ica and Huancavelica on a resolution pertaining to the formation of the boards. Whereas the Ica president did sign, his Huancavelica counterpart would do so only if the communities in the Pampas headwaters agreed. There was quite some pressure on the Ccarhuancho spokesperson and other leaders those days, also from GTRAH and other communities in the upper part of the Tambo-Santiago-Ica watershed. I talked with a PGMRH engineer and he told of an encounter with community leaders where the Ccarhuancho representative accused him of holding a gun to their heads forcing them to agree, to which the

(CRHC) or Watershed Boards. The process consists of five phases from a preliminary interinstitutional coordination up to the creation of the watershed board. Time frame for the entire process was put at 240 days; with four days in the very beginning, reserved to organize a Grupo Impulsor, a task group that was to plan activities leading to the CRHC creation. In the case of Ica and Huancavelica that organization took years. The formation of the watershed board became official in 2017 (D.S. 015-2017-MINAGRI).

engineer responded that it was actually the spokesperson holding the gun to the head of the PGMRH, for the pressure of project deadlines was equally felt. In the end, the communities did not consent, the president did not sign and the loan was lost. The PGMRH elected another pilot case, much to the chagrin of actors in Ica who, similar to earlier episodes in 2007, characterized the enemy in Huancavelica (communities) as an "an obstacle to progress, a backward force that can only be explained by political interest or ignorance" (Oré & Geng, 2014, p. 168).

During that period, I met with the Ccarhuancho spokesperson in Lima. He had asked me to think with him about the case and how to approach an old community ally. The president of the TLA was attending an international forum on human rights to water held at the *Colegio de Abogados* and had invited the spokesperson. Possibilities were explored of having a TLA public hearing in Peru in six months, where the TLA might mediate a roundtable between Ica and Ccarhuancho. Although the spokesperson was enthusiastic, I could not see the Ica actors assisting in such a meeting. At least not in 2011. The spokesperson also shared case developments with me that we then discussed and contemplated. It involved the reshaping of the planned hydrological unit by insisting on 'natural' watersheds and a special status for the hydraulic diversion zones. While early on they did not see the merit of joining any watershed board what so ever, Ccarhuancho leaders and those of neighboring communities continued to insist they were part of the Pampas watershed. And they were backed by GTRAH in this. However, they viewed recent activities, such as awareness campaigns and the attempts of actors in Ica to sway Huancavelica districts and communities in the Tambo-Santiago-Ica watershed, as something to act upon. After careful deliberation and consultation with allies, Ccarhuancho leadership suggested to ANA and PMGRH officials to set up in parallel the watershed boards of Pampas, of which their territory was part, and the watershed board of Tambo-Santiago-Ica, where part of their water was diverted to.

The four headwater communities would only agree to the next steps in the formalization of watershed boards if these were happening in both cases at the same time; an astute strategy by Ccarhuancho and its neighbors to potentially ally with other actors in Pampas to counteract new water diversion initiatives. This creative thinking was also fueled by the belief it would be more complicated and time-consuming to set up a board in the bigger, more diverse and less financially-endowed Pampas watershed. And without an officially recognized watershed board, per regulation, no new hydraulic projects can be developed or planned.[180]

Obviously, to any scale-making action from Ccarhuancho and its allies, there are counteractions in Ica, some of which I will briefly point out.

[180] Today, Ccarhuancho and other communities are part of the Pampas watershed board and hold a special position and seat on the Tambo-Santiago-Ica watershed board, representing the 'area de trasvase', or the diversion zone. A decade earlier, this was unthinkable to many water professionals in Peru. Although some water professionals appear to reason that the logic of this boundary is of their own doing, it was the scale shaping actions of Pampas communities that let to this.

Cultivating common-wealth

After the first attempts to set up the different Grupos Impulsor (or task groups) for the three regions covering the Pampas watershed proved difficult to achieve, actors concerned with the Tambo-Santiago-Ica watershed decided to move ahead with the formation of just that watershed board. Leaving the Pampas headwaters and diversion zone for what it was, Ica actors, like water user associations, water authorities, including ANA, and PETACC, associated themselves with the Huancavelica districts and communities in the same watershed through awareness creation and workshops held in situ organized by ANA. These attempts coincided with a recently started project of GIZ, the German Development Organization, about "adaptation to climate change and disaster risk reduction" that would run until 2016.[181] GIZ operated from Ica city and due to the tense situation and lukewarm reception in the Pampas headwaters, it decided to focus interventions, including small development projects and capacity training on watershed management, in the Tambo-Santiago-Ica watershed. Finally, despite the objection of Ccarhuancho, Huancavelica districts and communities in the Tambo-Santiago-Ica watershed were supported by GTRAH of which certain professionals disapproved the earlier non-signing and loss of World Bank funds. This cultivated the sense of connection between these districts and Ica that already existed; people in this area were more drawn to Ica (city), in terms of education, migration and labor, then they were to the capital of Huancavelica.

By mid-2012, both regions put forth the nominations for board delegates of the Tambo-Santiago-Ica watershed. However, Ccarhuancho and communities in the Pampas headwaters protested their exclusion and absence in this board, since any action regarding the infrastructure in the diversion zone, seen as it is on their territory, would be affecting them. Eventually, they were awarded a seat on the board of the Tambo-Santiago-Ica watershed as well, while themselves pertaining to the Pampas watershed (and to-be-installed board), wherein they would be dealing with actors from Ayacucho and Apurimac.

These three regions, among the poorest of the country, had formed in 2011 the *Mancomunidad Regional Los Andes* (MRLA), to combat extreme poverty within their constituency. The *Mancomunidad*, which translates as association or commonwealth of regions, looked to work together on projects to improve the lives and livelihoods of its inhabitants. In 2014, Ica joined the MRLA, which identified itself as the first institution of interregional development in the country. Later the Region of Junin became the fifth and final member. Board members are the

[181] In November of 2011 I travelled with a team of GIZ to the upper parts of the Tambo-Santiago-Ica watershed. GIZ recently closed a project on earthquake relief and reconstruction and were looking into a new study on climate change adaption in the area. They offered transport, logistics and guides while I shared my data about the area and contacts. As the project evolved GIZ made agreements with ANA and ODNS and became an important actor in the conflict. See https://www.giz.de/en/worldwide/13311.html (accessed 01-04-2019).

five regional presidents with the regional president of Ica elected chairman of the commonwealth in its first year as a member.

I consider this a scale making and managing activity by the president of the Ica region. It fits other strategies that extended its influence, like targeting Huancavelica and Ayacucho migrants in Ica, promising them better housing, or the offering of institutional space to Huancavelica districts –so that these have a satellite office within the compound of the Ica Regional government. Other strategies include the attending of festivities in Huancavelica districts to foster the idea of *Huancaveliquenos, hermanos en el agua*. Such slogans were used by politicians and in media to convey a sense of unity. Indeed, over the last five years, the influence of Ica actors in, mainly the Pacific side of the Andean regions, is expanding. More so, the importance of the MRLA, for example, regarding hydraulic projects or "Agua Grande" (section 7.2), should not be underestimated. Decisions taken at this level are awarded a higher legislative status (*Decreto Supremo*) and overrule regional resolutions that either Huancavelica or Ica can issue. This became apparent in later negotiations when emphasis was put by Ica stakeholders on the MRLA as the entity to concern itself with water availability for which a *Mesa Tecnica* had to be created at that scale.

Furthermore, an alternative to hydraulic infrastructure was presented in June 2015, under the banner of the MRLA (see also GESAAM, 2016). It was a sketch of the "Proyecto Hidroenergetico del Rio Pampas (PHRP)" that appeared too on the DL 29777 as a fourth project of national interest to increase water availability in Ica (section 7.2). The project aims to transfer water, via a tunnel, from the Atlantic side of the Andes to the Peruvian coast. It was presented by PETACC and engineers from the region of Apurimac; the tunnel entrance will be in Ayacucho, the tunnel exists in Huancavelica and the irrigated areas are in Ica. The benefit for the commonwealth was the creation of jobs and prosperity on the coastal plains for families now living under poor conditions in the Andean regions.

Having no business in the space of the mancomunidad, Ccarhuancho had already been looking for other ways to go over the head of regional presidents. They had done so by going to the TLA, and would do so again.

7.5. Dialogue and discussion.
Roundtable trickery

In June of 2014, before Ica became chair of the MRLA (section 7.4) and before the initiatives of "Agua Grande" (6.2), a delegation from the Huancavelica government, including representatives from Ccarhuancho and various communities in the region, traveled to the city of Huancayo, in the Region of Junin, to attend a workshop of the *Oficina Nacional de Dialogo y Sostenibilidad* or ONDS. This national office of dialogue and sustainability is the highest institution in Peru to deal with controversies and social conflict resolution. It falls under the PCM (*Presidencia del Consejo de Ministros*) or Prime Minister's office, and aims "to promote spaces for dialogue...for citizen participation and consolidation" (ONDS, 2014, p. 48). Its objective is to "foster agreements and

consensus between the State, private sector and society" (ONDS, 2014, p. 74). The ODNS emphasizes the importance of creating "a climate of trust [to reach] agreements that are mutually beneficial"; to transform conflicts into development opportunities (ibid.).

At this workshop in Junin, during an intermission, the Huancavelica delegation met with the ONDS' high commissioner, who was ex-President of Junin. Here, the Ccarhuancho representative spoke about the water conflict his community and Huancavelica had with Ica. The commissioner expressed his concern about the situation and the need for social justice for Huancavelica communities, which, he said, were on the ONDS radar. Once back at the main table, he publicly mentioned that the Peruvian state had a historical debt towards Huancavelica communities and he would acknowledge their situation and demands. This course of action by the Huancavelica delegation was followed up in September by a petition with an elaborated memorial about the denial of community water rights. It was submitted to the ODNS office by the Huancavelica Peasant Federation (FEDEH).

For the communities in the Pampas headwaters, the status of the diversion zone and hydraulic infrastructure was still a matter of concern, especially with the Ingahuasi project again on the agenda of Ica presidential candidates (section 7.2) and the failed attempt to set up parallel watershed boards in Tambo-Santiago-Ica and Pampas However, no action was undertaken by the ODNS until after the regional elections and after the social upheaval about "Agua Grande" threatened to destabilize the region.

Preparational ploys?

The creation of the "Bi-regional Dialogue and Development Platform Ica-Huancavelica" (MDDB) was announced in March 2015. Before the first actual roundtable dialogue, a number of preparatory meetings were held in both regions.

In the capital of Huancavelica, the ONDS moderator showed the community representatives a video of the Ica President renouncing the Ingahuasi catchwater drain on national television; because of "the environmental value of the wetlands". With this statement, or so suggested the ONDS official, the conflict has virtually ended. Therefore, he suggested Huancavelica had to adopt its agenda, as issues related to the transfer of water from Pampas to the Tambo-Santiago-Ica watershed were no longer part of the dialogue.

Those present expressed, however, that the outcome of the Ingahuasi project was just part of their agenda. The more immediate agenda points referred to the co-administration, by both regions, of PETACC or entity that will operate the infrastructure; and the recognition of community water needs and allocation of water rights. In a final preparatory meeting, in August 2015, delegations of both Huancavelica and Ica would present their agenda points for the MDDB. The meeting was chaired by the ONDS and participants included representatives of ANA, Huancavelica and Ica government branches, PETACC, the affected communities, the Ica water user associations and others. In total, 13 agenda points were formulated, nine by

Huancavelica and four by Ica (GESAAM, 2016). The main point of the latter was the formation of the Tambo-Santiago-Ica watershed board. It was agreed that both Huancavelica and Ica would appoint three candidates that would develop from these points a common plan.

In the following weeks, two ploys caused new frictions in a still delicate dialogue process; at least this is how members of the Huancavelica delegation perceived it. First was the news that a recent restructuring of the Ica Government changed the status of PETACC as a project with a certain autonomy. With Regional Ordinance 0003-2015-GORE Ica, PETACC became incorporated within the general affairs branch of the Ica government. Its executive board was discontinued, but its operating mechanisms, name and objectives remain unchanged.

There are at least two ways to evaluate this move. Since PETACC is expanding its area of influence from the Tambo-Santiago-Ica watershed and the Pampas headwaters to the entire Ica Region (and beyond), it is no longer the implementor and operator of a single hydraulic system (the trend seems to be moving towards tendering these projects to the private sector), but a managerial overseer. On the other hand, it was, of course, this executive board, and the shared control of it, that was one of the principal demands and current agenda point of the communities in the Pampas headwater and Huancavelica Government. The Ordinance moves PETACC into the depths of the Ica public administration and further from shared control. It is either a clumsy or cunning (resp.) move at this stage of the MDDB.

A second ploy and source of friction pertains to the appointing of candidates. According to the Ccarhuancho spokesperson, there are few professionals in Huancavelica who knew the history of and technicalities behind the conflict. One of them was the old chairperson of MEGAH, who worked for PRODERN in 2015, had long been an ally of the communities' cause (section 7.3), and he had volunteered to help out. However, every time a meeting related to the MDDB was scheduled, the engineer was sent off on assignment. Ccarhuancho leaders learned he was 'kindly requested' not to get involved, not to get PRODERN involved. His objection and suggestion to participate on personal title were neutralized through these work commitments.

Despite these trickeries, in October 2015, the first roundtable conversation was held. It was reported in the media as a historic meeting between the regions to determine a shared water future. There is careful optimism among the actors involved that a Watershed Board might be formed, PETACC might be substituted by a bi-regional project and other goals might be addressed. However, water reallocation and the construction of infrastructure remain the Achilles heel of the MDDB.

Pastoral power?

In January 2017, after four roundtable meetings (Lizana & Cabrera, 2018), the presidents (now called governors) of Ica and Huancavelica, under the auspices of the ONDS-PCM, signed the act creating yet another commonwealth, now bi-regional, between Huancavelica and Ica, called MANRHI. This *Mancomunidad Regional Huancavelica e Ica*, was ratified by the national government

two weeks later through Resolution No. 005-2017-PCM/SD. It was reported and communicated, by the national government and the media, as a historical event that put an end to 70 years of water conflict between both regions. The Commonwealth would assure an equal distribution and co-management of the basins shared by both departments. Days later, the case was removed from the national list of socio-environmental conflicts.

This last agreement, backed by both regions, can mean a step forward, but it could also have created a level of decision-making, the outcomes of which prevail over those of each region (section 7.2). More so, this new dialogue space was developed at a national policy level. According to the Ccarhuancho spokesperson, most actors involved in the MDDB sessions were not consulted, as the MANRHI does not seem to evidence the advances of 18 months of significant negotiation. The space for communities, water user associations and local governments to participate in the commonwealth is limited in comparison to the MDDB, which had actually agreed to create a bi-regional project to replace PETACC. Furthermore, the MANRHI bylaws do not specifically mention the water rights of the Huancavelica communities or the shared control of the transfer area and the hydraulic infrastructure of the Choclococha System, which is, to a large extent, the source of the conflict. The communities of the Pampas headwaters state that under these terms, without *voz ni voto* to decide, they will not accept this platform.

Still, statements by the Huancavelica president and press releases in Ica related to MANRHI specifically state that any future infrastructure project will not "include intervention in the bofedales of Ingahuasi and Ccarhuancho" (press release 033-2018-GORE-ICA/ORII). More so, in 2018, PETACC was transferred to MANRHI, following the decree 079-2018-PCM and a year earlier the Watershed Board of Tambo-Santiago-Ica, with corresponding hydrological unit, was created with two permanent seats for the communities of the Pampas headwaters[182] to assure the implantation of a compensation program (PAMA).

While it remains to be seen whether these agreements, decrees and commitments will last, it is important to observe that these recent outcomes are very similar to what the TLA verdict stated and the communities demanded in 2007 in Guadalajara. Said differently, it took politicians more than a decade to resolve a conflict with a proposal that Ccarhuancho and its allies put forth all along. This seems paradoxical in a way: a remote, marginal, community achieving this against odds (and funds) must somehow be powerful? It might, because of the countless of allies, (non)human actors from NGOs and researchers to formidable mountains and treaties, that "enter into the composition"; it might due to the powers of association (Latour, 1986, p. 265). What is further interesting to observe is that in many accounts (academic papers, press releases, NGO reports and institution statements) much of what that community, Ccarhuancho, its

[182] The composition of the watershed board, created in 2017 by D.S. 015-2017-MINAGRI was modified early in 2019 (D.S. 001-2019-MINAGRI) to include two members from the communities in the Pampas headwaters in the CRHC of Tambo-Santiago-Ica for being in the 'area de trasvase'. See also https://www.ana.gob.pe/noticia/encuentran-solucion-antiguo-conflicto-por-agua-entre-ica-y-huancavelica (accessed 01-04-2019).

members and much of its allies, did is not mentioned: the conflict was resolved by MANRHI or by regional presidents, or ANA and CRHC, or PCM and ODNS - mediated by GIZ.

One might conclude that, behind the scene or offstage, the communities shaped the outcome of the conflict, but actually this (governance) scene is itself staged, or performed, for one by those doing the writing and reporting. What matters is to be aware through which actor-world the conflict is made sense of and that reporting it is a political act. I think this chapter shows that pastoralists, like engineers, politicians and researchers, are not operating at or acting in a-priori scales and contexts but are involved in shaping them (Asdal, 2012), whether this is related indigenous identity, hydrological units or interregional commonwealth. Researchers should thus trace "the contexts the actors themselves mobilize in order to make sense of their own actions" (Asdal & Moser, 2012, p. 294) and how, in doing so, they contextualize the other. This implies, says Blok (2010, p. 900), that the idea of one single context, scale or environment "in which all local interaction is situated, has to be abandoned". There is no total view as thinking and engaging wetlands or watershed boundaries is located within actor-worlds.

Thus, tracing and reporting on actor-worlds potentially reveals new understandings of how conflicts work and how actors work on conflict; from the world of Ccarhuancho, the ANA appears much smaller and farther away. I return to the apparent power paradox. The paper illustrates there is no a priori center from where the conflict can or ought to be seen, so there is no remote place either, only by relation (section 2.3). I demonstrated that Ccarhuancho mobilizes ample allies and durable associations in its defense and is by no means marginal, not to the university networks, programs of environmental water, indigenous advocates or elected representative bodies. And thus, not to conceptualizations of justice, ILO 169, RAMSAR treaty and climate adaption discourses, nor Huancavelica territory and other material associations. Obviously, there are strong socioeconomic and racial inequalities in place; they are deeply felt and struggled against and must not be denied. Yet there is a hopeful message to end with, since the arduous work of protesting, alliance building, contexting and scale making by Ccarhuancho community members, who foster these supra-community solidarities and reciprocities, let to a successful defense of their wetlands.

8. Conclusion

Ica and Huancavelica sign treaty to end a 70-year-long water conflict. The document was signed by the Regional Presidents (*Gobernadores Regionales*) and the Minister of Agriculture and Irrigation. Its objective is to promote public-private co-financing of the system of water security in the Valleys and irrigable areas [in both regions] …The treaty establishes mechanisms for collaboration between institutions […] and the delegation of powers to guarantee water […] by means of two reservoirs to be constructed in Ica.

Excerpts from newspaper 'El Comercio', 03-03-2018[183]

Minister inaugurates three *cochas* and 13 reservoirs in communities. The inauguration was presided by the Minister of Agriculture and Irrigation, who toured the communities of the *sierra de Ica* where the project "Siembra y Cosecha de Agua" is being realized […]. the *cochas* (ponds), due to seepage, create springs and sources that benefit the lower parts of the watershed: …844 local families and – in the medium term – the agro-export sector of the Ica Valley […].

Excerpts from newspaper 'Correo', 19-11-2018[184]

These media excerpts (of national newspapers) are about the resolution of the longstanding water-controversy that centered, geographically, on Andean communities in Huancavelica and the implementation of a "*siembra y cosecha de agua*" ("water sowing and harvesting") initiative in Ica, which can be traced back to Andean communities in Ayacucho (MINAGRI, 2016). They are telling in that the controversy and the initiative would not have been newsworthy to these media outlets or worthy of the Minister's attention a decade ago. Indeed, large reservoirs *in* Ica, and a serious concern about Ica's highland communities, were unheard of at that time. Perhaps the newspaper excerpts are indicative of a shifting view among the general public and, in particular, water professionals in Peru, also reflecting a newly emerging way of looking at headwater realties.

The excerpts clearly are connected to the stories of Andean communities told in this thesis, which described the water conflict and longstanding practices of "siembra y cosecha de agua" in

[183] Excerpts, including photo, from: https://elcomercio.pe/peru/ica-huancavelica-firman-convenio-terminar-conflicto-70-anos-agua-noticia-501717 (last accessed 29-08-2019)

[184] Excerpts, including photo, from: https://diariocorreo.pe/edicion/ica/ministro-inaugura-3-qochas-y-13-reservorios-en-comunidad-de-quilcanto-curis-tibillo-y-otros-854513/ (last accessed 29-08-2019)

the Central Andes (in chapters 5, 6). In that sense, the news articles (that do mention Ica-based communities) are also telling in that these Central Andean highland communities remain absent. Not visible. And yet their acting and mobilizing in order to secure their water – among others, they initiated interregional roundtable negotiations and consensus-building (chapter 7); co-financed hydraulic infrastructure (chapter 4) and created and nurtured over 100 lakes (chapter 5) – are now changing how others relate to water. These and similar actions and practices of communities are at the core of this book, which focused on the main question, *how do Andean indigenous communities and water user groups organize and mobilize supra-community actors and allies in struggles to secure their water worlds and water-based livelihoods in the Regions of Ayacucho and Huancavelica, Peru?* One, often-heard, way to explain the invisibility of communities in news articles is to underline the power differences between ministers, regional presidents and the agro-export sector on the one hand, and Andean communities, local families and their spokespersons on the other. The conclusion would then be that the latter's practices, their rituals and resourcefulness, are being co-opted and incorporated by and into more powerful and bigger interests and institutional spaces. In this thesis, I have searched for an analysis and explanation that gives more credit to the achievements and agency of communities, showing how they actively manipulate and change actor-worlds when trying to secure water and defend their ways of living and being. This is why I add *another* conclusion to the one of cooptation and incorporation. I use the next sections to elaborate this conclusion by answering the main questions of this thesis.

8.1. Out of line

Tinker, water, research, why

To offer another explanation of this invisibility of communities, a different outlook is needed about how to practice research and use concepts. I thus assembled an approach in this thesis by challenging, with care, a common water research paradigm; one which uses separating binaries and a-priori social categories, contexts and scales to explain phenomena and decide on action.

My approach embraces the idea of acting and living in different, partially connected worlds. These worlds can overlap in Euclidian space but are networked differently and fluid. It recognizes that, communication-wise, Andean communities are almost entirely absent in a national newspaper, but notes at the same time that Ministerial doings go largely unmentioned in community minutes and oficios. With regard to communication, the national newspaper is part of longer networks (that include, for example, printing facilities and distribution systems). Yet, what follows from using this approach is that analytically the Minister is not necessarily bigger or more important than the community spokesperson, and the community is not more, or less, part of a ministerial world than the other way around. The relative size of one as compared to the other is not pre-given but depends on situatedness and vantage point. Obviously, there are effects of Ministerial doings and decrees on communities just as community practices shape Ministerial action; each is tacitly present in the other. Hence, I consider, newspapers, oficios, or

a thesis for that matter, are performances or enactments that help to visualize some things and worlds, while making others absent. What appears in all of them, even though linked to different entities, practices and stories - is water (differently referred to as *recursos hidricos, agua, aguaita, yakumama, H_2O*). This makes water not a singular substance, rather, water is multiple: enacted in entangled realities of differently connected and heterogenous (non)human beings and entities.

In chapters two and three, I provide the theoretical inspirations and ingredients for this approach – one that allows acknowledging multiplicity and its consequences. Though I am certainly not the first to engage in such an endeavor to reflect on water (cf. Barnes & Alatout, 2012; Hastrup & Hastrup, 2015; Yates, Harris, & Wilson, 2017; Zegwaard, 2016), I do offer insight in the ways different Andean worlds are connected not only through boundary objects and fluid spaces but because of variedly situated spokespersons. These persons are formed by and represent multiple worlds and can easily move between them, connecting and weaving together what seem like incommensurable realities.

The sub-question addressed in these two chapters was: *how can social mobilization and water security be conceptualized in a way that helps to make visible different Andean water realities and their entanglements?* My attempts to answer this question in these chapters reflect my research journey. They show how I engaged with, wondered about and tinkered with conceptualizations and theories that I initially chose, but that turned out to be ill-suited for the empirical encounters I had and the material I collected. By translating these and by mobilizing new concepts, I can address the sub-question, which I will do in this section and the next, starting with some key points regarding allies, actor-worlds and astuteness.

First point. I would like to recall the concepts that were central to the SWAS project, of which this thesis is a product; these were social mobilization and water security. My conclusion about them mirrors that of my colleagues (Hoogesteger, 2013; Sosa Landeo, 2017) in that these concepts are not particularly useful if the aim is to research what Andean peoples 'do', to have and to keep water. Notwithstanding, the absence or presence of indigenous social movements, a focus on social mobilization as contentious practice does not consider what actors and allies the Andean communities try to interess and enroll to secure *their* waters: I have shown in this thesis that these waters, often spirit-endowed, have to be reassured and cared for as part of securing their reciprocity or mutual dependence, which cannot be expressed in terms of some set water security benchmark. Instead, what has to be secured are these practices of water care themselves.

In searching for a way to increase their suitability, I decided to employ a trick often used by STS scholars: I turned these concepts (nouns) into active verbs. When ideas become practices – of mobilizing 'the social' (or masses of nonhumans and humans), and of securing water – it allows, even invites, considering things, actors and processes that would otherwise risk disappearing or not be considered. For me, it helped appreciate that whatever Andean communities and members do to have and keep water, they do not do it alone. Instead, they enroll all sorts of (non)human actors that, at the moment of being mobilized, are often (part of) supra-communal actors and allies (like movements, institutions, technologies, policies or treaties).

The prefix 'supra' here is an interesting one, as it indicates that what is beyond or outside a given community. It is what a community mobilizes to secure its water. Yet, for something to be supra, the boundaries of the community first need to be established and stabilized. If a community member works for an NGO, are her or his actions that of an external ally? If a community makes use of a large irrigation canal, is that outside of it, or part of it? I still used the term 'supra', but did this with care. I used it to compare and contrast what was enacted as 'in here' and as allies 'out there', and note that what is 'out there' can become part of the 'in here' and vice versa (for example title deeds, indigenous identity, hydraulic works or collective maintenance parties). Still, the notion of an external actor is perhaps more of a confusion when community worlds or realities are considered, since actors cannot be external or beyond, but are made sense of and enacted differently in these community worlds.

This then brings me to a **second point**, which is about the term actor-world. An actor-world can be seen as a relational network of associated heterogeneous entities. In that network, identities, roles and bonds are established, and histories and interests shared (Callon, 1986b). Differently put, entities (actors) are constituted in networks (worlds) that they help shape. I mobilized the term in the thesis, as it is an elegant composite term that usefully allows to suggest that worlds can behave as single actors, while also - and more interestingly – making it possible to acknowledge that single actors are constituted in, and thus come with, worlds indirectly but inherently implied. I have shown in this thesis that people, like community leaders, but also concepts like H_2O or yakumama, are thus not individual entities, but involve other things and beings, bonds and histories; they implicate certain networks of entities, or indeed certain actor-worlds. This also means that conclusions about water or people are actor-world dependent; they are necessarily partial, not universal. In the thesis, I mostly followed, studied and wrote of Andean community actor-worlds, but I saw and approached hydraulic projects, agro-export sectors, state agencies or knowledge institutions also as actor-worlds. Water appears also in each of them; it appears similar but is enacted differently.

The concept actor-worlds thus allowed flatness and symmetry in terms of analyzing empirical material; I have shown this, for example, by researching the community world and the hydraulic project world, and looking in the same way at similar practices of making sense of water and the environment. An important methodological choice, therefore, is on which actor-world(s) the research centers, as this will have implications for the findings. In the same vein, it is important to account for the actor-world that constitutes the researcher. Indeed, researchers tinker too, with paradigms: by zooming in on different actor-worlds, new divisions and ideas are revealed, different boundaries become visible, and *other* conclusions can be thought. I will go into these methodological choices and their normative and political implications in the next section.

A **third point** refers to the idea of situated astuteness that I used to indicate how actors – like Andean communities – manipulate, massage and mobilize certain situations and entities to suit their interests – for example, to secure their water. By focusing on or centering a particular community actor-world, and see how community members make sense of encountered entities

and phenomena, I prefer the idea of being astute over concepts like resistance and remoteness. This is because the latter always pre-suppose the existence of binaries – like modern-traditional, domination-subordination or nature-culture – that are often hierarchically associated with power(s), to structure and make sense of reality. Indeed, practitioners of water governance research often tend to conceptualize and make sense of water governance by pre-establishing what and who is the center, to then discuss possible ways of relating to or being included in it. I mobilize the term situated astuteness to avoid doing this; it allows more agnostically denoting actions of cunning (metis) or bricolage, of lateral thinking or tinkering care without necessarily referring to or assuming the existence of a binary, hierarchical, structuration. It is important to note that the term does not pertain to how Andean communities (or agro-export sectors and government agencies) refer to themselves, but it is a term I mobilize. The approach in this thesis thereby supports the possibility (and makes it plausible) that there is no center, or better that there can be many. Centers are enacted, done by institutions (and researchers and logics) who, through their mobilizations, make certain things and ideas big and important and others not. Researching and writing about certain centers and worlds, and not others, is an act of ontological politics, and co-creation of that center.

8.2. Before method
And after

Saskia Sassen (2017), in a keynote for the International Associations of the Commons, considers a before-method situation when a researcher realizes that her social science approaches and methodological treatment need innovation because the current ones are "capturing less and less of what is happening." Before-method, she says, is a mode of discovery, of encountering new ways, rather than of replicating. It does so by looking "in the shadows of powerful explanation" and by "destabilizing stable meanings". It positively resonates with what I did in this thesis: to zoom in on "el rincón" (to find new centers) and to make fluid what is mensurable or visualized. The appeal to me of such analytical inversions is that it brings about a social science of water that does not accumulate knowledge through replication and commensuration, but instead does so by adding on cases, creating new encounters and indeed through diversification or pluralization. This becomes even more important, when agreeing to John Law's argument that chosen methods and doing research do not just describe "social realities but also help to create them" (Law, 2004, p. ixx). It makes it important to think and take seriously what realities, 'after method', a researcher has supported and co-produced.

In my cases these are certain Andean water realities, mainly those relating to Andean communities, mainly those that are overlooked, at the margin or squeezed out due to (the replication of) more dominant versions or powerful explanations of water that invoke efficiency, legibility and universality (over, for example, care, fluidity and reverence). Method-*wise*, I engaged in an ethnography of practices, based on an approach that studies how things or entities are being done (praxiography) as a way to discover new, other, ways of "doing" water. Things and entities

that initially appeared to provide an obvious answer to a water security problem, became interesting and fuzzy matters of concern. If a canal secured community water for Socos, I wondered how that canal was enacted; if a roundtable helped to defend community water in Ccharhuancho, I asked what the community and spokesperson did to bring that roundtable into being. Practices are the fundament of realities and worlds; for me, this dictum-like sentence worked to activate empirical material and not conceal it as background. By continuously asking interviewees how they practice things and how entities came about, it became clear how these are differently situated and partially understood. A canal secures water for Socos but is an object of insecurity elsewhere; the same roundtable might be understood as an inclusive instrument in one given actor-world and a tool for assimilation or cooptation in another.

There are obviously things or entities, often referred to as boundary objects, like canals, roundtables and many others that connect different Andean water worlds (Michael, 2017). In the thesis I made a purposive choice to focus on those actors or objects which can move betwixt and between different actor-worlds: in particular on community spokespersons who help design a techno-scientific reservoir and also can make sense of a bull chained underneath it; those who enact a government water institution and also dance and converse with earth-beings during a canal *faena*; those who enact a village assembly and also perform in academic conferences. Persons that are simultaneously insiders and outsiders (Singleton & Michael, 1993). In my cases, these were, for example, the Ccarhuancho representative, Quispillacta NGO members or Socos engineers. Constituted in different actor-worlds, their knowledge of one is not replaced by the other, nor is there a necessary fusion into a more encompassing way of knowing. Instead, their knowledge is extended (de la Cadena, 2015): they know situations and can respond as both community member and as engineer. This enabled them to travel and translate among worlds, while offering alternatives that are beyond contemporary administrative or modern technology enactments or realities.

So, I set out, often with co-researchers, to show alternative water worlds, to explore how things can be done differently from dominant explanations of water. The re-conceptualization of 'social mobilization' as 'the translation of networks of (non)humans' and of 'water security' as 'securing water or securing water practices' enabled me to share in, experience and reflect on communities' ways of relating to water without making prior assumptions about their positioning in relations and structures of power. And to write about it in ways that I otherwise I could not have. While inspired by a desire to help bring about better futures, in this thesis, I largely refrained from making grand judgments about what better futures are, or how things ought to be. Instead of prescribing or defining *the good*, it is more useful, I believe, to see how this (defining the good) is practiced among cases and by actors themselves; how success or failure is recognized and made sense of, and how good (water governance) can materialize (Law & Mol, 2002). To do so in worlds out there that are fuzzy and fluid, requires methods that do not necessarily look for the repetitive or prescribed, for clarity or fixed formulations (of the good), but that instead allows for complexity and ambivalence. The analytical approach that I set out in the first chapters is a proposal to do just that.

8.3. Re: questions
Searching on

I have, in this thesis, with its methodological and conceptual transposals, contrasted and compared community practices of mobilization with practices elsewhere or done otherwise. Likewise, I have tried to enable and see what happens when academic or professional concepts converse and dance with community insights and cosmovisions, both by tinkering with the cherished science binary of conceptual-empirical and by looking at how Andean worlds can inform water research and policy. This will be shown below as I reply to the two research sub-questions that guided chapters four to seven – not by concluding on per-chapter findings, but by holding each sub-question against the cases of Andean communities (Socos, Quispillacta and Ccarhuancho) presented in the different chapters. I will start with the sub-question, *what are the irrigation and water practices and conceptualizations that help Andean communities to their secure wetlands and water worlds?*

This question is mainly informed by the empirical material presented in chapters five and six that specifically deal with water and irrigation, revolving around wetlands in the communities of Quispillacta and Ccarhuancho. In a certain way, a comparison between them was made for me by a member of the community of Quispillacta and the NGO ABA. When I told her of the wetland irrigation practices that I saw in Ccarhuancho, she reacted by saying that these were called crianza de agua: taking care of water movement by tinkering with streams and sources and then letting these flow freely. In Ccarhuancho, wetlands - or bofedales - are carefully studied by comuneras and comuneros. Subsequently, they construct ditches and position stones at strategic places to guide water and help make vital and fertile wetlands possible. In Quispillacta, wetlands are studied too and stones are also positioned at strategic depressions to retain water, nurture liveable environments and allow infiltration of water in the ground.

In both cases, water practices can be characterized as enacting a kind of fluid space: a wetland environment of which it is impossible to prescribe or calculate where herders will dig their ditches or position their stones or *tranqas*. Ditches or stones may be dug elsewhere or replaced after a single season if a maker so sees fit; this is something that is based on a situated intelligence (or metis) about her or his surroundings. In these environments, water is not known or mensurable in the volumetric terms preferred by water administrators. This is a cause for friction between the two worlds. Attempts have been made to make visible the impact of crianza or water care practices, for example, by maps I co-created with a spokesperson from Ccarhuancho, or by the remote sensing analysis that connects vegetation cover to water availability made in Quispillacta by ABA (ABA 2014). The necessity to demonstrate to adversaries and potential allies that community members actively take care of and govern wetlands comes with the danger that these visualizations are captured or co-opted by a water logic other than the one of community actor-worlds. Hydraulic projects and a state water apparatus might move in to register and quantify community water and irrigation practices to turn them into, and make them part of, administrative water governance worlds.

Writing about multiplicity is thus sensitive work that helps to make visible the worlds that would otherwise be(come) un-'done'. Part of such an endeavor is to see how the organizing conceptualizations and representations of one world can be used to learn more about the other without displacing it. For example, the idea of crianza plays a role in the life of Soquinas and Soquinos. Obviously. It does, to some extent, in all communities in the study area. On the other hand, Socos also contrasts with the described water practices in Quispillacta and Ccarhuancho in that in Socos they rely on more technoscience projects, on lined conveyance infrastructures and modern sprinkler irrigation. The case nevertheless shows this technology to be in flux. Through clever manipulation, bricolage and countless minute and mundane adaptations, community members reshaped the water delivery system; extended canals, added or moved hydrants, corresponding to in-the-field relations. Can it be crianza*?* If not the nurturing of technology, it surely resembles the kind of tinkering care, which I also saw in Ccarhuancho and Quispillacta. Perhaps it is counterintuitive to talk of *crianza* in relation to altering techno-scientific designs and systems. Indeed, chapter five showed how these two notions are constitutive of very different water worlds in Cuchoquesera. And yet, for a long time, technoscience-driven realities and practices have been deployed in attempts to transform how communities care for and secure water. For better or worse. So too in Quispillacta and the other Andean communities. A reversal of those positions – thus how crianza practices can be brought into play to reshape large hydraulic projects – is thus worth exploring to learn about what other ways of knowing water would have to say about contemporary water problems.

I started thinking about this since I, with others, elaborated on how comparable practices by the community Quispillacta and the PERC project enact a wetland area in Cuchoquesera differently. They were different, but still mirrored each other in terms of identifying sources, surveying the environment, building structures of stone and dealing with seepage. In the Pampas headwaters, I observed something similar when I looked at water practices of Ccarhuancho (and Huancavelica professionals) and the PETACC project, both enacting a different kind of environmental and irrigation water reality. In both cases, there were clear connections, or entanglements, between community and project worlds and realities. The communities of Quispillacta and Ccarhuancho, their members, mobilized their reality in encounters to defend their ways of relating to water. To mobilize ontological difference, I hold, is about promoting and putting to the fore their water practices and conceptualizations to solve pending water concerns. Community practices of water care in Quispillacta are put forth, by its members as a way to guarantee water for downstream uses in retribution schemes; community wetland practices in Ccarhuancho are used by spokespersons as examples for climate adaptation programs to protect similar environments elsewhere. Hesitantly, PERC, PETACC and others begin to acknowledge their merit.

Again, Socos seems like the odd community out. The case is tricky precisely because of how intricately entangled the community and PERC are. And obviously, I focused on a different question while collecting empirical material about Socos. Still, I would like to make a closing observation about mobilizing ontological difference to secure – in this case procure – water.

Lateral Socos was realized because the Socos's communities suggested *faenas* to start doing so. Hundreds of community members worked in line, each on a stretch assigned by community authorities. In fact, maintenance and cleaning of PERC infrastructure happens in the same way, with thousands working together. People also mobilize *chicha*, collectively prepare and eat food, enjoy breaks and share conversations. Members of Andean communities thus organize themselves and mobilize other things to solve a pending water management concern in a way that is *other* to the solutions proposed by most techno-scientific hydraulic projects. But it is one that shaped PERC profoundly.

This touches upon the third sub-question, *how do Andean communities and water user groups shape large scale hydraulic infrastructure (plans) to secure (either procure or protect) a water source and what are the impacts thereof?* The answer to this question is informed by the material presented in chapters four and seven – and to a certain extent chapter five – that specifically deal with community influences on the PERC and PETACC hydraulic projects.

The community described in chapter seven was Ccarhuancho. In a certain way, this is an almost emblematic case of a community defending their water and lifeworld against the threat of large-scale waterworks and economic interests – the PETACC project and commercial agro-export. Ccarhuancho's actions to secure their water have a lot of similarities with the actions taken by Quispillacta and Socos vis-à-vis PERC, even when the economic powers present are less intimidating compared to those in the Ica Valley and the relation between the communities and the hydraulic project is more complicated and messier. Socos and Quispillacta simultaneously opposed the PERC project while also collaborating with it to secure water and strengthen their water-related position.

In all cases discussed in the thesis, I showed community members to be crafty alliance builders and scale makers (or scale-bricoleurs) who have been engaged for decades to get or keep water. Among their mobilized allies are international treaties and (foreign) knowledge institutions, but also colonial documents, identities, the wool-economy, organic maize, NGOs and regional governments. Furthermore, organization skills, the authority of the community *asamblea* and community professionals living part-time in regional capitals, contribute to making these three communities into capable defenders of Andean waters. Community spokespersons used hydro-logic against water professionals about watershed boundaries, altered project scales and board formations. They broke FAO paradigms about soil irrigation suitability and took the lead in setting up roundtable negotiations. I conclude carefully that they have been relatively successful in realizing their interests. I am more confident in concluding that their astuteness is matched by their arduous work over many years.

In a certain way, the cases of Socos (chapter 4) and Ccarhuancho (chapter 7) resemble each other. The communities and their spokespersons mobilized neighbors to protest, but also came up with deliberated alternatives to the designs and plans of hydraulic projects. The difference is that securing water for Socos meant obtaining it, while for Ccarhuancho it meant protecting it. Both have greatly shaped PERC and PETACC, respectively, by assuring the realization of unplanned hydraulic works and by assuring the nonrealization of planned hydraulic works.

In Quispillacta, the dam and reservoir were both planned and realized, but not exactly realized as planned. There was a lot of controversy about it that continues until today, and there continues to be a sense of ambiguity among those living in Cuchoquesera about the project. Regardless, they shaped the large-scale hydraulic system to a great extent: new areas, above the regulating reservoir, were taken up in PERC's hydraulic scheme for which conveyance canals that would only transport water to the Cuchoquesera reservoir were redone, so that they also had distribution functions. The fostering of more healthy headwaters is now a policy of the system, and beyond. Quispilllacta was one of the communities that helped pioneer a rainwater harvesting movement (MINAGRI 2016) that led to a popping up of initiatives and programs about siembra y cosecha de agua like the one in the newspaper article cited above.

In all three cases, communities drafted proposals, protested, steered negotiations, enrolled and maintained heterogenous allies and astutely worked to attain the water they need. They communicated their cause and struggle through local reporting, but above all social media. Through this, community representatives kneaded water authorities and regional as well as national politicians to, in great part, make them adapt to community terms (without publicly stating this). Such is the story, Ccarhuancho's story, behind the solution to the conflict between Huancavelica and Ica. While they - just like the other communities - are absent from national newspaper coverage, they did mobilize (for them) more effective channels to connect and to communicate.

8.4. Issued research
Embody the multiple

This thesis detailed that, through a myriad of mobilizations – of identifying concerns, interessing or incentivizing (non)human allies and enrolling them – the Andean communities followed in this study have, to a great extent, secured their water worlds. At least for now. I tried to make sense of and write about this from a community vantage point, without claiming an insider perspective. To the contrary, I assume to not know and instead I learned, and will continue to learn, from community members I encountered and conversed with how they tacitly practice and make sense of such things as wetlands, infrastructure, water institutions, movements and more. Through this – and the reply given above - I have obtained an understanding of *how Andean indigenous communities and water user groups in the Regions of Ayacucho and Huancavelica organize and mobilize supra-community actors and allies to secure their water worlds and water-based livelihoods.*

This understanding and vantage point generates new reflections and musings. Now that the research is done, I would like to share some of these. First, if I made sense of certain community water worlds, then obviously there are those who do and did the same, concerning and/or departing from other worlds. These will lead to other conclusions that, like the one offered here, are always necessarily partial. A problematic water movement in bofedales can be explained by gravity and obstructed capillary action, as well as by upset entities active in uku pacha. There is thus not one world, but a multiplicity of worlds and centers. This leads back the argument made

by Donna Harraway and Marilyn Strathern, among others, that there is no total – universal, all-integrated or encompassing – understanding to be had. I find it easy to agree to the merits of this argument; to see all ways of relating to and knowing water as valid and full versions. I have shown that water can be enacted as a substance of technoscience, like H2O, and as an earth-being in a single community. What I want to emphasize is that the one version ought not and cannot be explained in terms of the other. Instead, the enactments overlap, clash and entangle.

I have written about those realties that are other to enactments of universal and encompassing explanations. With today's challenges of climate change, population pressure and sectoral competition over water that are found in the Andes, I believe there is a need to look more to these ways of relating to water that are other to the more technoscience versions when envisioning tomorrow's water worlds. Put differently, I make a plea for water governance studies to embody the multiple and for researcher to disclose new centers and realities (for is water governance not, at its broadest and humblest, a term used to indicate how groups of actors "do" things with water).

A second musing pertains to the question of the 'outsider' position, and the importance of reflecting on which point of view is used to explain other views. It matters which concepts are used to talk about concepts; that is, which empirical hinterland is mobilized to explain other empirical findings. I realized the potential (importance) of this during conversations with community members of mainly Ccarhuancho and Quispillacta about *ayni* (mutuality) or *ayllu* (community) and how these extend beyond agricultural activities, into all matter of life. In particular, I recall a meeting a few years ago, in 2017, with two NGO members from Quispillacta in the city of Huamanga. We entertained the idea of how the notion of crianza could inform science and if large infrastructure, like a dam, could be created using a crianza approach. I think it is fascinating to study how crianza de agua (water care) can be used to talk about management and water control and see what can be learned.

Critics might conclude it a pointless exercise in research. Strictly hypothetical. Perhaps, however, there is a sense of mutuality between the use of concepts and the attitude or pose of the user. If a researcher uses concepts like control, management, theory or efficiency, objects appear stable. It could also bring out a more rigid, abate or predictable pose. When concepts like care, reciprocity, multiplicity and ambivalence are used, objects may come to appear more malleable and ephemeral. A more reflective, hesitant or open-minded attitude is fostered. In contemporary water governance research, I believe, the second one deserves to be cultivated more.

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Resumen

En las últimas dos décadas, las comunidades andinas en el Perú han vivido cambios significativos. El crecimiento de la población humana, una mayor movilidad y disponibilidad de telecomunicaciones, así como también un mejor acceso a la educación, mayores recursos económicos, la implementación de una política de regionalización y el cambio climático, entre otros, han tenido un impacto significativo en las comunidades y sus miembros. Junto a estos cambios se produjo una intensificación de los conflictos por el agua dentro y entre las comunidades andinas, pero también con los sectores mineros, los intereses del agua urbana, las necesidades agrícolas comerciales y las demandas de energía hidroeléctrica – materializándose en gran parte en territorios comunales, como es el caso de los grandes proyectos hidráulicos. Dos de estos proyectos, en las regiones de Ayacucho y Huancavelica, se discuten en esta tesis.

Mientras que, en Ecuador y Bolivia, las comunidades andinas se movilizaron y ayudaron a consolidar los movimientos indígenas nacionales para abordar la inseguridad hídrica que surgió de estos conflictos, esto no sucedió en el Perú. En lugar de explicar esta aparente ausencia, analizo en esta tesis qué es lo que estas comunidades movilizan para asegurar su agua y cómo se inscriben en plataformas y asociaciones nacionales, así como otros actores supracomunitarios, para permitirse acceder continuamente al agua. La tesis se enfoca en las prácticas de las comunidades y cómo le dan sentido al mundo y a las entidades y fenómenos que encuentran. (*capítulo uno*)

Para llevar a cabo esto, he requerido analizar estas acciones fuera de ciertos binarios divisionales que a menudo se asumen en las ciencias sociales y naturales para explicar los valores, los motivos y las acciones de las comunidades, así como de los grandes proyectos hidráulicos, agencias estatales o actores comerciales. El uso de estos binarios, como las nociones de margen-centro, lo moderno-tradicional o lo humano-no humano, conlleva el riesgo de que las comunidades indígenas, por ejemplo, se asuman como marginales o que la movilización social se limite solo a la coalición y la acción de las personas. De esta forma, fue necesario elaborar un enfoque conceptual distinto que permita el análisis sin binarios, lo cual requirió una revisión crítica de conceptos de movilización social y seguridad hídrica tal como los conocía.

Para esto tuve que transformar algunos de estos conceptos en prácticas, como movilización y seguridad en movilizando y asegurando. Además, propuse tres herramientas conceptuales: *translation*, como una forma de estudiar cómo las comunidades también movilizan actores y redes no-humanas; *actor-worlds*, para establecer el centro situado de análisis; y *astucia*, para dar cuenta a las prácticas que utilizan las comunidades para transformar situaciones o entidades para apoyar sus proyectos. Utilizando estas herramientas reviso los eventos ocurridos en un paro agrario contemporáneo y un movimiento indígena del pasado, ambos llevados a cabo en Ayacucho. Los resultados mostraron que, en diferentes comunidades, existen diferentes versiones de este único paro o movimiento. Las ideas de *translation*, *actor-worlds* y *astucia* no solo ayudan a identificar y comprender el comportamiento de actores andinos comunales, sino que también se aplican al

'hacer' investigación. Con estas herramientas y enfoques (de ANT), revisaré la forma en que las comunidades andinas obtienen, retienen, protegen y defienden sus aguas. (*capítulo dos*)
Si existen diferentes versiones de un solo paro o movimiento porque se practican de manera diferente en los diversos mundos de agua (*actor-worlds*), esto también debe aplicarse para el agua como objeto de estudio. En esta tesis, discuto diferentes aguas andinas. Por ejemplo, por un lado, el agua que es producida por prácticas que conectan montañas veneradas (como *wamanis*), la madre tierra y comunera(o)s, y, por otro lado, discuto aguas cuyas prácticas conectan el concepto de gravedad, la ecuación de Manning e ingenieros agrícolas. Estas son dos formas de "hacer o producir" una cierta versión del agua, dos realidades del agua entre muchas otras, que excluyen la posibilidad de alguna forma de conocimiento que pretenda ilustrarlo todo.

La idea de multiplicidad informa entonces las observaciones del siguiente capítulo de cómo se lleva a cabo una junta de usuarios, la JUDRA (Junta de Usuarios del Distrito de Riego Ayacucho), en diferentes lugares. Estos lugares incluyen oficinas en la ciudad de Huamanga y varias comunidades andinas, en donde se produce una versión de JUDRA para apoyar los proyectos comunales de seguridad hídrica, o una posición relacionada con el agua. Es así que JUDRA se practica de diversas maneras, como una institución legal (oficinas), una iniciativa de base (Huamanguilla), un aliado para ayudar a traducir y apropiar una ley del agua para su proyecto (Quicapata), o un aliado complementario inconveniente pero necesario para el gobierno de la comunidad (Quispillacta). Los resultados muestran que JUDRA es un actor fluido, que carece de límites fijos o entidades estables, y que emerge en diferentes mundos parcialmente conectados. Considero cómo los portavoces de estos mundos producidos representan en un lugar un aparato hídrico nacional, y en otro su propia comunidad. Los enredos que crean, ayudan a que JUDRA sea un actor fluido y duradero. (*capítulo tres*)

El enredo de los diferentes mundos del agua se explora más a fondo cuando examino la democratización de grandes obras hidráulicas. Aquí muestro como la gran infraestructura, en particular los canales de distribución, están constituidos por y al mismo tiempo, son constitutivos de diferentes mundos (*actor-worlds*) que involucran entidades, prácticas e historias heterogéneas. En este caso, tomo como ejemplo las comunidades, y sus miembros, del distrito de Socos en Ayacucho, que durante mucho tiempo aspiraron y trabajaron para asegurar el agua de riego; más recientemente en el proyecto hidráulico PERC. Basado en diseños hidráulicos más antiguos y su proprio inversiones, el pueblo de Socos pensó que su inclusión en el proyecto era legítima. Sin embargo, cuando el "canal lateral Socos" finalmente se materializó, los ingenieros del proyecto y regantes de otras partes atribuyeron al canal y las acciones de Socos como anti-técnicas y corruptas.

Las tecnologías se crean en redes que preestablecen trayectorias tecnológicas, legitimando así lo que se puede debatir y lo que se considera irracional, esto establece el margen de maniobra y participación. Desde el punto de vista del proyecto PERC, las intervenciones de Socos no se consideraron democráticas. Sin embargo, desde el punto de vista de los miembros de las familias de las comunidades de Socos y su proyecto para construir un canal y asegurar el agua, fueron los ingenieros de PERC, entre otros, quienes participaron junto con ellos para realizar este proyecto

comunitario de larga duración. Sin embargo, una vez realizado otros intervinieron alterando la disponibilidad de agua para Socos, lo que llevó a la conclusión de que las tecnologías no son estables, sino que están en cambio constante, ya que continuaron siendo reproducidas de diferentes maneras. (*capítulo cuatro*)

Continúo estudiando la coexistencia e interferencia de los mundos del proyecto PERC y de la comunidad, observando cómo en ambos los bofedales de Cuchoquesera son producidos. Tanto para el proyecto como para la comunidad de Quispillacta, analizo las prácticas de identificación de fuentes de agua, inspección del paisaje, construcción de estructuras y respuesta a la filtración de agua. Esta exploración muestra la existencia de dos mundos de agua en un solo espacio: uno da lugar a una gran represa que se conecta a redes hidrometeorológicas y geodésicas, y a una distribución controlada del agua. El otro representa un espacio sagrado que se une a los seres terrestres, una red más antigua de líneas de visión veneradas y un cuidado (o crianza) recíproco del agua.

Las interferencias ontológicas entre estos dos mundos de agua resultaron en sufrimiento (material) para la comunidad y puso en controversia lo que significan los límites geográficos: como una línea divisoria o una relación fluida. Estos problemas conllevaron a una perdida de confianza y acción recíproca que era importante para la comunidad. Sin embargo, las interacciones posteriores también crearon oportunidades para la comunidad cuando en tiempos de escasez de agua y cambio climático, los ingenieros tomaron en cuenta muchas de las prácticas comunales de crianza de agua como alternativas a la actual inseguridad hídrica. (*capítulo cinco*)

La discusión sobre la fluidez de los actores y las prácticas de crianza del agua se profundizan en el caso de los bofedales, de la comunidad indígena de Ccarhuancho, en Huancavelica. Su territorio, y el de tres otras comunidades más, conforman la cabecera de cuenca del río Pampas, donde el proyecto PETACC planificó y realizó varias grandes obras hidráulicas para dar servicio al riego comercial en la costa peruana. En Ccarhuancho, el agua y los bofedales están profundamente conectados con los seres de montaña, los pastores y el ganado que forman parte de un mundo relacional que es mutable y fluido. En este capítulo investigo las prácticas para irrigar bofedales que implican abrir zanjas y canales, reubicar piedras y seguir procedimientos y decisiones comunales.

Comparo dichas ontologías y prácticas de agua de comunidades andinas en la cabecera de cuenca del río Pampas, con la lógica (u ontología) del "agua de irrigación" de la costa peruana en Ica. Esto me lleva a observar que el agua que practican los actores de PETACC e Ica tiene más que ver con el control, la cuantificación y la administración de los flujos de agua, mientras que el "agua ambiental" que practica Ccarhuancho, entre otros, tiene que ver más con hacer posible que el agua fluya "libremente", entrelazándose con el entorno. El primero trata de hacer que las cosas sean medibles o visibles, mientras que el otro es más fluido. Concluyo que en las ontologías de cabeceras de cuenca andina hay una cierta relación ambivalente entre los que es fluido y cuantificable (visible).

Las dos formas de relacionarse con el agua, el agua ambiental y el agua de irrigación, son la raíz de un conflicto hídrico prolongado entre actores que pertenecen a (o son aliados de)

Huancavelica o Ica. Sostengo que las tensiones ontológicas entre estos dos actores se produjeron debido a las soluciones propuestas por los protagonistas del agua de irrigación en Ica que continuaron pasando por alto las necesidades de agua en Huancavelica. Estudio este conflicto desde el punto de vista de la comunidad indígena de Ccarhuancho, en Huancavelica, y analizo cómo sus miembros entienden, buscan y movilizan todo tipo de aliados.

En este caso, yo soy uno de ellos, por haber acompañado a representantes de la comunidad al Tribunal Latinoamericano del Agua y por haber escrito artículos académicos con portavoces o líderes de la comunidad. Juntos documentamos cómo la comunidad organizó y participó en protestas y en plataformas de defensa, pero también cómo prepararon una petición legal, establecieron negociaciones en mesas redondas y alteraron activamente escalas y contextos. A través de sus acciones, Ccarhuancho y sus comunidades vecinas han defendido con éxito sus bofedales, hasta la fecha. Desafiaron las asimetrías existentes y reformularon el pensamiento sobre el agua en estas regiones de los Andes centrales de Perú. (*capítulo siete*)

El conflicto hídrico entre Huancavelica e Ica no solamente ha sido de larga duración, sino que también está muy bien documentado. A pesar de esto, la forma en que los representantes de Ccarhuancho como también los miembros de la comunidad practican sus versiones de agua (y cabecera de cuenca, leyes, y bofedales) y como dan sentido a este conflicto, apenas se reflejan en las conclusiones de estos documentos.-Del mismo modo, las nociones de crianza no obtienen mucho respaldo en los programas recientes de siembra y cosecha de agua, ni tampoco las diferentes versiones de JUDRA se reconocen en los documentos sobre capacitación de organizaciones de usuarios. En esta tesis discuto como esto tiene que ver con los mundos (*actor-worlds*) analizados, como también con los mundos de los investigadores de ciencias sociales; es decir cómo están situados (epistemológicamente) y el enfoque teórico que proponen. Conclusiones son siempre parciales.

Gran parte de lo que se escribe sobre el agua en el área de estudio, cómo darle sentido y cómo gobernarla, tiende a centrarse (o comenzar del punto de vista de) entidades como proyectos hidráulicos, autoridades de agua, políticas y leyes, grandes ciudades o sectores comerciales. Aun si ha sido para criticarlos. Esto es en un tanto extraño si consideramos que los portavoces en Ccarhuancho o Quispillacta han trabajado y conocen el agua (llámela gobernanza, gestión, cuidado o crianza del agua) durante mucho tiempo en el cual han sido testigos de la desactivación de proyectos hidráulicos, la sustitución de profesionales del agua y el cierre de organizaciones de agua. Me parece que aquellos, me incluyo, que nos dedicamos a escribir sobre la seguridad hídrica o del agua en los Andes, haríamos bien en aprender de estas comunidades y sus formas de comunicarse sobre el agua. En esta tesis estudié cómo las comunidades indígenas andinas practican el agua de riego y movilizan aliados supracomunitarios para asegurar sus mundos de agua. Concluyo que esto ha sido a través de acciones tales como diseñar infraestructura hidráulica, y al mismo tiempo protestar en contra de esta, movilizando sus propias escalas y contextos en las negociaciones, timando ciertos actores y creando aliados con otros, así como también, movilizando sus cosmovisiones y prácticas sobre cómo se debe tratar el agua. Y mucho más.

Las comunidades también movilizan a los investigadores para escribir historias sobre ellos y sobre cómo creen que las cosas pueden o deberían ser. Esto me sucedió a mi. Esta tesis es, en parte, un producto de eso, creada con cuidado a través de muchas conversaciones y encuentros recíprocos. Estoy seguro de que no entendí, ni tampoco apunto a entender completamente, lo que compartieron conmigo e intentaron enseñarme, y es posible que no estén de acuerdo con cómo lo he transmitido en este libro. Sin embargo, espero que aprueben su mensaje, el cual es el de someterse a la multiplicidad de los mundos de agua en el estudio de esta; estar abierto a conocimientos y formas ontológicas que son diferentes a las convencionales; y contribuir al conocimiento sobre el agua de riego no a través de la replicación o reproducción de centros o mundos existentes, sino mediante la adición de puntos de vista y nuevos encuentros. (*capítulo ocho*)

Samenvatting

In de afgelopen twee decennia hebben gemeenschappen in de Peruaanse Andes moeten leven met grote veranderingen. Een groeiende bevolking, betere mobiliteit en telecommunicatie, toegankelijker onderwijs en meer economische middelen, de uitvoering van regionaliseringsbeleid en klimaatverandering hebben verschillende ingrijpende gevolgen gehad voor de gemeenschappen en hun bewoners. Tegelijk met deze veranderingen is er een toename van waterconflicten waargenomen, intern en tussen Andesgemeenschappen, maar ook met de mijnbouwsector, stedelijke waterbelangen, commerciële landbouw en voorstanders van waterkrachtcentrales (om te voldoen aan stijgende energiebehoeftes). De laatste drie komen binnen het gebied van Andesgemeenschappen vaak tot uiting in grootschalige hydraulische projecten. Twee hiervan, in de regio's Ayacucho en Huancavelica, worden in dit proefschrift besproken.

Terwijl in de buurlanden Ecuador en Bolivia Andesgemeenschappen werden gemobiliseerd door, en hielpen bij het consolideren van, inheemse sociale bewegingen om de wateronzekerheid aan te pakken die uit deze conflicten voortkwam, gebeurde dit niet in Peru. In plaats van een onderzoek naar die ogenschijnlijke afwezigheid, kijk ik in dit proefschrift juist naar wat deze gemeenschappen dan wel mobiliseren om hun water veilig te stellen. De omkeer staat centraal: wat doen Andesgemeenschappen om bijvoorbeeld nationale belangenorganisaties, bondgenootschappen of andere actoren van buiten de gemeenschap, aan zich te binden om zo hun toegang tot water te consolideren. Het onderzoek draait dus om wat gemeenschappen doen en hoe ze de wereld en de entiteiten en fenomenen die ze tegenkomen, begrijpen. *(hoofdstuk een)*

Om dit te doen, had ik een manier nodig om verder te denken dan bepaalde splijtende dualismen die vaak op voorhand worden aangenomen in de sociale en natuurwetenschappen om waarden, motieven en acties van gemeenschappen uit te leggen, net zoals die van grote infrastructuurprojecten, overheidsinstanties of commerciële actoren. Het gebruik van deze dualismen, zoals centraal-in de marge, modern-traditioneel of menselijk-niet menselijk, brengt het risico met zich mee dat bijvoorbeeld inheemse gemeenschappen bij voorbaat marginaal worden bevonden of dat sociale mobilisatie beperkt is tot alleen coalities en acties van mensen. Ik bespreek een benadering voor analyse zonder dualismen, waarvoor ik de concepten van sociale mobilisatie en waterveiligheid, zoals ik ze kende, heb moeten herzien.

Hiertoe activeerde ik deze concepten, zette begrip om in gebruik (*practice*): mobilisatie en veiligheid om in mobiliseren en beveiligen. En ik stelde drie analytische instrumenten voor: *translation*, als een manier om te bestuderen hoe ook niet-menselijke actoren en netwerken door Andesgemeenschappen worden gemobiliseerd; actor-werelden, om de situering of het analysecentrum van de studie vast te stellen; en vernuft (*astuteness*), om rekenschap te geven van de praktijken die gemeenschappen gebruiken om een situatie of entiteit naar hun hand te zetten en zo eigen projecten te ondersteunen. Een recente landbouwstaking en een inheemse sociale

beweging uit het verleden, beide waargenomen in Ayacucho, heb ik opnieuw bekeken met behulp van deze instrumenten. Uit de resulterende analyses bleek dat er in verschillende gemeenschappen verschillende versies bestaan van deze enkele staking of beweging. En dat ideeën over *translation*, actor-werelden en vernuft niet alleen helpen het gedrag van actoren in de Andesgemeenschappen te begrijpen, maar ook van toepassing zijn op doen van onderzoek zelf. Met deze ideeën en inzichten (van ANT) zal ik kijken naar hoe Andesgemeenschappen hun water verkrijgen, behouden, beschermen en verdedigen. *(hoofdstuk twee)*

Als verschillende versies van een enkele staking of sociale beweging bestaan omdat ze anders worden beoefend in verschillende actor-werelden, geldt dit ook voor water. Ik bespreek verschillende Andeswateren. Bijvoorbeeld water dat enerzijds tot stand komt door gebruiken die geanimeerde bergen verbinden met Moeder Aarde en leden van de gemeenschap, en anderzijds door praktijken die de zwaartekracht verbinden met de Manning-vergelijking en landbouwingenieurs. Dit zijn twee manieren om water te 'doen', twee werkelijkheden van water onder vele andere, die de mogelijkheid van een verlichte allesomvattende werkelijkheid uitsluiten.

Dit idee van *multiplicity*, of veelvuldigheid, wordt vervolgens getoetst door te kijken hoe een watergebruikersorganisatie, de JUDRA (*Junta de Usuarios del Distrito de Riego Ayacucho*), tot stand komt op verschillende locaties. Deze locaties zijn onder andere kantoren in de stad Ayacucho en verschillende Andesgemeenschappen waar mensen en niet-mensen een versie van JUDRA uitvoeren om hun waterzekerheidsprojecten te realiseren of een water-gerelateerde positie veilig te stellen. Ik ontdekte dat JUDRA op verschillende manieren wordt beoefend als een juridische instelling (kantoren), als een *grasroots*- of boereninitiatief (Huamanguilla), als een bondgenoot bij het interpreteren en eigenen van een waterwet (Quicapata), of als een lastige maar noodzakelijke aanvulling op het gemeenschapsbestuur en gemeenschapsontwikkeling (Quispillacta). De resultaten laten zien dat de JUDRA fluïde is, vaste grenzen of stabiele entiteiten mist, en tot stand komt in verschillende, gedeeltelijk verbonden, werelden. Ik bestudeer hoe de woordvoerders van deze werelden op de ene locatie een nationaal waterapparaat vertegenwoordigen, op een andere hun gemeenschap. De verwevingen die zij creëren, maken de JUDRA zowel fluïde als duurzaam. (*hoofdstuk drie*)

De verwevenheid van verschillende waterwerelden wordt verder onderzocht wanneer ik de democratisering van grote waterwerken bespreek. Ik laat zien dat grootschalige infrastructuur, en met name distributiekanalen, zijn gevormd in en geven vorm aan verschillende actorwerelden waarin heterogene entiteiten, gebruiken en geschiedenissen een rol spelen. In dit geval kijk ik naar de gemeenschappen van het district Socos in Ayacucho, die lang streefden en werkten om irrigatiewater veilig te stellen, meest recentelijk van het grootschalige hydraulisch project PERC. Op basis van vroege ontwerpen en investeringen vonden mensen van Socos hun deelname legitiem. Echter na de realisatie van hun secundaire kanaal, oordeelde projectingenieurs en andere watergebruikers dat het kanaal en de acties van Socos anti-technisch en corrupt waren.

Technologieën worden gecreëerd in netwerken die vooraf een technologisch traject vaststellen en zo legitimeren wat er kan worden besproken en wat irrationeel is. Dit bepaalt de speelruimte voor manoeuvres en deelname. Vanuit het oogpunt van het PERC-project worden,

volgens haar ingenieurs, de interventies van Socos niet als democratisch beschouwd; vanuit het perspectief van de Socos-gemeenschappen en hun project om een kanaal te bouwen en toegang tot water veilig te stellen, waren het juist deze PERC-ingenieurs die samen met andere actoren, met hen meededen om een al lang bestaand gemeenschapsproject te realiseren. Eenmaal in gebruik genomen, hebben anderen echter toegang tot het Socos kanaal en waterbeschikbaarheid geëist. Dit onderschrijft de conclusie dat technologieën niet stabiel zijn, maar juist constant in beweging, omdat ze steeds opnieuw en op verschillende manieren tot stand worden gebracht. (*hoofdstuk vier*)

Vervolgens ga ik dieper in op de co-existentie van, en interventies tussen PERC-project- en gemeenschapswerelden door te kijken naar hoe het Cuchoquesera-hooglandmoeras wordt gerealiseerd door verschillende actoren. Voor zowel het project als de gemeenschap van Quispillacta kijk ik naar de gebruiken om waterbronnen te identificeren, de omgeving te kennen, structuren te bouwen en te reageren op kwelwater. Dit onderzoek laat zien dat twee waterwerelden op één zelfde plek tot stand komen: één leidt tot een grote dam en een opslagreservoir die zijn verbonden aan meteorologische en geodetische netwerken, en een gecontroleerde waterverdeling. De andere stelt een verheven ruimte voor die verbonden is met aardse entiteiten (*earth-beings*), een ouder netwerk van geëerde zichtlijnen en wederzijdse mens-water zorg.

De ontologische interferentie tussen de twee waterwerelden resulteerde in (materieel) verdriet voor de gemeenschap en voor controverse over wat grenzen betekenen; een scheidslijn of fluïde relatie. Een gevoel van vertrouwen en wederkerigheid, welke belangrijk was voor de gemeenschap, ging verloren. Toch creëerden latere interacties ook kansen toen ingenieurs in tijden van waterschaarste en klimaatverandering voor oplossingen keken naar gemeenschapsgebruiken op het gebied van waterzorg. (*hoofdstuk vijf*)

Zaken omtrent fluïditeit en waterzorg-gebruiken worden vervolgens verder uitgewerkt door te kijken naar de 'bofedales' of hooglandmoerassen van de inheemse gemeenschap Ccarhuancho, in Huancavelica. Het grondgebied en dat van drie andere gemeenschappen vormen de bovenloop van de Pampas-rivier, waar het grootschalige hydraulisch project, PETACC, verschillende grote waterwerken heeft gepland, en andere al gerealiseerd, voor commerciële irrigatie aan de Peruaanse kust. In Ccarhuancho zijn water en hooglandmoerassen diep verbonden met geanimeerde bergtoppen, herders en alpaca's die deel uitmaken van een relationele wereld die veranderlijk en fluïde is. Ik bestudeer de gebruiken voor moerasirrigatie, zoals het graven van greppels, herpositioneren van stenen en op volgen van gemeenschappelijke procedures en beslissingen.

Ik vergelijk de waterontologie en -gebruiken in de hooglanden met de 'irrigatiewater'-logica aan de Peruaanse kust in Ica. Dit brengt mij tot de vaststelling dat irrigatiewater, dat door PETACC- en Ica-actoren wordt beoefend, meer gaat over het beheersen, kwantificeren en toekennen van volumetrische waterstromen, terwijl het 'omgevingswater' dat onder meer door Ccarhuancho wordt beoefend, meer gaat over het 'vrij' laten stromen van water en het toelaten van vloeiende overgangen tussen water en land. De ene logica gaat meer over het meetbaar of zichtbaar maken van dingen terwijl de andere logica fluïde is. Wat betreft waterontologieën in

Peruaanse stroomgebieden, concludeer ik dat een zekere wederkerige ambivalentie tussen deze twee logica's noodzakelijk is. (*hoofdstuk zes*)

De twee manieren om met water om te gaan, omgevingswater en irrigatiewater, liggen aan de basis van een langlopend waterconflict tussen actoren die komen uit, of steun geven aan, Huancavelica of Ica. De ontologische spanning, meen ik, wordt continue bekrachtigd door voorgestelde oplossingen van Ica-voorstanders die de waterbehoeften in Huancavelica blijven ontkennen. Ik bestudeer dit conflict vanuit het standpunt van de inheemse gemeenschap van Ccarhuancho, in Huancavelica, en kijk hoe haar leden allerlei allianties en bondgenoten wegen, opzoeken en mobiliseren.

In dit geval ben ik hier een van; een medestander die gemeenschapsvertegenwoordigers naar het Latijns-Amerikaanse Watertribunaal heeft vergezeld en coauteur is geweest met woordvoerders van de gemeenschap. Samen bespraken en documenteerden wij hoe de gemeenschap protesteerde, burgerinitiatieven startte en deelnam aan belangengroepen, maar ook hoe ze een petitie opstelden, ronde tafelonderhandelingen begonnen en schalen en contexten actief veranderden. Door hun acties hebben Ccarhuancho en de naburige gemeenschappen tot nu toe met succes hun hooglandmoerassen verdedigd. Ze tartten hiermee bestaande asymmetrieën en hervormden het denken over water in deze regio's van de centrale Andes in Peru. (*hoofdstuk zeven*)

Het waterconflict tussen Huancavelica en Ica is niet alleen langlopend, maar ook veel gedocumenteerd. Echter de opvattingen van Ccarhuancho-woordvoerders en leden van de gemeenschap en de hieraan gekoppelde waterwereld komen nauwelijks aan bod in de conclusies van deze documenten (waaronder projectrapporten, aankondigingen van de regering, commerciële landbouwdiscoursen en onderzoeksdocumenten). Evenzo worden noties van *crianza*, of wederzijdse mens-water zorg, nauwelijks onderschreven in recente programma over regenwater opvang, noch worden de verschillende beoefende JUDRA-versies, die de organisatie continuïteit geven, erkend in teksten over het versterken van watergebruikersorganisaties. Ik heb in dit proefschrift laten zien dat dit te maken heeft met de actor-werelden waar schrijvers of onderzoekers (voor kiezen en) zich op focussen, en op die waarin ze zich bevinden. Conclusies zijn hierdoor altijd gedeeltelijk en begrensd.

Veel van wat is geschreven over water in het onderzoeksgebied, dus over hoe het te begrijpen en hoe het te besturen, heeft de neiging zich te concentreren rond actoren zoals hydraulische projecten, water autoriteiten, nationaal beleid en wetten, grote steden of commerciële sectoren. Ook als het doel van het schrijven is om deze actoren te bekritiseren. Dit is raar als je bedenkt dat woordvoerders in Ccarhuancho of Quispillacta al lang met water werken en water kennen (noem het bestuur, beheer, management, zorg of *crianza*), waarin ze getuige zijn geweest van de ontmanteling van hydraulische projecten, vervanging van waterprofessionals en sluiting van waterorganisaties. Het lijkt mij dat degenen, waaronder ikzelf, die zich bezighouden met waterzekerheid in de Andes er goed aan doen om te leren van hen en van hun manieren om over water te communiceren. In dit proefschrift bestudeerde ik hoe inheemse gemeenschappen in de Andes water bewerkstelligen of 'doen' en hoe ze bondgenoten van buiten de gemeenschap

mobiliseren om hun waterwerelden veilig te stellen. Ik concludeerde dat dit gebeurt door infrastructuur te ontwerpen, ertegen te protesteren, hun eigen schalen en contexten in te zetten bij onderhandelingen, bepaalde actoren te misleiden en allianties te smeden met anderen, en het promoten van hun opvattingen en praktijken over hoe water moet worden behandeld. En veel meer.

Andesgemeenschappen mobiliseren ook onderzoekers om verhalen te schrijven over hun manieren van doen en hoe ze denken dat dingen kunnen of zouden moeten zijn. Het is mij overkomen, en dit proefschrift is gedeeltelijk een product daarvan, dat met zorg tot stand is gekomen door middel van vele wederzijdse gesprekken en ontmoetingen. Ik weet zeker dat ik niet volledig heb begrepen wat ze deelden en mij probeerden te leren, en ze zijn het misschien niet eens met hoe ik het in dit boek heb overgebracht, maar ik hoop dat ze de boodschap onderschrijven, namelijk om *multiplicity* of veelvuldigheid in wateronderzoek te omarmen; open te staan voor dingen die 'anders' zijn; en om waterkennis toe te voegen, niet door replicatie of reproductie van bestaande centra, maar door het toevoegen van invalshoeken en nieuwe ontmoetingen. (*hoofdstuk acht*)

Summary

Over the last two decades, Andean communities in Peru have lived with significant changes. A growing human population, increased mobility and telecommunication, more accessible education and economic means, the implementation of regionalization policies, and climate change, among others, have variously impacted the communities and their members. Together with these changes came an increase in water conflicts within and among Andean communities, but also with mining sectors, urban water interests, commercial agricultural needs and increased hydropower demands. The latter three often materialize, in community territory, as large-scale hydraulic projects. Two of these, in the regions of Ayacucho and Huancavelica, are discussed in this thesis.

While in the neighboring countries of Ecuador and Bolivia, Andean communities were mobilized by and helped consolidate national indigenous movements to address the water insecurity that arose from these conflicts, this did not happen in Peru. Instead of explaining that absence, I look in this thesis at what it is that communities mobilize to secure their water and how they enroll national platforms and associations, as well as other supra-community actors, to help consolidate continued water access. It centers on what communities do and how they make sense of the world and of the entities and phenomena they encounter. *(chapter one)*

To do so, I needed a way to think around certain divisional binaries that are often assumed in social and natural sciences to explain values, motives and actions of communities, as well as of large infrastructure projects, state agencies or commercial actors. Using these binaries, like center-margin, modern-traditional or human-nonhuman, carries the risk that indigenous communities, for example, are assumed to be marginal or that social mobilization is restricted to just the coalition and action of people. I assembled an approach for analysis without binaries, for which I had to revise the concepts of social mobilization and water security as I knew them.

I activated them, turning concepts into practices: mobilization and security into mobilizing and securing. I also suggested three analytical tools: translation, as a way to study how also nonhuman actors and networks are mobilized by communities; actor-worlds, to establish the study's situatedness or its center of analysis; and astuteness, to account for the practices that are used by communities to turn a situation or entity to support their projects. A recent agricultural strike and a past indigenous movement, both observed in Ayacucho, were reviewed using these tools. The resulting analyses revealed that in different communities, different versions exist of this single strike or movement. And that ideas of translation, actor-worlds and astuteness not just help to identify and understand Andean families' behaviour but similarly apply to the practice of doing research. With these ideas and insights (from ANT), I will look at how Andean communities procure, retain, protect and defend their waters. *(chapter two)*

If different versions of single a strike or movement exist because they are practiced differently in different actor-worlds, this applies to water as well. I discuss different Andean waters. For

example, water that, on the one hand, is enacted by practices that connect spirit-endowed mountains, Mother Earth and *comunera(o)s* or community members, and, on the other, by practices that connect gravity, the Manning Equation and *ingenieros agrícolas* or agricultural engineers. These are two ways of 'doing' water, two water realities among many more enacted, and which exclude the possibility of an enlightened all-encompassing one.

This idea of multiplicity is then tested by looking at how an Andean water user association, the JUDRA (*Junta de Usuarios del Distrito de Riego Ayacucho)*, is done at various locations. These include offices in Ayacucho city and various Andean communities where a version of JUDRA is enacted to support people's projects of securing water, or of a water-related position. I found that JUDRA is variously practiced as a legal institution (offices), a grassroots initiative (Huamanguilla), an ally to help translate and utilize a water law (Quicapata), or an inconvenient but necessary complement to community rule (Quispillacta). The results show the JUDRA to be fluid, lacking fixed boundaries or stable entities, brought into being in different partially connected worlds. I consider how spokespersons of these worlds represent at one location a national water apparatus, at another their community. The entanglements they create help make the JUDRA fluid and durable. *(chapter three)*

The entanglement of different water worlds is further explored as I discuss the democratization of large waterworks. I show that large infrastructure, in particular distribution canals, are constituted in and constitutive of different actor-worlds that involve heterogeneous entities, practices and histories. In this case, I look at the communities and comunera(o)s of the Socos district in Ayacucho, who for long aspired and worked to secure irrigation water, most recently from the PERC hydraulic project. Based on pre-PERC designs and their early investments, people from Socos considered their inclusion legitimate. However, when their "lateral Socos" finally materialized, project engineers and water users from elsewhere considered the canal and the actions of Socos anti-technical and corrupt.

Technologies are created in networks that preestablish technological trajectories, legitimizing what can be debated and what is irrational. This sets the room for maneuver and participation. From the vantage point of the PERC project (engineers), the interventions of Socos were not considered democratic; from the situation of the Socos communities and their project to construct a canal and secure water , it were the PERC engineers, together with other actors, that participated with them, the Socos families, to realize a longstanding communal project. Once realized, however, others impinged on Socos' water availability leading to the conclusion that technologies are not stable but in constant flux as they continued to be re-enacted in different ways. *(chapter four)*

I continue to study the coexistence and interference of PERC project and community worlds by looking at how the Cuchoquesera wetland environment is enacted. For both the project and the community of Quispillacta, I look at practices of identifying water sources, surveying the environment, building structures and responding to seeping water. This exploration reveals two water worlds being brought into existence in a single place: One gives rise to a large dam and storage reservoir that links to hydrometeorological and geodetic networks, and controlled water

distribution. The other enacts a sacred space that links to earth-beings, an older network of revered sightlines and reciprocal water care.

The ontological interference between the two resulted in (material) grief for the community and controversy over what boundaries mean; a dividing line or fluid relation. After that a sense of trust and reciprocal action that was important to the community was lost. Still, later interactions also created opportunities when, in times of water scarcity and climate change, engineers looked to community practices of water care for answers to water insecurity. *(chapter five)*

Matters of fluidity and water care practices are elaborated upon by turning to the bofedales, or wetlands, of the indigenous community of Ccarhuancho, in Huancavelica. Its territory, and that of three other communities, make up the headwaters of the Pampas River, where the PETACC project planned and realized several large hydraulic works to service commercial irrigation on the Peruvian coast. In Ccarhuancho, water and wetlands are deeply connected to spirited-endowed mountaintops, herders and livestock that form part of a relational world that is mutable and fluid. I study practices to irrigate wetlands that involve digging ditches, re-positioning stones and following communal procedures and decisions.

I compare this highland community water ontology and practices to the "irrigation water" logic on the Peruvian coast in Ica. This leads me to observing that the irrigation water practiced by PETACC and Ica actors is more about control, quantification and administration of water flows, while the "environmental water" practiced by Ccarhuancho, among others, is more about enabling water to flow 'freely' and mesh with the surroundings. The one is more about making things measurable or visible while the other seems more fluid. Still, considering Andean headwater ontologies, I conclude there is in each a mutual ambivalence between the measurable/visible and the fluid. *(chapter six)*

The two ways of relating to water, environmental water and irrigation water, are at the root of a longstanding water conflict between actors that are from, or side with, Huancavelica, or with Ica. The ontological tension, I hold, was manifested by proposed solutions of Ica irrigation water proponents that continued to overlook the water needs in Huancavelica. I study this conflict from the vantage point of the indigenous community of Ccarhuancho, in Huancavelica, and look at how its members make sense of, seek out and mobilize all kinds of allies.

In this case, I am one of them, having accompanied community representatives to the Latin-American Water Tribunal and having co-authored with community spokespersons. We documented how the community staged and engaged in protests, and participated in advocacy platforms – but also how they prepared a legal petition, set up roundtable negotiations and actively altered scales and contexts. Through their actions, Ccarhuancho and its neighboring communities have successfully defended their wetlands, to date. They defied existing asymmetries and reshaped thinking about water in these regions of Peru's Central Andes. *(chapter seven)*

The water conflict between Huancavelica and Ica is not only longstanding, but much-documented as well. Still, the sense-makings of Ccarhuancho representatives, community members and corresponding enactments of headwaters, laws, wetlands and water are barely reflected in the conclusions of these documents, which include project reports, government

announcements, commercial agricultural discourses and research papers. Likewise, notions of crianza do not get endorsement in recent water harvesting programs, nor are versions of *JUDRA*, which give it durability, acknowledged in writings on capacitating water user organizations. I suggested in this thesis that this has to do with the actor-worlds which writers or researchers (choose to) center, and on the ones they are themselves situated in. Conclusions are always partial.

Much of what is written about water in the study area, how to make sense of it and how to govern it, tends to center on (or depart from the vantage point of) entities like hydraulic projects, water authorities, policies and laws, large cities or commercial sectors. Also if it is too criticize them. This is weird if you consider that spokespersons in Ccarhuancho or Quispillacta have worked with and know of water (call it water governance, management, care or crianza) for a long time in which they have witnessed the decommissioning of hydraulic projects, replacing of water professionals and closing of water organizations. It seems to me that those, including me, who engage with water security in the Andes would do well to learn from them and their ways of communicating about water. In this thesis I studied how Andean indigenous communities practice water and mobilize supra-community allies to secure their water worlds and conclude that this is through designing infrastructure, protesting against it, deploying their own scales and contexts in negotiations, tricking certain actors and forging allies with others, and promoting their views and practices on how water should be treated. And much more.

Communities also mobilize researchers to write stories of their ways and of how they think things can or ought to be. It happened to me, and this thesis is, partially, a product of that, brought into being with care through many reciprocal conversations and encounters. I am sure I did not, cannot, fully understand what they shared and tried to teach me, and they might not agree with how I conveyed it in this book, but I hope they approve of its message, which is to embrace multiplicity in water studies; to be open to things done otherwise; and to add water knowledge not through replication or reproduction of existing centers but by adding vantage points and new encounters. *(chapter eight)*

Acknowledgements

Practicing research, in particular ethnographic research, is about cultivating relations and reciprocities among numerous actors in multiple worlds. From Andean communities to academic ones, I am indebted to many* that and who were decisive for this research and for me as a researcher and person. Some might not even be aware of this and probably will never be, like the fisherman on a cloud-covered lake whose story gave me an insight on people moving among different Andean worlds.

For being able to appreciate this and encounters like it, I owe a debt of gratitude to Marcela Machaca. She gave a truly inspiring presentation at a meeting of government engineers and representatives of Irrigator Commissions. I hardly know her and was there by accident, slipped away from a JUDRA (water user organization) assembly. Marcela spoke eloquently about how waterbodies had family relationships and moods, how people should nurture water and let water nurture them in return (*criar y dejarse criar*). She was so clear and persuasive in conveying her cosmovision and approach to water, suggesting it as an alternative to what was happening in the area, that she not only awakened my curiosity about nonhuman beings but also convinced me to take these seriously. Feeling inspired was crucial to my promotion research.

Undoubtedly, this was one of the more defining moments for this research project and for me personally. But there were others, significant to me, of which I would like to foreground a few formative ones.

* It is true what I read in the dissertation acknowledgments of so many that came before mine: if I look back at my research and at who looked after me along the way – *at who inspired, encouraged, supported, guided, motivated or nurtured me; who provided laughs and perspectives, or indeed authority and austerity; at who helped me find myself, bore with and covered for me, who listened, celebrated and even prayed for me* – the sense of humbleness and gratitude is overwhelming. But there is also a sense of melancholy, for some who so graciously helped me, I will never see again.

When the SWAS grant proposal for this research was developed, I was a visiting researcher at CBC in Cusco. The late Mourik de Bueno Mesquita was the coordinator of several water programs and expert on Andean water realities and injustices. He helped me with my part of the proposal and provided contacts for both cases of JUDRA in Ayacucho and the MEGAH in Huancavelica. I am forever grateful for his guidance. I also want to thank the other colleagues and friends at CBC – Martin, Fabricio, Gustavo, Edwin, Javier (x2) and Marco – for sharing their knowledge on Andean culture and for sharing a lot of laughs.

I further like to express my gratitude to JUDRA staff and board members that received me upon my first arrival in Ayacucho, a day before the *para agrario*: Zenon Calle, Teresa Rivera, Teodoro Quispe, Percy Aponte and Gladys. Thanks for your support and lessons as representatives and spokespersons of 40,000 water users; as my protectors from my naivety, during the agrarian protest; and as friends, showing me how to cook *puca picante* and visiting Yanacocha with me as tourists. My second case, and second departing point of this study, was the MEGAH, a stakeholder platform that defended the interests of Huancavelica water users. I am thankful to its member representatives Yvonne Pacheco, Augustin Gonzalez and Floriberto Quispe for sharing their stories, confiding in me and providing documentation.

Doing ethnography in/on unfamiliar environments is exciting. It can also be quite unnerving. But not so much for me: on my first quick visit to the study area I was fortunate to have been invited by David and Rosa Bayer to come and stay in their house in Ica. It felt familiar fast and it became a home to me. In subsequent years, I often stayed with them when I came back for fieldwork. I joined them for meals, took trips with them and exchanged life stories and lessons. David was a retired sociologist and development professional who was passionately engaged with social injustices in the area. He told me about complicated and contentious water relations and took me to see controversial sites. David also took me to seminars and to festivities, like pisco tasting during the *vendimia*. People inferred we were related, which made a deep impression on me at the time. Rosa and David are two of the most generous and hospitable persons I have ever met. They supported me in research and life – and sometimes urged me to be more pragmatic. Feeling encouraged and supported was crucial to my work.

Many years later, I was in Ayacucho visiting Oseas, a co-researcher and friend, when I heard of David's passing. Devasted by this news, I tried to find ways to get to the funeral in time, but it was not possible. I decided, sad as I was, to go ahead with my plan to see the *ushnu* (a terraced ritual platform) on the summit of Altarniyocc, the mountain-being that oversees the community of Quispillacta. When we walked to the top, over steep terrain and in thin air, there was not much talking. It is just putting one foot in front of the other, starring at the *ichu* grass, listening to the wind and grieving him. When I took a pause and looked up, there was a ring of clouds above us, crowning Altarniyocc. As I moved on, to make a *pago* on the ushnu eventually, I felt a deep sense of appreciation and gratitude for all David and Rosa had done for and meant to me - a debt that can only be paid forward. Feeling lost and finding myself again was crucial to my Ph.D.

Silvano Guerrero was also a member of MEGAH and spokesperson of the community of Ccarhuancho. He is someone I greatly admire as a person. His tireless effort championing the cause of Huancavelica water users is without equal. And he still always had time for my barge of questions. Our successful co-researching endeavors online are a foothold in times of covid. I like to think I was, and am his confident and am proud of our co-authoring and friendship. Thanks, Silva, and thank you, Nancy and fellow *Ccarhuanchinos,* for always receiving me warmly.

I was warmly received in Ayacucho as well. I was invited to stay with Jeroen, Saskia and Aisha at their home. And later with Oseas, Juely and Tariq. Thank you for making me feel welcome. Eventually, I co-authored papers with both Jeroen and Oseas and am grateful to the former for his technical expertise and critical stance and for allowing me to use his creative idea for this thesis' cover. I am thankful to the latter for his anthropological expertise and critical voice and for allowing me to use his photos in this thesis.

Thanks, Oseas, for also accompanying to Quispillacta. To other *Quispillactinos* –Marlene, Antonio (co-researchers), Magda and Lorenzo (ABA) and many others – thanks so much for your stories and understandings of worlds new to me.

This, I like to extend also to people in Socos (Andres Quispe, Juan Quispe and Gustavo Aquino) who kindly shared time and even their personal archives with me. So did PERC *ingeneiros* Carlos Aperrigue, Luis Morales, Cristian Castro, Lucio Torres and media coordinator Augusto Pacheco. I like to express my appreciation to them and many other Ayacucho engineers for patiently explaining the project's technical characteristics and vantage points. And for inviting me to celebrate the anniversary of the project's patroness saint.

I am also thankful to Maria Teresa Ore, Eric Rendon, and Javier Chiong for their explanations and insights, social and technical, of water flows in Ica. And for our continued research collaboration, to this day, on water footprint and groundwater. We met at David's house long ago, and I am glad I have been able to receive you in Amsterdam.

I am indebted also to people in my academic world, especially from the Irrigation and Water Engineering Group (now Water Resources Management Group) of Wageningen University. I feel privileged to have been part of that group and its unique approach to water studies. There was a moment, at the start of my Ph.D project, when I felt particularly appreciative of its collective dynamics: On a spring day in late May, the elevated terrace of Hotel the 'Wageningse berg' (lit. 'Mount Wageningen'), which oversees the river Rhine and its floodplains, was the backdrop of the I-We research strategy meeting. Here we jointly contemplated on our research focus for the coming years and, related to this, the core values of our group. The atmosphere was relaxing – Margreet's hilarious drawing of a colleague set the tone and makes me smile to this day – but also serious. Water security became a focal point and, a kind of emancipatory action-research was what inspired all of us. The relation between Ph.Ds-to-be and regular staff was mutually energizing. Feeling guided and motivated was crucial to my dissertation.

That day ended in good spirits with drinks and laughs on the terrace. I remember it fondly as the moment when I considered my career change (from mechanical engineer) concluded. I thank everyone for that and for the continued sharing of experiences and viewpoints over the years.

As I move from Andean to Academic worlds, I would like to express my appreciation to other water scholars in Peru - Patricia Urteaga, Armando Guevera, Gerardo Damonte, Elizabeth Salmon, Laureano del Castillo, Aldo Panfichi and Sonja Bleeker. Thank you for sharing your time and expertise.

For a long time, the center of my academic world was the IWE group at Wageningen University. A time I thoroughly enjoyed and in which I learned a lot. For all discussions, coffees, feedback, encouragement, beers, inspirations and patience: thank you, Rutgerd Boelens, Harm Boesveld, Alex Bolding, Lisa Bossenbroek, Bert Bruins, Gerda de Fauw, Gerardo van Halsema, Petra Hellegers, Jaime Hoogesteger van Dijk, Frans Huibers, Deepa Joshi, Saskia van der Kooij, Janwillem Liebrand, Yvan Lopez, Rossana Manosalvas, Patricio Mena, Pieter van Oel, Maria Pierce, Nynke Post-Uiterweer, Edwin Rap, Henk Ritzema, Rigel Rocha, Jean-Carol Rodriguez, Esha Shah, Milagros Sosa, Jonas Vanwoeke, Gert Jan Veldwisch, Jean-Philippe Venot, Linden Vincent, Juana Vera, Jeroen Vos, Gerrit van Vuren, Flip Wester, Kai Wegerich, Cristina Yacoub, Arjen Zegwaard, Margreet Zwarteveen. Truly an inspiring group of Ph.Ds and a great staff. Anyone of which would be great to have as supervisor.

It turns out, if you take your time, many can be. To my fantastic four, I owe you big! To Linden, now retired: thank you for always being enthusiastic about my field material, for helping me shape my empirical stories into papers and for overviewing the project, trying to keep me on track. To Edwin, for a while in Cairo, now at Radboud University: thanks for accompanying me on so many field visits across Southern Peru as comrades, for teaching me to take our ethnographic fieldwork seriously and for having my back. To Rutgerd, still at Wageningen, but now also at CEDLA among many places, thanks for being this generous authority on Andean waters, for the many helpful comments and easy approachability, for your guidance and giving me the room I needed to finish. (And for the countless opportunities, since we first met, to pursue the career I aspire in the field that I want). To Margreet, now at IHE-Delft: thank you for stepping in during the final period. I feel we are kindred spirits when it comes to studying the things and phenomena out there. I and my work have significantly benefitted from your sharpness and eloquence. Honestly, I believe I would still be puzzling otherwise. It has been (and continues to be) a privilege and pleasure to work together.

Finally, a special thanks goes out to James, Mily and Roxi, my SWAS Ph.D colleagues, for their insights and encouragements; for the laughs and the listening ears when I needed to vent frustration. Looking back, I am proud of our early co-writing endeavors and look forward to an opportunity to pick that up again. It is time to reel in Roxi ;-). Thanks for the joint journey.

Indeed, it has been many years, this Ph.D project of mine – to the point that its beginning and ending stopped being dates: they are now periods. This final period feels surreal. Worlds that were, have ended. Life with covid is tense and trying; for me, my partner and basically everyone we know. Especially for those living in less privileged places: all of Peru. It is scary and sad. But there is an upside to lockdowns, closed day-cares and working from home, which nurtures my partner and me and brightens our conceptual thinking: raising Mar. She is our one-year-old-table-height-grabs-everything little toddler. Being able to see her discover her world creates much laughter and peace. I am amazed at how she notes changes in a room that I do not see. She brings me instruments to play, one after another. The second I am fixated on how to play for her, she is off, out of my sight, to grab a wooden bowl I tried to dissuade her from taking earlier. My little trickster, imbued with *metis*, you make my day.

At such moments I have to think off Marcela and one of the concepts that organizes her Andean worlds: *criar y dejarse criar* (to raise and be raised or nurture and be nurtured). Without it, it is not possible or fun to finish a Ph.D.

There have been other academic groups that provided support, in all manners, during the years it took me to finish this Ph.D project. Thanks to Michiel Baud, Barbara Hogenboom and all colleagues at CEDLA for sharing their knowledge on Latin America, their beautiful office and best library for a Peru-based research.

I am also very grateful to the members of the Eating Body Team and Annemarie Mol (whose format of her seminal book I have appropriated, poorly, for these acknowledgments – as an act of appreciation). Thank you all for allowing me to attend your (walking) seminars and letting me pick your brains in such a pleasant environment.

Other groups have welcomed and inspired me: I am grateful to Michaela Hordijk, Jochem de Vries, Joyeeta Gupta and colleagues at the GPIO department for broadening my research interests beyond Andean waters and for cultivating my abilities as a teacher. Special thanks to Arjen and Margreet for taking me on a tour of deltas. And to Annelies Zoomers from the International Development Studies Group at Utrecht University and Veena Srinivasan of Ashoka Trust for Research in Ecology and the Environment for the chance to continue studying deltas and making me feel welcome in their respective groups.

I am indebted to others for their contributions to this dissertation: for laughs, perspective and good-sensed (self)mockery over these many years, and often over beers, thank you, Ivo, Fem, Rens, Nel, Bas, Jochem, Arjen, maria and many others. Thanks to those whose fieldwork I was allowed to supervise and that complemented mine: Joost Veltmaat, Edwin Rodriguez, Aldo Cardenas, Robin van Kuijck & Francesca Nightingale. Many more have read, engaged with and helped to improve the papers that became chapters of this dissertation. For this, I am grateful to Dik Roth, Jeroen Warner, Marcel Kuper, Hermen Smit, Saskia van der Kooij, Frances Cleaver, Jessica de Koning, Oliver Human, Filippo Bertoni, Jeroen Vos, Atsuro Morita, Arjen Zegwaard – and of course the entire SWAS team.

I thank my family in the Netherlands and Peru for their love and lasting support, especially my mother, Marielos, sister, Nida and Ties, Valentijn, Tia, Jan, Clara en Cesar. I am forever grateful for your continued and unconditional inspiriting.

All generous contributions and support notwithstanding, I consider this dissertation part of a diptych, made with my beloved one. Together with Carol's work, it forms a pair (of Andean worlds in the south and Criollo worlds in the north of Peru) hinged by intimate teamwork, and an affinity for feminist STS and *slow science* ;-). Carol, letting me see the world your way, inspires and nurtures me more than you know. Thank you for 'letting your eyes shine through me'. And for your incredible patience as I wrestled to finish, thank you for being my better half in things that matter most. *Besa*

About the Author

Andres currently holds postdoc positions at the University of Amsterdam and Utrecht University where he continues to research amphibious environments, like deltas and high-altitude wetlands. To think through and understand otherness among them, he works with, and aims to further notions of, multiplicity, mobilization, care and cunning in the study of water-land relations.

Andres grew up in Eersel, a village in the south of the Netherlands, where he attended primary and secondary school. His house stood at the boundary of the village's residential area and the surrounding agricultural and forested lands. It was an excellent playground for acting out the stories of cunning childhood heroes, who remain a source of inspiration in later research.

After a degree in mechanical engineering, Andres worked a while for international consultancy firms, before deciding to study International Land and Water Management at Wageningen University to be able to engage more with social and development issues. For his Master degree, he wrote two theses on (customary) water rights and water management tasks in Peru and Switzerland. This sparked an interest in the different ways of enacting and making sense of water, leading to a fascination for ethnographic fieldwork.

Eventually, he was allowed to further explore ethnography and develop ideas on astuteness as a Ph.D. researcher in the NWO-WOTRO Integrated Program "Struggling for water security: Social mobilization for the defence of water rights in Peru and Ecuador." This culminated in defending the dissertation entitled "Water movements: fluidity and visibility among Andean worlds" at the Water Resources Management Group of Wageningen University.

During thesis writing, Andres held a teaching position at the Governance and Inclusive Development Group of the University of Amsterdam (UvA). His current work at UvA entails research on innovative or astute attempts of local (grassroots) groundwater recharge in Peru and India as part of the Transformations to Groundwater Sustainability (T2GS) project. He is also involved in delta research and studying different realities of the Mekong and Cauvery deltas together with the Ashoka Trust For Research In Ecology And The Environment, in Bangalore and the International Development Studies Group of Utrecht University.

Andres Verzijl
Wageningen School of Social Sciences (WASS)
Completed Training and Supervision Plan

Name of the learning activity	Department/ Institute	Year	ECTS*
A) Project related competences			
Foundation seminar "La Lucha por El Agua" (Struggling for water rights)	IWE, PUCP	2007	2.0
CERES Presentation Tutorials	CERES	2008	5.5
IWE-WUR Seminar on Social Mobilization	IWE	2008	4.0
"Investigating Technology: Politics Power and the Social Shaping of Technology"	WASS	2011	4.0
Masterclass "Social movements in the South"	WASS	2011	0.5
Workshop "Capturing Critical Institutionalism"	King's College London	2013	2.0
B) General research related competences			
"Conceptualizing Water Security from grassroots' struggles and localized perspectives"	CERES Summerschool	2009	1.0
"¿El lado oscuro de la seguridad y la banalidad de los conflictos de agua? Una exploración conceptual para los Andes Centrales, Perú"	Alianza Justicia Hídrica	2009	2.0
"Los fundamentos morales de la 'sociedad política'; ¿hacia una nueva justicia hídrica en la cuenca Ica-Alto Pampas?"	Alianza Justicia Hídrica	2011	2.0
"From the hills to the Altiplano: what Andean small holders and alpaca herders have in common"	ICCWaDS meeting (IWE–SOAS–ZEF)	2012	2.0
"The art of self-governing resources, institutions and livelihoods: Tracing community resource struggles and politics in Ccarhuancho, Peru"	WASS seminar	2012	1.0
"Democratizing Technology? The inclusion of the communities of Socos in the Rio Cachi Integrated Water Use Project"	WASS PhD day	2013	1.0
"Análisis de iniciativas supra-comunales orientadas a la seguridad hídrica Andina: experiencias de las regiones de Ayacucho y Huancavelica"	PUCP seminar	2013	0.5
C) Career related competences/personal development			
Facilitating and assisting Ccarhuancho Group to Latin American Water Tribunal, Guadalajara, Mexico	CBC Concertación Ccarhuancho	2007	2.0
Organizing SWAS research programme field and peer visit and local stakeholder meeting in Ica-Huancavelica	IWE	2009	3.0
Scientific writing	WGS	2010	1.8
Education, teaching and supervision of MSc, BSc and local Peruvian researchers	IWE CBC	2011	3.0
Grant Proposal Writing	WGS	2012	2.0
Organizing SWAS program closing activities: - Exchange visit of community water struggles of Ccarhuancho y Quispillacta - Local stakeholder workshop "Sinergias, tensiones y colaboración entre actores locales e investigadores"	Ccarhuancho Quispillacta IWE	2013	3.0
Total			42.3

*One credit according to ECTS is on average equivalent to 28 hours of study load

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