Agua de papel: moving beyond paper realities in the Ecuadorian waterscape

How power dynamics affect water users' opportunities to materialise their water rights along the Nagsiche river in Ecuador

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Master thesis conducted at the Water Resources Management group and submitted in partial fulfilment of the Master of Science in International Land and Water Management (specialisation B – Water, Society and Technology) at Wageningen University, the Netherlands.

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Abstract

Abstract: In Ecuador, both the country's constitution and its National Water Law provide significant levels of protection for nature and the rural and indigenous communities that depend on it. As such, water use and water extraction in the country are highly regulated on paper. However, in practice, many water sources in Ecuador suffer high levels of water overallocation. Along the Nagsiche river, this form of *institutionalised water scarcity* results in tensions between the multitude of water right holders in the river's territory, because the opportunities to materialise their water rights are drying up, and a myriad of actors scramble for access to the same resource. This thesis investigates how water distribution and water access are defined amongst the various actors present in the basin in the context of fictitious water rights, or *agua de papel*. It finds that, following a lack of institutional capacity at the governmental water authorities in Ecuador, economic and geographical powers are employed in order to take control over all water resources in the basin. Thereby, these powers are directly limiting the water access of many downstream rural communities that depend on water to sustain their agricultural livelihoods. As such, this thesis concludes that water access in the Nagsiche river basin finds itself in a vicious cycle in which the unquestioned, continued use of existing water allocation regulations in combination with the absence of governmental control on compliance with existing legal frameworks to define water access, opens up possibilities to abuse existing power dynamics and to generate ever high levels of water injustices, and ever reducing institutional capacity to respond to experienced realities of water scarcity nor to restore formal control and authority over water.

Keywords: Ecuador, National Water Law, *agua de papel*, institutionalised water scarcity, Nagsiche river, political ecology, water justice.

Abstracto: En Ecuador, tanto la constitución del país como su Ley Nacional de Aguas brindan niveles significativos de protección para la naturaleza y las comunidades rurales e indígenas que dependen de ella. Como tal, el uso y la extracción del agua en el país están altamente regulados sobre el papel. Sin embargo, en la práctica, muchas fuentes de agua en Ecuador sufren altos niveles de agua en todas partes. A lo largo del río Nagsiche, esta forma de escasez de agua institucionalizada genera tensiones entre la multitud de titulares de derechos de agua en el territorio del río, porque las oportunidades para materializar sus derechos de agua se están agotando y una miríada de actores luchan por acceder al mismo recurso. Esta tesis investiga cómo se define la distribución y el acceso al agua entre los diversos actores presentes en la cuenca en el contexto de los derechos de agua ficticios o agua de papel. Se encuentra que, debido a la falta de capacidad institucional de las autoridades gubernamentales del agua en Ecuador, se emplean poderes económicos y geográficos para tomar control sobre todos los recursos hídricos de la cuenca. Por lo tanto, estos poderes están limitando directamente el acceso al agua de muchas comunidades rurales aguas abajo que dependen del agua para sostener sus medios de vida agrícolas. Como tal, esta tesis concluye que el acceso al agua en la cuenca del río Nagsiche se encuentra en un círculo vicioso en el que el uso continuo e incuestionable de las regulaciones de asignación de agua existentes, en combinación con la ausencia de control gubernamental sobre el cumplimiento de los marcos legales existentes para definir el acceso al agua, abre posibilidades para abusar las dinámicas de poder existentes y generar altos niveles de injusticias hídricas, y una capacidad institucional cada vez más reducida para responder a las realidades experimentadas de escasez de agua ni para restaurar el control formal y la autoridad sobre el agua.

Palabras claves: Ecuador, Ley Nacional de Aguas, agua de papel, escasez de agua institucionalizada, río Nagsiche, ecología política, justicia hídrica.

Positionality statement

This master thesis is conducted in partial fulfilment of the Master of Science in International Land and Water Management, and executed as a part of the Master students exchange programme of the Riverhood and River Commons research projects. Through being part of these projects, this thesis aligns with their objectives. As such, from the start, the intention of this thesis has been to gain understanding of how powerful actors in the Nagsiche river basin secure their access to water resources. With this, I hope it may constitute a means to support water justice movements in finding ways to develop counteractive strategies and enhance water access for those actors that currently lose out. Considering the injustices faced in the context of Ecuador, I deliberately chose to focus my main investigatory efforts on the lived experiences of those that face the realities of *agua de papel* on a daily basis; Nagsiche's water users.

In correspondence with this objective, this thesis research has been conducted with the support of two Ecuadorian organisations: CAMAREN and the *Central Ecuatoriana de Servicios Agrícolas* (CESA). Both organisations work tirelessly for the integration of local knowledge and values in natural resource management practices in order to promote a more just society for small and medium peasant producers, and provide recognition for the fundamental contributions they make to Ecuadorian society. The cooperation with CESA has been crucial to establish the first connections in the field and beyond, since CESA previously ran several projects in the Nagsiche river basin, and disposes of a good track record of supporting community-led projects. Similarly, they also have a wealth of connections in the water governance domain, which helped me connect with the main government authorities. However, working under their name also brought along additional responsibilities to protect their position in the field. At times, this led me into a struggle of finding the balance between sharply addressing and questioning existing injustices, and protecting the established position of CESA. I believe this is a struggle that continuously worked through in the thesis presented in front of you.

This position was further complicated as the tensions experienced in the basin were way more present than anticipated. Especially in the conflict between San Isidro and Yacubamba, which is presented in Chapter 9, tensions had basically spiralled out of any form of governmental control, resulting in very high levels of despair amongst community members and an ongoing risk for violent outbreaks from both sides. This induced the need to adapt my research goals to the experienced reality, and to redefine my own objectives in the field with an eye on securing everyone's individual safety. Based on the judgement of the situation by CESA, Camaren and local community members, whose opinions I valued over my own limited experience with Ecuadorian water realities, this resulted in the decision to stay away from the upstream communities present in the basin and focus instead on the lived realities of the communities downstream. As such, I induced a strong bias towards the perspectives of downstream communities. Although this was hard to prevent given the existing tensions in the basin, in terms of a research perspective, the research lost an important element in being unable to properly represent both sides of the conflict.

Lastly, but undeniably, it is extremely important to mention that I executed this research as a non-Ecuadorian student, with 0 experiences in the country before entering it in January of this year. Although I think that doing research provides an extremely fast, and at times unforgiving, learning experience, there is no way I could have captured all dynamics, histories and experiences of the region and its inhabitants in the relatively short period of exposure that I had to these cultures and stories. I think it is crucial to acknowledge that the Ecuadorian waterscape is shaped by an incredibly intricate and complex web of structures and (colonial) histories that over time have shaped injustices, tensions, and distrusts that go way beyond the current generation of inhabitants in the zone. Executing the whole research as a non-native Spanish speaker amongst all of this complexity therefore at times only

seemed like a minor issue, but has definitely added its own, unintended, consequences. I am aware that my (initial) limited understanding of Spanish may have unintentionally created a bias towards some of the already anticipated realities of water scarcity, as I initially lacked the linguistic capacity to adequately adjust my interviews on the spot in the event of encountering new and unanticipated realities. Moreover, there is a risk that my respondents may have oversimplified their realities when realising my limited understanding of the Spanish language, thereby inducing the risk that I lost some of the more intricate realities that shape local experiences of water scarcity.

Despite this reality, I soon realised that it was actually for my non-Ecuadorian background that many doors that for so long had remained closed for local community members nearly automatically opened for me. Although this is a privilege that I of course had heard about before, the confrontation with this reality got me into a significant struggle for finding the "right" thing to do. On the one hand, I of course strongly resent the fact that doors open for me just because I look foreign, while those that are Ecuadorian have a way more important contribution to make in such spaces. On the other hand, I soon learned that if I would not accept the open door, it would not mean that the invitation would be passed on to others. So, I found myself in a constant search between sticking to my own principles, or taking my position to the (potential) advantage of the interests I was trying to protect. In close conversation with the communities I was working with, I opted for the latter. Part of this choice has been to ensure that *my* words are an as close as possible representation of *their* experiences, fears, interests and hopes. In doing so, I hope I have been able to produce an initial (local) insight into the many environmental and representational injustices that continue to be part of the current Ecuadorian waterscape, and their reproduction by existing power dynamics.

Figure 1 In acknowledgement of the people that accepted me, adopted me, let me into their lives, and shared the stories that currently make up the thesis that you find in front of you (own picture).

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1. Introduction

In *The Mystery of Capital*, De Soto (2000) introduced the idea that the formalisation of property is a crucial step towards securing financial benefits from natural resources and alleviating rural poverty. In the Andean highlands, this discourse spurred demands for the formal recognition of customary rights. Local irrigation communities widely believed that the formal recognition of their water use would enhance their possibilities to access water and would increase future water security (Seemann, 2016). However, with ever increasing frequency, academic literature suggests that the recognition and formalisation of customary water rights in practice subordinates the diversity of local water laws and strengthens the ideology of modern water policies. Rather than promoting equality, Benjaminsen et al. (2009) found that the formalisation of private property rights frequently favours those with most power, resources, or information. In the context of formal water rights allocation in the Andean highlands, Seemann (2016) points out how water rights policies risk to be appropriated by "legal structures and power relations that may promote unequal distribution of resources, water rights and decision-making power in conflict-resolution processes" (p. 158). Property right formalisation as a panacea for poverty alleviation and water justice thus has become increasingly criticised within political ecology oriented academic community.

Outside of this community, however, the reality of De Soto's discourse prevails, and many countries adopted major changes in their institutional and legal frameworks that support the large-scale acquisition of resource rights (Boelens, Gaybor and Hendriks, 2014). In Ecuador, this allowed vast amounts of land and water resources to be claimed by agribusinesses that produce crops for the international market. In many river basins, this has resulted in the appropriation of these resources from smallholder farming communities and ecosystems. Rather than a fundamental instrument to control water sources, prevent their contaminations and avoid conflict (Gaybor, 2008), it appears that water rights allocation thus also induced the seizure of local resources, and in doing so generated an additional source of conflict (Boelens, Gaybor and Hendriks, 2014).

In Ecuador, these conflicts are fed by the way in which water rights are allocated, since the *Ministerio del Ambiente, Agua y Transición Ecológica* (MAATE) allocates formal water rights in fixed litres/second allocations. In a country that is characterised by highly seasonal rainfall and discharge patterns, insufficient capacity to monitor actual water flows and the unquestioned continued allocation of new water rights, this practice results in periods of water scarcity during which the allocated volumes of water exceed the rivers' discharges. In this context of what I will call *institutionalised water scarcity*, a myriad of actors scramble to materialise their formal right to access the rivers' waters. This reveals that, even beyond the point of whether formalisation provides adequate opportunities to those most in need of water access to secure this access, it demands to scrutinize the consequences of the creation of *agua de papel*: water rights that exist on paper but that do not provide actual water access in practice.

This thesis sets out on a first endeavour to investigate the realities behind the existence of *agua de papel* in the Ecuadorian waterscape by scrutinizing how water overallocation influences the opportunities of different water users in the Nagsiche river basin in Ecuador to secure and defend their access to water. In order to do so, Chapter 2 first dives into how the current water availability and water distribution in Ecuador have come about. Chapter 3 specifies this situation to the context of the Nagsiche river basin in Cotopaxi province, which serves as the case study of this thesis research. Subsequently, a problem definition is defined around the current water allocation mechanism and the inequities that it introduces in terms of water access (Chapter 4). Chapters 5 and 6 introduce the conceptual framework (*agua de papel*) and methodologies (literature review, participant observation

and semi-structured interviews) that are deemed relevant for responding to the identified problem. Chapter 7-10 subsequently present the main results of this investigation. Chapter 7 focusses on understanding both the potential and the pitfalls of current institutional arrangements regarding water scarcity. Chapter 8 and 9, on the other hand, aim to share the stories of how various actors defend and secure their water access amidst the existence of *agua de papel*. In a waterscape that is filled with an increasingly wide variety of actors with highly divergent interests, the focus is specifically on the conflictive realities that are generated by the inequity in opportunities for different actors to materialise their on-paper-rights. Chapter 10 reveals how these inequities continue to work through in potential solution frameworks. Lastly, Chapter 11 discusses the value of the conceptualisation of *agua de papel* that this thesis developed in an attempt to understand local realities in river basins that are plagued by water overallocation. In Chapter 12, I conclude that this thesis reveals that situations of institutionalised water scarcity open the doors to an increased use of power dynamics in the defence of water rights, thereby inducing increased water injustice in the country's waterscape.

2. The Ecuadorian waterscape

Ecuador is a country that is extremely rich in water resources, due to its abundance in river basins and hydrological sources on a relatively small land surface (Isch López, 2009). On average, every Ecuadorian has access to 40,000 m^3 of water per year, which is nearly 4 times the global average (Gaybor, 2008). Therefore, Ecuador is often not directly associated with the concept of water scarcity, let alone with high levels of tensions as a result of water shortage. Yet, all over the country, these tensions are on a rise, and in more and more river basins the population suffers from periods of water scarcity. What is happening in the Ecuadorian waterscape?

2.1 Water scarcity or water inequity?

Ecuador's experiences of water scarcity mainly occur in regions that naturally possess sufficient water for consumption and production (Fernando Teran, 2009). As such, a focus on potential physical drivers for water scarcity is insufficient to understand the country's experiences of water shortage. On the contrary, all over the country, experiences of water scarcity are seen to accumulate in specific social classes (Isch López, 2009). In a population of which over 80% of the people work in agriculture, 50-60% of all flows available for irrigation remain controlled by only 1-4% of agricultural producers, while smallholder farmers who make up 88% of the irrigator community only have access to about 6-20% of available irrigation water (Isch López, 2012; Jackson, 2018). As a result, Ecuador ranks as the second most inequitable country in terms of water access in South America (Isch López, 2009). Water scarcity in Ecuador should therefore be understood as a *social scarcity,* a scarcity that accumulates in specific societal groups, accelerates the structural unviability of their livelihoods, and results in an amplification of historical problems of inequity, poverty, and unemployment (Fernando Teran, 2009; Zapatta Carpio & Hidalgo Flor, 2009).

Rather than focusing on physical drivers of water scarcity, Fernando Teran (2009) therefore points at the important role of the country's governance systems in defining water access. He asserts that in weak democracies, like that of Ecuador, power relations play a significant role in shaping a strong concentration of water in certain actors and economic uses. According to Fernando Teran (2009), it is the laws, administrative procedures, and public institutions for water governance in Ecuador that perpetuate water inequity between regions, agents, uses and economic activities, and that induce water scarcity upon specific societal groups. Based on this argumentation, the social water scarcity experienced in the country can be understood as a *political scarcity*, a scarcity that is induced by political or institutional decisions, legislations, or actions (Warner, 2009). But what are the main decisions, legislations and actions that have defined water access in Ecuadorian history?

2.2 Ecuador's history of water related policies

2.2.1 Pre-Columbian water cultures

For many decades, if not ages, the complexity of the Ecuadorian waterscape has been known to many of its water users and politicians alike. As a result, Ecuador has a long history of water regulations and water institutions. Already long before the Spanish invasion in Ecuador in 1532, Andean highland communities developed the first systems and regulations to organise riverine water use within and between their communities. The core element of their traditional customary water rights frameworks was to perceive water as a common resource property to which all individuals are entitled. In these systems, access to water was defined through community *mingas*, a form of communal labour that was used to construct and maintain irrigation infrastructure (Ramazzotti, 2008). The Andean water cultures and their related indigenous water laws, however, were profoundly compromised during the Spanish invasion, when access to land and water were increasingly concentrated as communal lands

were expropriated and community members were forced to work as labourers for the new large-scale landowners (Zapatta Carpio & Hidalgo Flor, 2009).

2.2.2 Colonial legacies in resource distribution

Although the Spanish rule ended over 200 years ago, the accumulation of land and water continued. After the withdrawal of the Spanish crown, initially the hacienda occupation, now led by local elites, intensified. Subsequently, large state investments into the industrialisation of agricultural production similarly continued to favour the concentration of ownership of land and water (Zapatta Carpio & Hidalgo Flor, 2009). Ecuador's first official water law, that was called into force in 1832 (only 2 years after the establishment of the Ecuadorian state), was therefore no exemption to the ongoing misrecognition of century-old indigenous water cultures in the country, and heavily promoted private water rights systems over traditional systems (Boelens, Hoogesteger & Baud, 2015).

2.2.3 Resource distribution in the development state

Only by 1964, a first attempt was made to restore the recognition of indigenous and rural cultures and livelihoods and undo the inequalities that got instilled in Ecuadorian society through centuries of Spanish colonial rule and subsequent rule by republican elites (Zapatta Carpio & Hidalgo Flor, 2009). In the Agricultural Reform and Colonization Law that was drafted in this period, maximum landholdings were defined that forced large scale landowners to redistribute their lands, presumably towards neighbouring indigenous communities (Blankstein & Zuvekas, 1973.

However, the precolonial communal control over water remained out of sight as water control got centred in the hands of the state and the National Water Law of 1972 stuck with the idea of water rights titles, although reframed under the name of temporary water use permits (Boelens, Hoogesteger & Baud, 2015; Isch López, 2012). Similarly, despite the intentions of the Agricultural Reform, Blankstein & Zuvekas (1973) found that only half of the proposed redistributions succeeded, and average plot sizes for indigenous families after such "successful" redistributions often remained below what was needed to sustain these families. With the drafting of the Agrarian Development Law in 1994, this skewed land ownership was consolidated once more through the introduction of land ownership rights (Zapatta Carpio & Hidalgo Flor, 2009). Only three years later, a reform on this law coupled the transfer of water rights to transfers of land ownership, thus providing legal security to not only skewed land distributions, but also to the accumulation of water resources in large-scale land properties (Fernando Teran, 2009).

2.2.4 A new water culture?

Only by 2008, a new significant change in terms of water legislation announced itself in the form of an extensive renewal of the country's constitution. Way beyond the borders of Ecuador, this new constitution was accredited for its progressive views on nature and human rights. With its implementation, Ecuador became the first ever nation to constitutionally declare access to water as a human right (Wingfield et al., 2021). The main implication of this new conceptualisation of water is that it allows communities throughout the country to contest the inequality in water access in Ecuador. To materialise these rights, in 2014 Ecuador revised its 42-year-old National Water Law to correspond to the new perspectives on water laid out in the country's constitution. The key concept of this new National Water Law (known as the *Ley Orgánica de Recursos Hídricos, Usos, y Aprovechamiento del Agua*) is the ancient Andean understanding of *sumac kawsay*, which is to live in harmony with nature. According to this principle, human development and environmental protection should go hand in hand in the country (Ley Orgánica de Recursos Hídricos, Usos, y Aprovechamiento del Agua, 2014).

Similarly, the law proposes a revaluation of local water management practices. For the first time since the Spanish invasion, the law allows for the issuing of communitarian water rights and the recognition of *minga* as a method of defining internal water allocations (Ley Orgánica de Recursos Hídricos, Usos, y Aprovechamiento del Agua, 2014). To support this more communal outlook on water management, local water users' associations (called *Juntas del Agua*) are recognised to play a key role in the new Ecuadorian waterscape. These *Juntas* are divided into those that determine drinking water allocation and those that determine the allocation of irrigation water. With this gesture, the National Water Law provides the rural regions in Ecuador with a greater voice in water policy development (Ley Orgánica de Recursos Hídricos, Usos, y Aprovechamiento del Agua, 2014).

However, despite the formal recognition of traditional water management systems in this new National Water Law, in practice little has changed in the Ecuadorian waterscape since its implementation in 2014. While being one of the world's most progressive water laws in terms of its focus on equity, sustainability, and environmental protection, there are many financial and technical limitations that have hampered its possibilities to put its environmental and social consciousness into practice (Wingfield et al., 2021). In reality, many *Juntas* are for example seen to suffer financial restraints that form a source of internal dispute over water allocation, and provide the largest economic powers in the river basins (generally the large-scale agribusinesses) with increased power over water resources. As a result, since the introduction of the National Water Law, water inequity and threats of water insecurity for smallholder farming communities have only increased (Wingfield et al., 2021).

Figure 2 In 2015, indigenous people set out on a 10-day march towards the capital to protest against the new National Water Law of the country, as they argued that indigenous representation during the drafting of the law had been too limited (Human Rights Watch, 2015).

Textbox 1: The National Water Law – impractical ánd unconstitutional

In June 2015, only one year after the formal implementation of the National Water Law, the *Confederación de Nacionalidades Indígenas del Ecuador* (CONAIE) filed a demand to revise the National Water Law based on the predicament that indigenous communities were insufficiently included in the drafting of the law (see also Figure 2; Foro de los Recursos Hídricos, 2022). In January 2022, nearly 7 years after this claim was filed, the constitutional court stated that the pre-legislative consultation of the Law did indeed not include sufficient opportunity for communities, indigenous peoples, and nationalities to participate in its preparation, despite the significant impact its regulations would have on these groups. As a result, the court ruled that the National Water Law and its regulations would be deemed "unconstitutional". However, it also ruled that the law should remain in force until a new Water Law has passed through the National Assembly (Foro de los Recursos Hídricos, 2022). Currently, this process has been delayed until national elections in October 2023, following the presidential decision to dissolve the National Assembly in May 2023.

2.3 Water overallocation

For a long time, the highly unequitable water distribution in Ecuador was made up by the abundance of water resources in the country's territory. Yet currently water resources are retreating at a rapid rate. Over the Latin American continent, climate change subjects the Ecuadorian highlands to an increase and intensification of meteorological droughts, compounded by an above-average increase in temperatures (Reyer et al., 2017; Vicente Serrano et al., 2017). Simultaneously, the country's *páramo* ecosystems are degrading, through which they lose their capacity to balance strong fluctuations in water supplies (Yasig & Allauca, 2008). Therefore, the impacts of institutionalised water scarcity become ever clearer, and (seasonal) water shortages reveal themselves in more and more river systems in Ecuador.

Key element in this relatively new reality is the country's existing water allocation mechanism, which distributes water according to fixed litres/second concessions and thus does not account for the sharp seasonal variability in river flows. As such, a significant overallocation of rivers' dry season flows has developed. The country's experienced water scarcity could therefore largely be described as an *institutionalised water scarcity*, a term that indicates that the country's water institutions and regulations play a major role in defining experiences of scarcity. Water rights that exist on paper no longer guarantee actual access to this water throughout the year. In the remainder of this thesis, I will refer to this as *agua de papel,* a situation in which the overallocation of water rights in Ecuador results in the existence of fictitious water rights, and with that institutionalises and activates conflicts over water between right holders. The existence of this *agua de papel* reveals the vulnerability of farming communities that entirely depend on the river's flows, but moreover, it reveals their dependency on the behaviours of other water users in the territory. As Fernando Teran (2009) summarises: "*Lo que la naturaleza te da, la sociedad te lo quita*" (p. 58), in other words: while nature provides, society in the end decides.

2.4 Concluding remarks

This chapter reveals that Ecuador's water inequity is not a new or just established reality, but that it is deeply engrained in the country's history and its institutions. Despite nearly 200 years of continuous revisions and elaborations of its water related policies, resulting in ever more detailed water management structures and an ever-changing landscape of related water institutes, none of these changes have really been able to undo existing inequities. In the meantime, the resulting political and social water scarcity in the country presents severe challenges for agriculture in Ecuador. With close to 90% of all water resources in the country being used in this sector, and over 80% of Ecuadorians depending on (irrigated) agriculture to secure their livelihoods (Isch López, 2012), there is a need to analyse the dynamics that drive political and social water scarcity and identify potential directions for future water distribution policies in Ecuador. To do so, the next chapter will introduce the case of the Nagsiche river in Central Ecuador.

3. An introduction to the Nagsiche river basin

The Nagsiche river basin is a micro river basin in the central Ecuadorian highlands. The basin covers an area of nearly 22,000 ha in the province of Cotopaxi, and supplies drinking and irrigation water to 23,000 people. However, while nearly 88% of these people depend directly on the river's waters for human consumption and over 75% of them need it for irrigation, the river runs completely dry every year between June and September (Chancusig et al., 2012). Although at first sight this might seem like a physical water shortage, a deeper dive into the context of this river reveals a highly political backdrop of existing water shortages. What is the situation at hand in the Nagsiche river basin?

3.1 The (socio)geography of the Nagsiche river basin

The Nagsiche river basin is a micro river basin that constitutes part of the Cutuchi subbasin. The river sources at an altitude of about 4,500 meters above sea level and terminates about 30 kilometres east in the Cutuchi river at an altitude of 2660 meters (Guallo et al., 2018). It partially constitutes a natural boundary between the canton of Salcedo on its right bank and the canton of Pujilí on its left bank (Figure 3). As such, it crosses through the indigenous territories of both Cusubamba and Pujilí Jatun Juiga, two territories which remain highly dependent on subsistence farming. The majority of the inhabitants of these territories depend completely on small scale agriculture plots for their livelihoods. On these plots, which are often smaller than one hectare, they grow a wide variety of crops in order to supply their family with a varied diet (Figure 4). Commonly, this includes mixtures of potatoes, maize, beans, vegetables and some types of flowers and fruits, often in combination with pastures that support small numbers of cattle. As a form of supplementary income, many families breed guinea pigs, which they sell in the regional trade centres. However, overall, average incomes in the area remain very low, with estimates describing incomes of only $2.50-$4 per day (Yasig & Allauca 2008).

However, it is not only small-scale agricultural production that defines the landscape in this region. The gentle slopes in the midstream and downstream sections of the river have also attracted large scale agroindustrial production to the area (Figure 5). In the last three decades, a cooperative of agribusinesses that focusses on the large-scale production of broccoli and flowers for the international market have settled in the region, and as such have rapidly incorporated the area into international trade flows (Chancusig et al, 2012). The region's ever-growing incorporation in (inter)national markets has transformed indigenous lifestyles in the region significantly, and induced a growing dependence on neighbouring market cities like Salcedo, Saquisilí and Latacunga.

3.2 Local water use and water distributions

Considering the large importance of agriculture in the region, the flows of the Nagsiche river are crucial to support local livelihoods. As a result, a total of 31 water intakes are distributed over its 30-kilometre course. 16 of these intakes have the single purpose of providing drinking water to the inhabitants of the basin, whereas the remaining 15 intakes service irrigation systems. However, in terms of the water allocation over different water users, 124 out of the total of 223 concessions are destined for irrigation compared to solely 71 of them being destined for human consumption. The remainder of the concessions is distributed between drinking water for livestock and industries in the area. In terms of allocated flows, the prominence of agriculture in the region is also reflected, as 1587 l/s (89%) of the allocated river flow is granted for agricultural purposes while only 183 l/s (10%) is allocated for human consumption, 3.8 l/s for livestock, and 2.2 l/s for industries (see Figure 6).

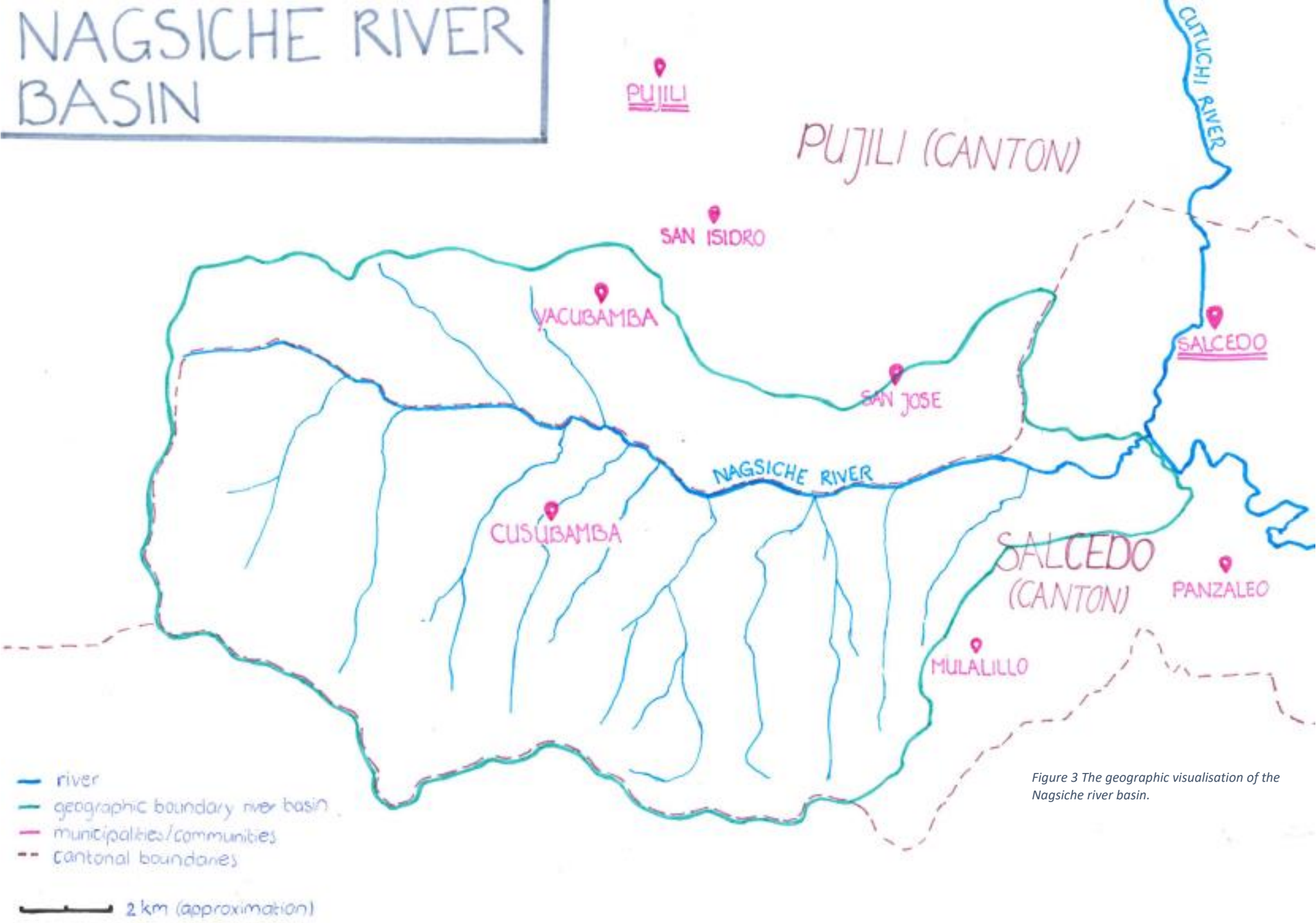


Figure 3 The geographic visualisation of the Nagsiche river basin.

Figure 4 Small scale agricultural plots in San Isidro, on the left bank of the Nagsiche river basin (own picture).

Figure 5 Large scale broccoli production near San Jose de Alpamalag on the left bank of the Nagsiche river basin (own picture).

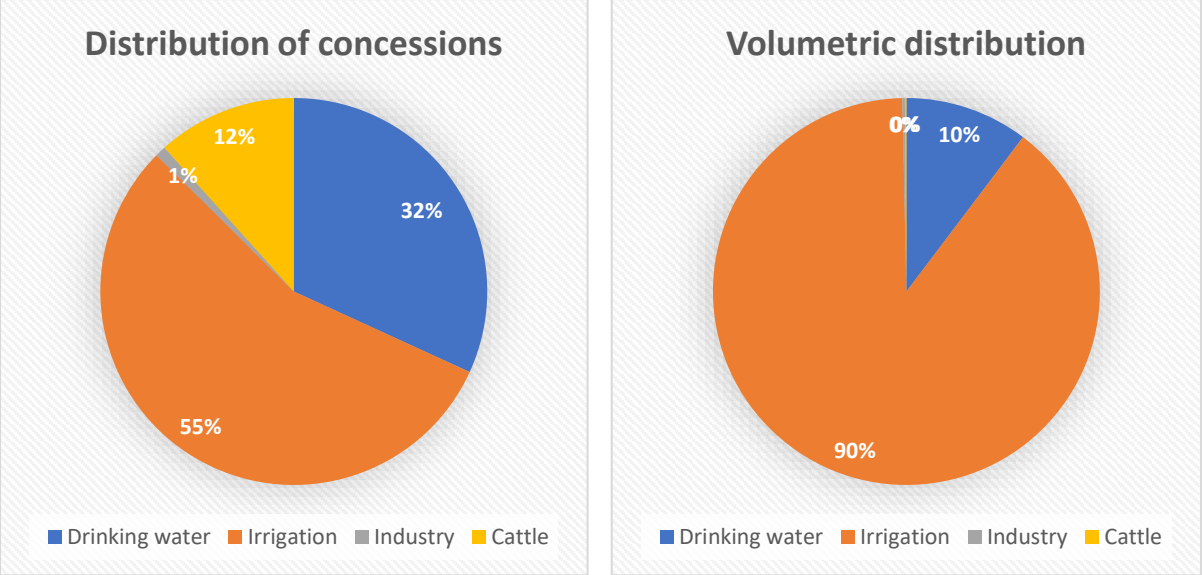


Figure 6 The (volumetric) distribution of concessions in the Nagsiche river basin over various water uses.

3.3 Agua de papel: the scene of institutionalised water scarcity

While water distribution from Nagsiche's flows is clearly defined on paper, a problem arises in practice: the Nagsiche river basin experiences a marked difference in precipitation between the dry months of June to September and the wet months between October and May. Due to these strong seasonal differences in rainfall patterns, the discharge of the Nagsiche river also fluctuates significantly throughout the year. Figure 7 shows that while the river reaches discharges of over 3000 L/s in the rainy season, average low discharge is at only 980 l/s in September (Chancusig et al., 2012).

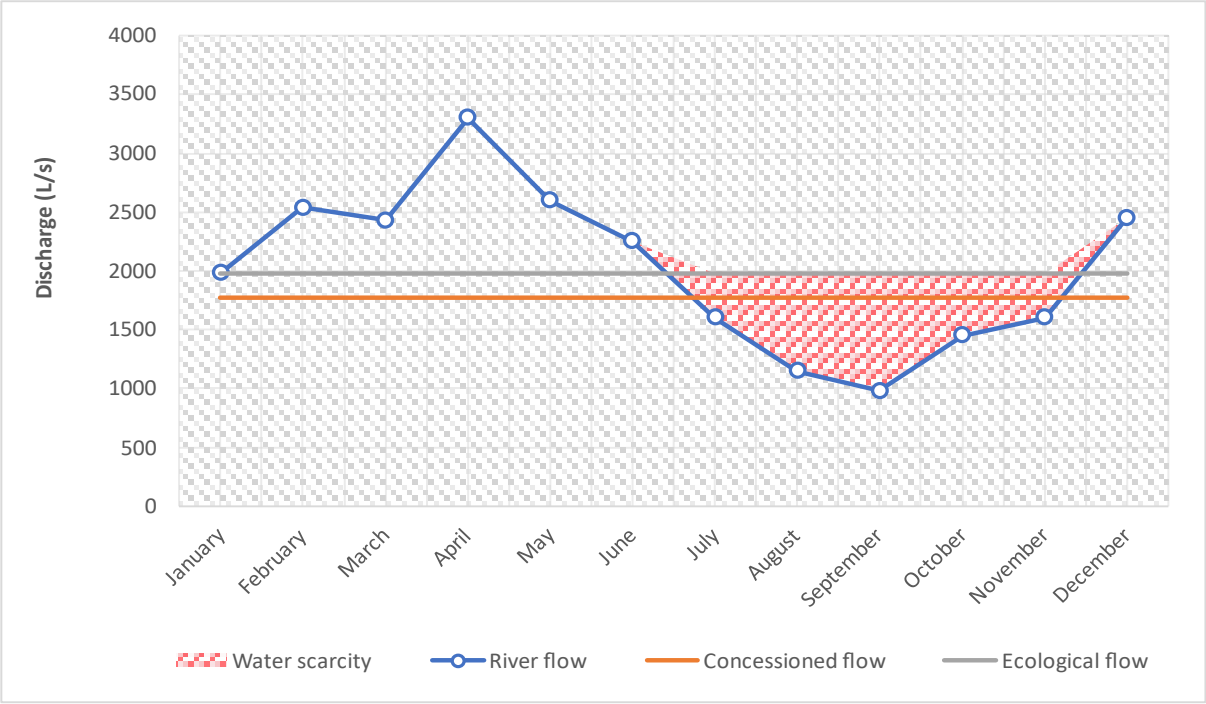


Figure 7 The concessioned flow of water relative to the average available flow in the river. The grey line indicates the situation if you would include the obligation to account for ecological flow on top of the concessioned flows.

This provides significant problems for water users in the Nagsiche river basin, as a total of 1776 l/s of the river's flow is allocated to their different water uses, while the river does not even reach discharges of 1700 l/s during the majority of the dry season. In September, the difference between allocated

water rights and actual water discharge even reaches over 800 L/s, indicating that nearly 45% of the existing water rights in the basin remain unfulfilled in this period. This figure gets even worse when the institutional obligation to secure at least 10% of the average river flow as an ecological flow would be added to the existing water demands, instead of letting the river run dry for several months on end. The situation along the Nagsiche river (see Figure 8) thus is a key example of the many Ecuadorian rivers that suffer from *institutionalised water scarcity*.

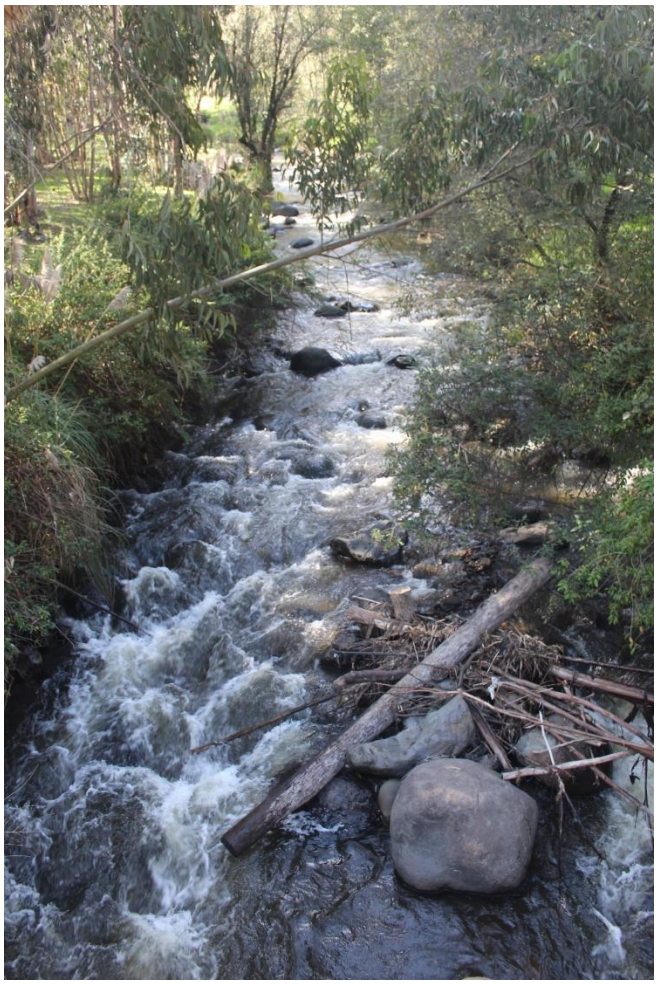


Figure 8 Low water levels in the Nagsiche river, in February 2023 (own picture).

The past years, the lack of water to supply existing water right has led to increasing tensions between the wide variety of actors and uses that legally source their water needs from the Nagsiche river. Chancusig et al. (2012) found that these conflicts over water occur in virtually every irrigation system in the basin, both between irrigators of the same system as well as between irrigation systems. In these conflicts, both water distributions between large scale landowners and rural communities and access to the páramo territories have become heated topics of debate. As such, it appears that current water allocations do not only institutionalise water scarcity, but also build in water conflict, and that the realities of institutionalised water scarcity in the Nagsiche river basin stretch way beyond the single event of water overallocation. As a consequence, the river increasingly suffers from the existence of *agua de papel*, especially between August and November but increasingly also between January and March.

3.4 Concluding remarks

In this chapter, the Nagsiche river basin is presented as the scene for high levels of institutionalised water scarcity. It reveals that the existence of such scarcities give rise to significant tensions in the basin, inducing a situation that could be referred to as *institutionalised water conflicts:* conflicts that result from a conscious decision to overallocate a river's water resources at local, regional, or even national governance levels. As such, it reveals that the existence of *agua de papel* is more than the single act to overallocate water resources, but bears implications for water access and relations between water users on a day-to-day basis. In the next chapter, I will use this understanding to draft a problem statement for the Nagsiche river basin, and to define some key objectives for enhancing our understanding of *agua de papel* with the help of this case study area.

4. Research outline

4.1 Problem statement

Following the regulations of Ecuador's National Water Law, water authorities in Ecuador allocate water rights in fixed litres/second allocations. Yet, in a country that is characterised by highly seasonal rainfall and discharge patterns, limited monitoring capacity of actual river discharges and an in practice ever-continuing (class-based) allocation of new water rights, this distribution mechanism results in a frequent overallocation of existing water resources. In the Nagsiche river basin, this overallocation presents high levels of *institutionalised water scarcity* during the dry season. While most of the water users have a formal right to extract water from the river, the opportunities to actually materialise these water rights are therefore drying up, and a myriad of actors scramble for access to the same resource. Along the Nagsiche River, this results in severe tensions between the multitude of water right holders in the river's territory, especially since the impacts of institutionalised water scarcity are unequally distributed between various communities in the basin. As such, more than "just" fictitious water rights, *agua de papel* opens up a new realm of water injustices in the Ecuadorian water scape; one in which access to water has become a highly politicised subject that is largely defined by existing power asymmetries between different water users in the Nagsiche river basin.

4.2 Research objectives

The **research objectives** of this study are…

… to understand the **institutional landscape** in which institutionalised water scarcity and the distribution of its impacts over various water users in the Nagsiche river basin is shaped;

… to understand how various **power dynamics** in the Nagsiche river basin shape and maintain the water injustices that occur following institutionalised water scarcity;

… to understand how power dynamics affect **perceptions and actions** towards a more just waterscape in the Nagsiche river basin.

There have been many studies that investigated encounters between different meanings, values, and governance systems of rivers in relation to mega-hydraulic developments (e.g., Boelens, 2017; Del Bene, Scheidel & Temper, 2018; Duarte-Abadía & Boelens, 2019; Hidalgo Bastidas, Boelens & Isch, 2018). Most of these cases reveal how power asymmetries between proponents and opponents of these developments resulted in the creation of environmental injustices. While these cases are often surrounded by overt conflicts and protest, many water injustices in reality are concealed in policies and rights systems. These often have a major influence on the lived realities of water users, yet their more hidden character complicates the opportunity to voice these injustices. In this study I aim to unravel the realities of water users that depend on the flow of the Nagsiche river in Ecuador. I aim to uncover the power dynamics that are encapsulated in rules and regulations and determine water access along this river, and strive to show how both subtle and explicit rules and practices of inclusion and exclusion influence the opportunities of different water users to materialise their water rights. In doing so, I hope to provide an initial insight into how environmental injustices in the Ecuadorian waterscape are shaped, and into how New Water Justice Movements could navigate these dynamics in order to support water justice in these types of river territories.

4.3. Research questions

4.3.1 Main research question

How does water overallocation influence the opportunities for different water users to secure and defend their access to water in the Nagsiche river basin in Ecuador?

4.3.2 Sub research questions

- What is the institutional landscape in which water overallocation and subsequent water injustices in the Nagsiche river basin originate?
- How do power dynamics shape and maintain the water injustices that occur following water over allocation in the Nagsiche river basin?
- How do power dynamics affect the perceptions and actions towards water justice in the context of water overallocation in the Nagsiche river basin?

5. Conceptual framework

In the Nagsiche river basin, the overallocation of water resources institutionalised water scarcity as part of the local reality during the dry season. As questions submerge about whose formal water right is respected, and whose formal water right is denied in times of scarcity, it becomes apparent that not only water scarcity, but also water conflicts have become institutionalised in the river territory. Until recently, these local dynamics and the conflicts that submerged from it remained a hidden reality, as most of the attention in the Ecuadorian waterscape was taken up by the rise in mining concessions and the construction of large hydraulic infrastructure. This research will conceptualise the network of (power) relations that define water conflict and water access in situations of overallocation through developing a new concept: *agua de papel* (Figure 9).

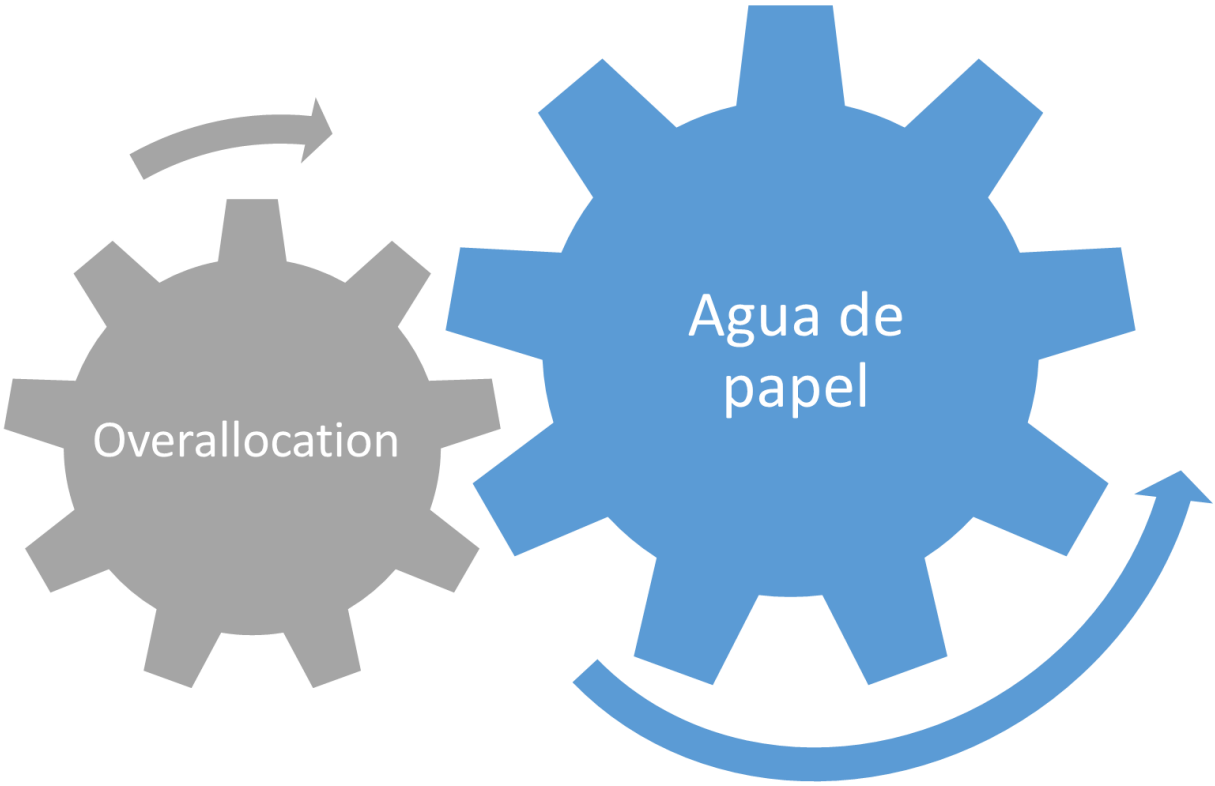


Figure 9 Overallocation as a momentarily, institutional act triggers a large network of new water realities conceptualised as agua de papel.

5.1 Water overallocation and agua de papel

Overallocation is a well-known reality in the Ecuadorian water scape. Ever since the turn to neoliberal water policies in the 1990s, water user communities all over Ecuador have experienced unfair water allocation frameworks, that followed from policies that were strongly biased towards economically powerful stakeholders (Boelens, Hoogesteger & Baud, 2015). In the Ecuadorian highlands, this "triggered greater competition for water between local communities and private companies [and] led to more conflicts as well as to more applications to register water rights" (Boelens, Hoogesteger & Baud, 2015, p. 288). However, these new concessions were largely granted without proper determination of actual available water levels, as financial and human resources to monitor water flows lacked within the Water Agencies responsible for allocating water rights. As such, overallocation in the Ecuadorian waterscape was born.

Soon after, it became apparent that the overallocation of water rights caused new conflicts, discussing whose access to water would be guaranteed over the access of others (Boelens, Hoogesteger & Baud,

2015). While the responsibility for resolving such conflicts is formally posted within the existing Water Agencies, their understaffing meant that little happened to resolve newly developing conflicts, and local power dynamics thrived in defining water access. As such, it reveals that the momentarily, institutional act of overallocation, in which water rights are granted for water resources that do not exist in practice, in reality triggers a whole network of new in which the actual value of water rights is reevaluated based on local (power) dynamics and interactions. Figure 10 shows that these dynamics in this research will be conceptualised through three main concepts: 1) echelons of rights; 2) power, and; 3) water justice.

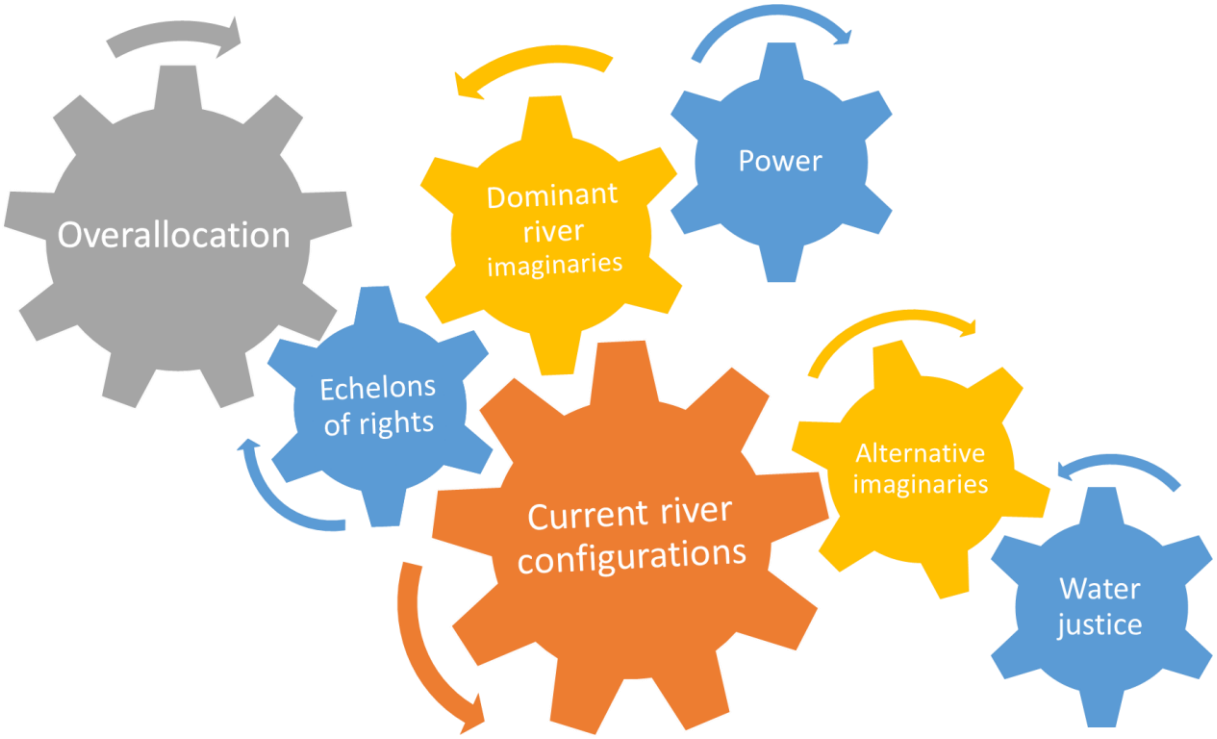


Figure 10 The concept of agua de papel can be understood as a network of intricate relations in which existing discourses, authorities, rules, and regulations formally define water access, while power dynamics and alternative perspectives for water justice continuously fight for priority in their aim to create different realities.

5.2 The echelons of rights

Already in 2008, Boelens (2008) discussed that in many conflicts surrounding water rights, it is no longer only about the resource itself, but also about "the right to culturally define, politically organise and discursively shape [water systems]" (Boelens, 2008, p. 50). The echelons of rights analysis framework is specifically developed to provide guidance through all the realms of struggle related to rights allocation. In order to do so, the framework distinguishes four separate echelons (see also Figure 11): 1) the discourses that defend or challenge particular water policies and rights systems; 2) the legitimacy of authorities and right systems; 3) the content of the rules and regulations that determine access, distribution and withdrawal, and; 4) the access to the resource itself (Boelens, 2008; Stoltenborg & Boelens, 2018).

Figure 11 The 'echelons of rights'-conceptualisation as used in this study.

The echelons of rights framework generally assumes that contestations occur in any of these realms, and that such contestations trickle down from one realm into the other. This perspective is extremely helpful to place existing contestations over whose water rights are materialised and transformed into actual water access in contexts of institutionalised water scarcity in the broader perspective of contestations over existing rules and regulations that would define water access, the legitimacy of the various authorities that establish these rules and regulations, and the discourses that support or contest their assumed legitimacy. As such, the echelons of rights framework provides an important contribution for understanding current river configurations. However, the inequities in access to water scarcity form a sharp contrast with the progressive rules and regulations encountered in Ecuador's National Water Law, thus indicating that there is more to water access than just rules and regulations. As such, I aim to understand this deviation by developing power dynamics as a second conceptual lens.

5.3 Three dimensions of power

Ribot and Peluso (2003) argue that power is a critical element in defining access to resources. They assert that "[d]ifferent people and institutions hold and can draw on different "bundles of powers"" (Ribot & Peluso, 2003, p. 154). In this study, I will define these bundles of power along the three dimensions of power introduced by Gaventa (1980): 1) visible power; 2) hidden power, and; 3) invisible power (Figure 12).

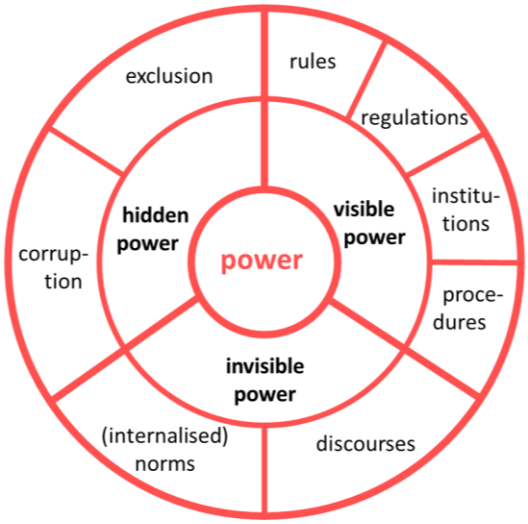


Figure 12 Power conceptualisation as used in this study.

Visible power builds on the basic notion of power in which one entity exercises power over the other by making the other entity act in a way that is contrary to its own interests. In this arena, power can be assessed through analysing who participates in decision-making, who profits (and who loses), and what rules, institutions and procedures guide decision-making processes. The second dimension describes hidden power. In academic literature, this is also often referred to as agenda-setting power as it describes how people or institutions maintain their influence by deciding what could be discussed, and who is included in these discussions (Gaventa, 1980). This dimension of power is one of exclusion of certain views, and may involve forms of corruption. The third and last dimension of power in Gaventa's theory (1980) is invisible power. This is about the system that shapes the psychological boundaries of participation, in which certain issues are not only kept from the decision-making table, but also from the consciousness of people through shaping people's belief systems.

Textbox 2: A disclaimer for the use of power concepts

It is critical to realise that the positioning of people and institutions towards resources varies over time and scale, thus continuously changing "the nature of power and forms of access to resources" (Ribot & Peluso, 2003, p. 154). The current study of the impact of power on shaping water access in the Nagsiche river basin therefore is bound to the current time of investigation. However, employing this understanding of powers could still provide a nice insight in understanding the contemporary differences in possibilities between various users to access resources, despite similar rights to these resources.

Figure 13 shows how each of these three dimensions of power is intricately interwoven into the interrelations between the four echelons. In the following section I will explore how this relation also affects water justice.

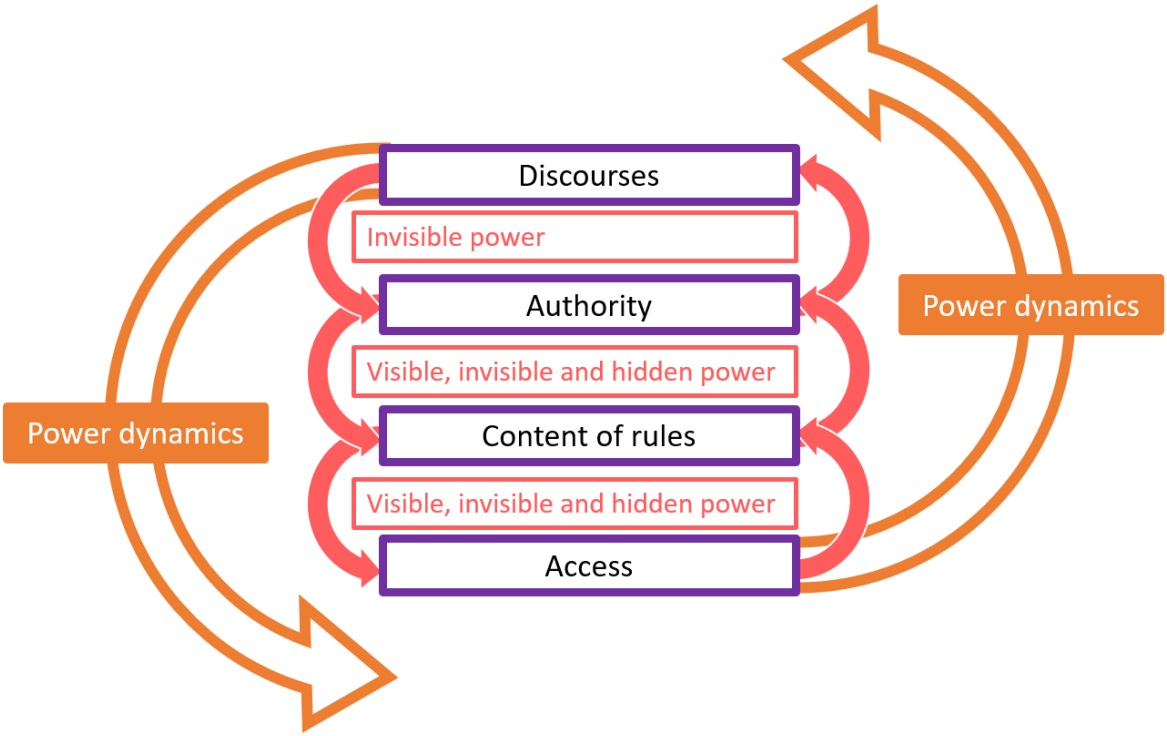


Figure 13 The interactions between the three dimensions of power and the various echelons of rights.

5.4 Water justice

The interactions between the three dimensions of power and the echelons of rights as shown in Figure 13 could be used as a base to explain how dominant river imaginations come about and shape existing river configurations and how many "water rights and water-based livelihoods of smallholder irrigator communities in many countries in the global South are under constant threat by bureaucratic administrations, market-driven policies, desk-invented legislation and top-down project intervention practices, which tend to steer water flows in the direction of supposedly more productive uses and users" (Zwarteveen & Boelens, 2014, p. 143). Yet, this explains only part of the river-as-territory ontology, as small and medium peasant producers in the Ecuadorian context continuously try to challenge the existing water configuration, in which the distribution of rights to access water, and especially the possibility to materialise these rights, is extremely skewed. Through such continuous efforts, they try to instil an alternative river imaginary which looks at more just ways of arranging water access in the country. In this study, I will analyse how the various water users perceive and defend water justice in the Nagsiche river basin in relation to four commonly used realms

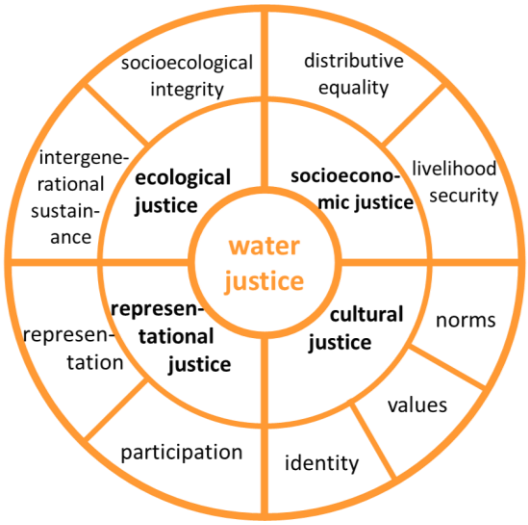


Figure 144 Water justice as conceptualised in this

of justices as detailed in Figure 14: 1) socioeconomic justice; 2) cultural justice; 3) representational justice, and; 4) ecological justice (Boelens, 2015b; Fraser, 2000; Zwarteveen & Boelens, 2014).

5.5 Placing *agua de papel* in a riverine context

Across the world, rivers are defined and understood differently. This thesis research follows the conceptual approaches of the Riverhood and River Commons projects by aiming to provide insight into *riverhood*; the myriad of ways in which rivers could be "imagined, defined, built, produced, and lived as socionatural, political-economic, and cultural-symbolic systems" (Boelens et al., 2023, p. 1127). The context of water (over)allocation in the Ecuadorian highlands provides a new context in which riverhood could be explored: one that allows to highlight the hidden conflicts that exist between the variety of relations that different water users maintain to their rivers and to each other, and that are informed by the institutional landscape in which they are based.

Boelens et al. (2023) defined riverhood along the lines of four key ontologies: 1) river-as-ecosociety; 2) river-as-territory; 3) river-as-subject, and; 4) river-as-movement. To strengthen the understanding of riverhood in the context of the overallocation of rivers' waters and the subsequent conflicts over access to their waters, this thesis will elaborate the rivers-as-territory ontology as that allows "to identify and examine the complex interactions, conflicts and hybrid arrangements among dominant and alternative imaginaries and materialized river-territorial configurations" (Boelens et al., 2023, p1137). As such, it provides an opportunity to analyse how different actors imagine their surrounding river territories, and how they work towards making this imagination into a reality (Boelens et al., 2023). While Seemann (2016) already recognised that "[t]he concept of territory, […] plays a fundamental role in understanding the struggle over water control" (p. 160), the river-as- territories ontology allows to develop the multidirectional reality of the relation between territory and struggles

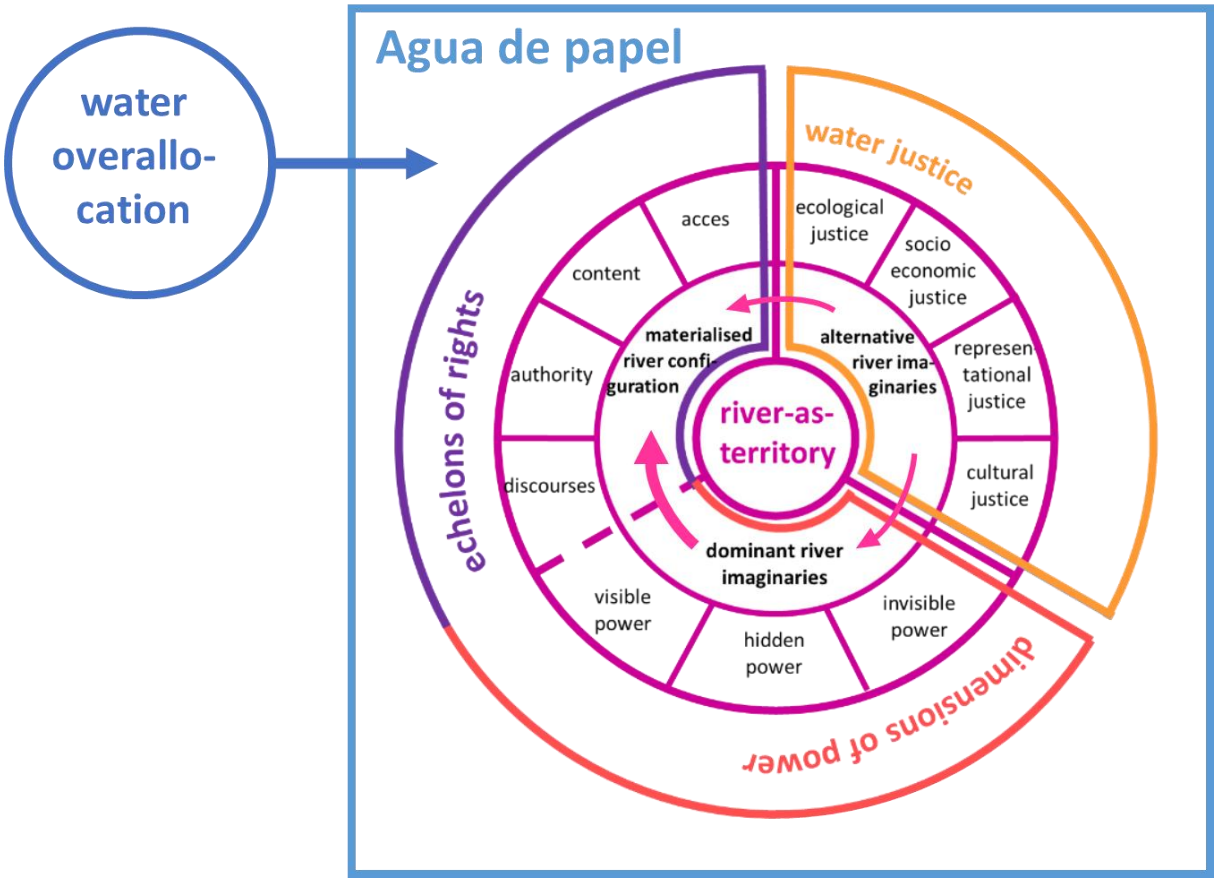


Figure 15 Defining riverhood in the presence of agua de papel.

over water. As such, it allows to grasp a reality in which dominant imaginaries of the river territory not only exert an exceptionally strong influence on the way in which conflicts over water develop, but conflicts between different imaginaries of the river territory also have a significant influence on what local river territories come to be in practice.

Following this line of thought, dominant imaginaries have the **power** to gradually capture and dominate alternative imaginaries for the river territory, thereby dismissing alternative meanings, values, and right systems. Due to their dominance, they have more opportunity to materialise and thereby transform existing river configurations and the **discourses, rules and access mechanisms** that define the existing water distribution. At the same time, alternative river imaginaries continuously challenge the existing river configuration, in an attempt to do **justice** to local values, meanings and relations to rivers that are rendered invisible in dominant discourses. Figure 15 visualises how the complex interactions that shape *agua de papel* (Figure 10) as such can be adopted into a conceptualisation of rivers-as-territories, and as such can help to use this framework also in other riverine territories.

5.6 Concluding remarks

The abovementioned complexities in the domain of water right allocation reveal the importance of developing our understanding of water rights beyond the conceptualisation of water rights as a simple mean to define how much water each use, or user could divert or consume (Perry, 1999) to include the myriad of complexities that come into play when materialising those rights on the ground (Boelens, 2009). The water rights context then reveals a contested space in which the access to, content of and discourses surrounding them are continuously redefined and reshaped to adjust to changing circumstances. The developed framework helps to understand these dynamics and to ground water rights as more than a paper description of rules for access, but as a way to constitute a social relationship that has the power both to include and to exclude (Boelens, 2008; Boelens & Hoogendam, 2002). I will use the following chapters to develop the case of the Nagsiche river through the help of this framework, in which Chapter 7 focusses on the materialised river configurations and how these have come about, Chapter 8 and 9 develop an insight into how dominant river imaginaries create new river realities that may be highly different from what formal rules and regulations propose, and Chapter 10 places emphasis on how alternative river imaginaries are proposed based on the idea of water justice.

6. Methodology

This thesis research has been executed through an ethnographic approach, consisting of a 6-months fieldwork period in Ecuador. Considering the sensitive nature of the topic, which aims to unravel power relations that have been prevailing in the waterscape for a long time, this longer-term presence has been key in order to build relations of trust. Moreover, the long-term involvement in the region allowed to employ a river basin scale, which provided a possibility to study relations and interactions between various users at various locations along the river basin. This allowed to capture more sensitive power dynamics between different users, and to gain higher levels of understanding of how these dynamics influence the manifestation of rights to materialise different imaginaries for the river.

Apart from the need to build a basis of trust, a key consideration in the selection of methodologies has been the acknowledgement of my own limited understanding of local (hi)stories. This research therefore built upon three research methods that each subsequently add to building up this local knowledge base: 1) literature study at the offices of Camaren and CESA; 2) participant observation; 3) semi-structured interviews.

6.1 Literature study

Literature studies provide a more or less systematic way of collecting and synthesizing previous research, and are therefore considered as a valuable method to study existing knowledge on a topic and to ensure your research builds on and relates to this knowledge. It is generally considered as the first step towards synthesising existing knowledge and identifying knowledge gaps that could subsequently help to advance the existing knowledge or facilitate the development of new conceptual frameworks (Snyder, 2019; Tranfield, Denyer & Smart, 1997). Therefore, the first two months of my fieldwork period have (next to studying Spanish) been dedicated to retrieving more country and region-specific information with regards to national and local institutional histories, its contestations and its implications for water distribution and access in rivers throughout the country. This introduction to the Ecuadorian context has largely been based on the book *Gestión integrada del agua: conceptos y politicas*, which has been published on the account of Camaren in 2009, and contributed significantly to Chapters 2 and 7 of this thesis. In this period, also the National Water Law and its regulations have extensively been studied in order to identify its key principles with respect to water (re)distribution in periods of shortages, of which the main insights can be found in Chapter 7. Lastly, the book *Informe del inventario hídrico de la microcuenca del río Nagsiche* in this stage provided crucial information with regards to water flows, water distribution and its related conflicts in the Nagsiche river basin. This book has been of major importance to sketch an overview of the situation in this river basin (see Chapter 3), and to complement the fairly limited information that is published in academic literature on this small region in Ecuador.

In the context of this research, however, the value of undertaking a literature review was limited to the exploratory phase, as academic literature does not exist for the Nagsiche river basin. As such, the literature review could only base itself on information published by NGOs working in the field, which builds in one of the main pitfalls of literature studies: the selectivity of the evidence on which subsequent research is build, resulting in potentially flawed or biased assumptions (Snyder, 2019). As such, it was critical to move to the next step of the research: participant observation.

6.2 Participant observation

After 2 months of familiarizing myself with the country, the available literature, and the fieldwork site, I started a process of (participant) observation. Observation is one of the few research methods that provide the opportunity to collect information about a given situation without intervening or disturbing this situation. As such, its strength is that it allows to gain detailed understanding of

relatively unexplored phenomena, while maintaining the natural conditions under which it occurs. When studying human interactions, observation is therefore generally considered the only reliable way of gathering data (Queirós, Faria & Almeida, 2017).

In this research, observation has been a key element. Most importantly, it included a 1.5 month stay with a family in the community of San Isidro, which allowed me to learn more about agriculture in this part of the world, and the vital importance of water in this context. It also allowed me to join several family and community meetings[1], in which many conflict dynamics and their consequences were elaborated. Many of the learnings I had during this time are included in Chapter 9. Similarly, the attendance of river basin meetings that were organized in the *parroquia* of Cusubamba to discuss the communities' fears of the alteration of local rainfall patterns through the use of chemicals by the agribusinesses have been an important source of information. The observations of the communities' distrust towards local governments, scientific experts, and agribusinesses that I captured during these sessions are included in Chapter 8 of this research.

A key limitation of participant observations is that it is highly sensitive to the positionality of the researcher with regards to the topic at hand, since the interpretation of observations is exclusively in the hands of the researcher and dependent on her interests and the way this places certain accents on the totality of the information obtained (Queirós, Faria & Almeida, 2017). The positionality statement included at the start of this report aims to provide insights into the potential biases this might have created for the current research.

6.3 Semi-structured interviews

After the first opportunities for participant observation had given me an insight into the (tense) dynamics between and concerns of various water user groups in the basin, I started combining ongoing observations with a process of gathering more detailed insights and perspectives of the main interest groups for this research through conducting semi-structured interviews. Semi-structured interviews use a set of predefined questions that direct the discussion towards some main topics of interest. However, the method simultaneously provides a freedom to explore some of these questions in greater depth by probing, asking follow-up questions and establishing interrelations between various answers. As such, very rich information can be obtained (Snyder, 2019).

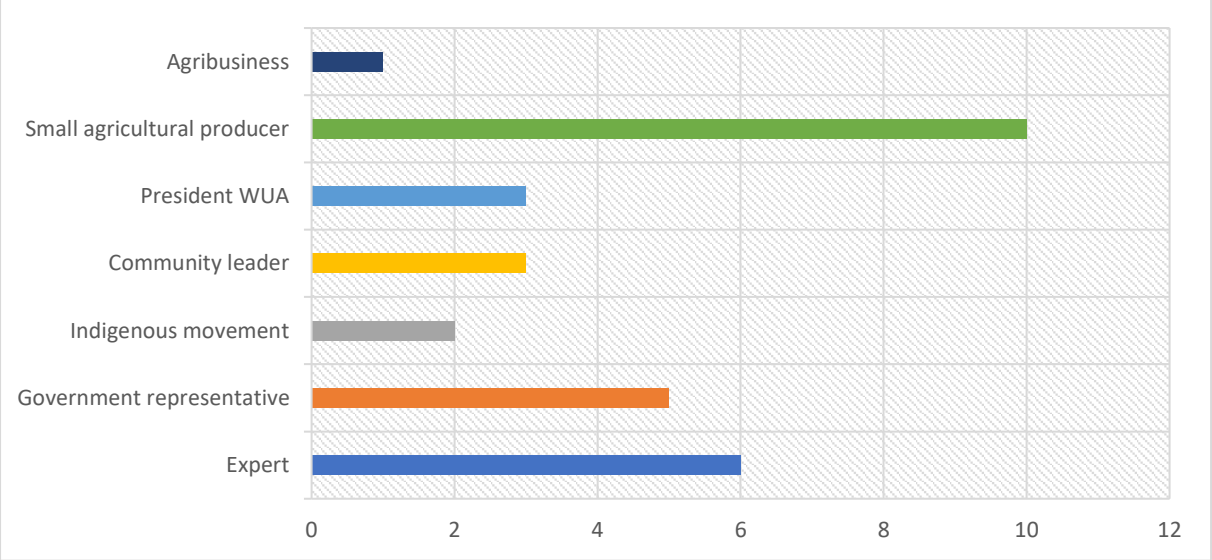
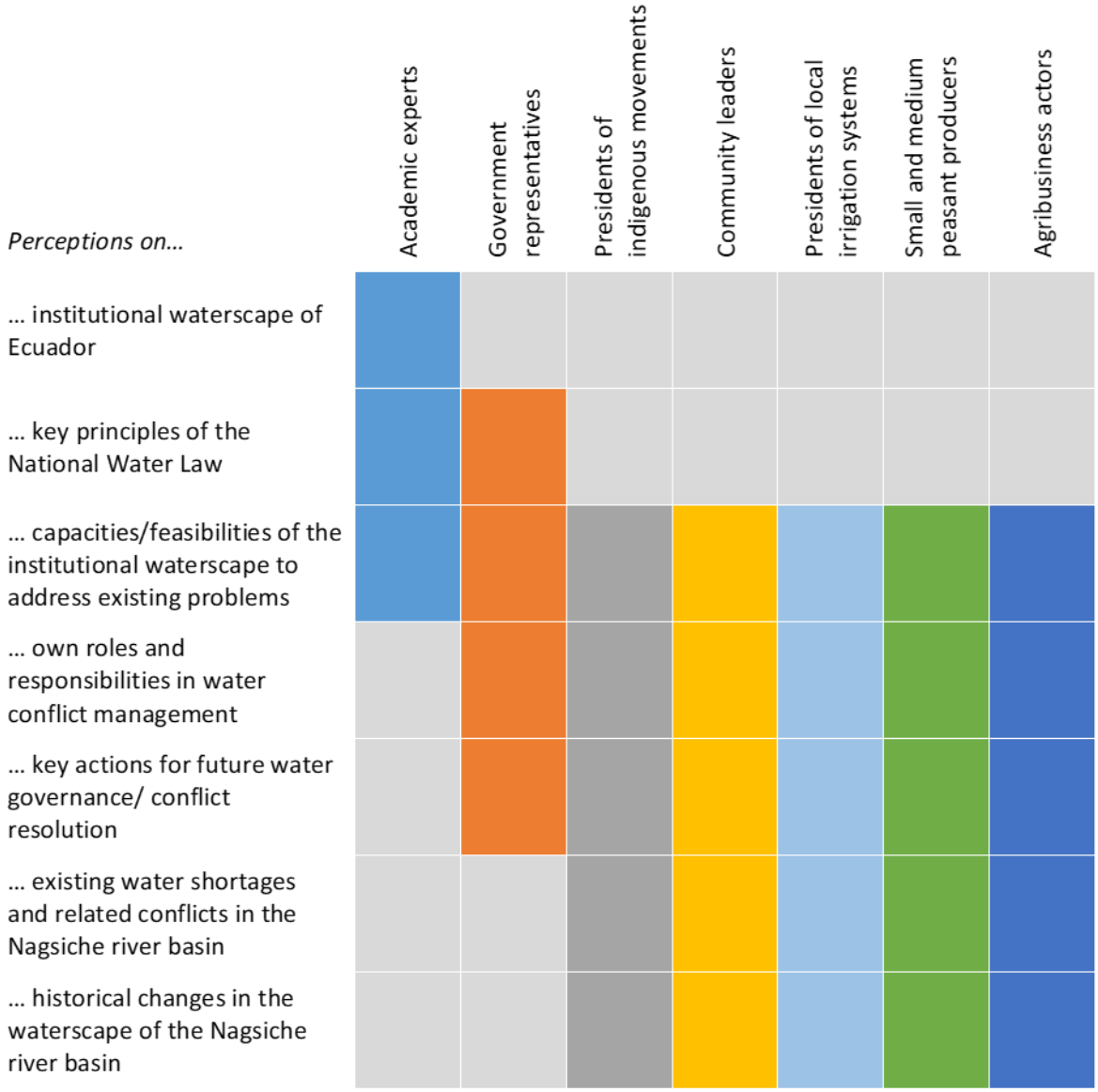


Figure 16 Distribution of the 30 participants over the seven interest groups.

[1] An overview of all formally organised meetings that I attended as a part of the participant observation can be found in Annex 2

The main limitation to this methodology is that its results are very personal, and as such the information obtained through this method is not generalizable. This means that a relatively high number of interviews with a sufficient variety in perspectives is required to provide a representative perspective on the topic of interest. For the semi-structured interviews executed in this research, I defined seven different interest groups to cover the full extent of relations and interrelations within the basin: 1) academic experts; 2) government representatives; 3) presidents of indigenous movements; 4) community leaders; 5) presidents of local irrigation systems; 6) small and medium peasant producers, and; 7) agribusiness actors (Figure 16). In total, 21 interviews were conducted with a total of 30 participants[2]. Note that the discrepancy between the number of interviews and the number of participants signals the existence of various group interviews. Table 1 reveals the topics of interest that I discussed with each respective interest group.

Table 1 Overview of the various interest groups that were included in the semi-structured interviews, and the topics that were discussed with each respective group.



[2] An overview of the respondents included in the semi-structured interviews can be found in Annex 2

6.4 The implications of spatial scale and temporality

Despite existing awareness that a high number of Ecuadorian rivers shows characteristics of *agua de papel*, due to time constraints this research decided to employ a case study approach, in which the focus was specifically directed at one single river basin: the Nagsiche river basin. This allows to deep dive into the complex dynamics that exist in this river basin, and to explore multiple variables (current, dominant, and future river imaginaries) at once. However, a case study approach is also known for its near inability to establish clear cause-and-effect relations. As this research is the first to conceptualise *agua de papel* and the local realities of water overallocation in the Ecuadorian contexts, it is of critical importance to realize that it results may sketch a very clear picture for the Nagsiche river basin, but should not directly be generalised to all other rivers suffering from a similar phenomenon. It is therefore recommended to perceive this research, and especially its conceptual framework, as an initial attempt to study *agua de papel*, and as a potential framework for exploring *agua de papel* in other rivers. Only once more Ecuadorian rivers have been studied under this framework, we might be able to generalise some of its conclusions beyond the Nagsiche river basin.

The main advantage of selecting a case study approach, however, has been that it allowed to employ a river basin scale, which allowed to reveal the significant changes in relations to the river, experiences of water scarcity, and intercommunal dynamics along the course of the river. This revealed that spatial differences have an enormous impact on the perception of water rights along the river, where the importance of formal rights allocation increased following the increasing number of uses and users and the increasing levels of economic and state interests in downstream direction. As this research focuses on the realities shaped by formal water rights allocation, the perceptions of the downstream sector will therefore be represented somewhat more strongly than those of the upstream sector where formal water rights are of relatively lower importance.

Lastly, it is important to realise that the field work of this research has been conducted from February to June, which is considered as the wet period for the Nagsiche river basin. As such, the implications of water overallocation were only visible through the tensions and dynamics between various water users that prevail throughout the year following years of experiences with water shortage in the dry season. However, my presence therefore did not coincide with the actual occurrence of water shortage following from institutionalised water scarcity. As such, the pictures included in this research show a relatively green and productive basin, which is not always representative of the situation I describe and the realities of *agua de papel* that occur from June to November.

6.5 Concluding remarks

This research is executed through an ethnographic case study approach, which was based on literature reviews, participant observation, and semi-structured interviews. In total, 3 river basin meetings, 2 meetings of local *Juntas de Agua,* and 5 community meetings have been attended, supplemented by 21 interviews through which a total of 30 respondents from all over the river basin and beyond have been reached. While it cannot be ignored that the selected research methods induce a vulnerability to my own positionality as shaped by my (limited) experience in the country, language barriers and my position towards water injustices, the selected methodologies simultaneously allow to deep dive into the local realities behind *agua de papel*, thus providing a first insight into what is beyond paper realities in the Ecuadorian water scape.

7. Ecuador's institutional waterscape

Keywords: current river configurations, echelons of rights, layers of governance, content of rules, struggles for authority

"Las leyes siempre han sido en contra de los pueblos; el papel no nos compra nada, no nos da comida."– unknown small-scale farmer (Cusubamba, March 2023)

In the Nagsiche river basin, the overallocation of water reaches levels of close to 800 l/s during the region's dry season (Chancusig et al., 2012), and leaves little to no opportunity for establishing minimal ecological flows. Experiences with dry season scarcity in the past couple of years revealed that water access in such periods remains largely defined by the relative geographical position of the users along the river. In other words, downstream users are way more impacted by the existence of institutionalised water scarcity than their upstream neighbours. For example, Chancusig et al. (2012) found that in the irrigation system of La Márquez, at the downstream end of the river, only 32% of allocated flows are physically available to the communities that rely on this system, thus indicating the large impact of the complete absence of river flow on downstream irrigation communities. This absence of river flow in the area provides a severe threat to the viability of subsistence farming practices in the downstream region. As a result, downstream communities increasingly resist the current realities of skewed water access in the region, and demand a reallocation of existing water rights. But what are the rules and regulations, authorities and discourses that define and uphold current river configurations, and what is their capacity to define change?

7.1 Water authorities in the Ecuadorian context

Water authorities are key actors in establishing, implementing, and enforcing water related laws. From the 1980s onwards, many countries in Latin America, including Ecuador, set out on a strong effort to decentralise natural resource management (Hoogesteger, Boelens & Baud, 2016). As a result, a multitude of water authorities at nearly all levels of governance is involved in organising water access and distribution (Fernando Teran, 2009).

Both the country's current constitution and its National Water Law include various articles to outline and clarify the specific responsibilities of the various levels of governance (see Figure 17). On paper, these different responsibilities within the Ecuadorian waterscape are generally simplified by stating that the Water Agency (currently called MAATE) is responsible for water allocation, while provincial governments are responsible for irrigation system management, and municipal governments for drinking water supply. However, in practice, uncertainties remain with regards to the specific responsibilities of every single one of the multitude of water institutes for a couple of reasons: 1) the line between the responsibilities of various water authorities is extremely thin, and practical realities reveal significant overlap between them; 2) water is a multipurpose resource over which many, often contradictory, interests compete; 3) a general lack of resources exist that hampers the possibilities to execute the predefined responsibilities, and; 4) in reality, water management is decentralised even beyond municipal governments towards *Juntas de Agua*, local communities and indigenous movements, each with yet their own authority, decision making power, and legal structures.

7.1.1 Overlapping responsibilities between water authorities

In the Nagsiche river basin, institutionalised water scarcity reveals the complicated reality behind this thin line between the various responsibilities of governance levels. While the (over)allocation of water rights falls under the responsibility of MAATE, the subsequent conflicts that arise over water generally play out within and between water users of different irrigation systems, who fall under the formal responsibility of the provincial governments. Similarly, if the upper basin irrigation systems in a situation of institutionalised water scarcity continue to consume their full allocations in the dry season, this affects the availability of potable water in systems downstream, stretching conflicts across the predefined responsibilities between provincial and municipal responsibilities. Fernando Teran (2009) argues that these uncertainties in respective responsibilities enforce a strong competition for

influence, authority, and resources amongst institutes, which frequently end up in overlapping spheres of influence. As a result, rural communities experience increasing uncertainty with regards to where to voice concerns or claim human rights violations, thus resulting in an ever more limited scope to address and resolve water conflicts.

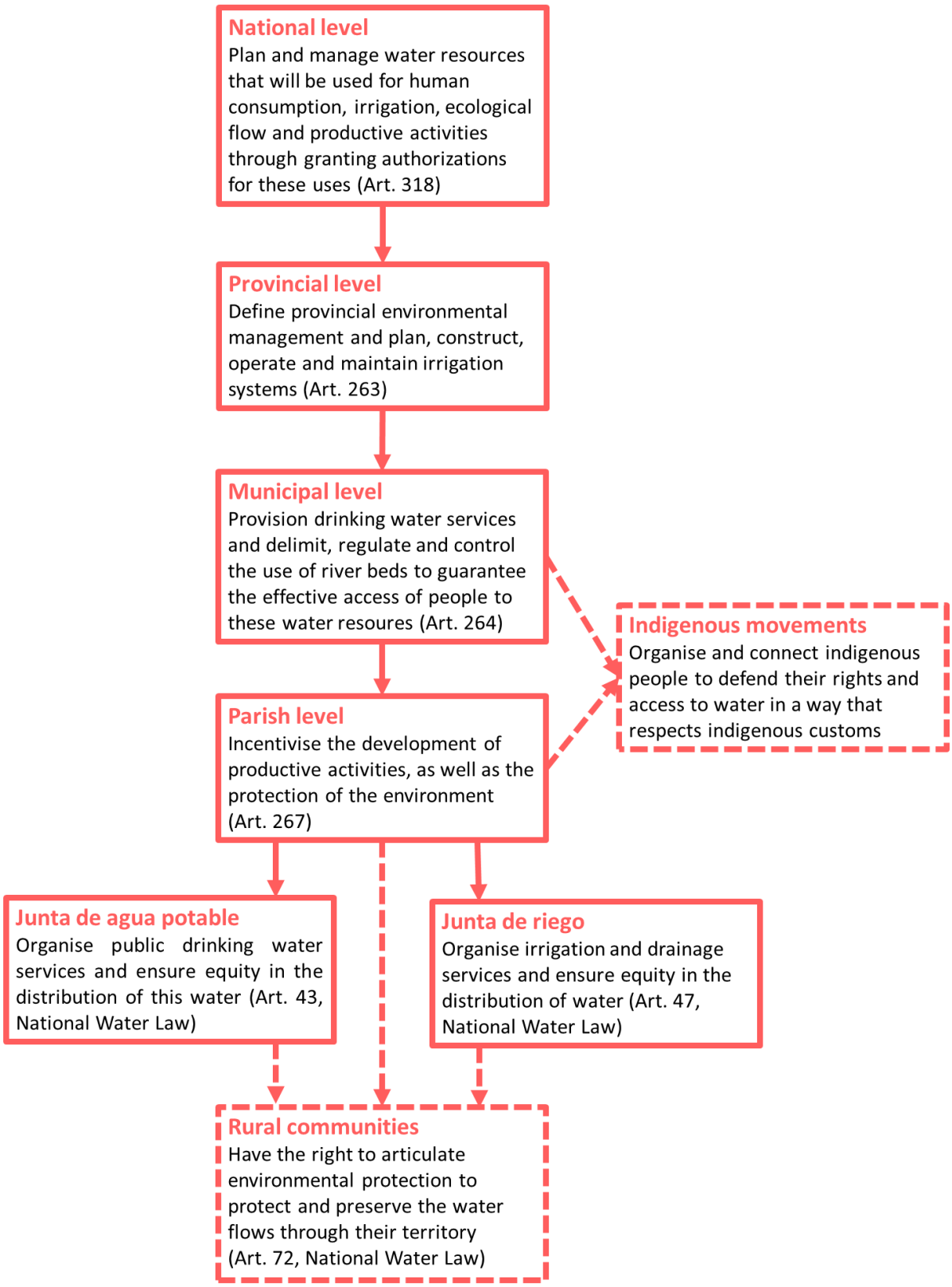


Figure 17 The decentralised institutional waterscape of Ecuador, visualising the various layers of water governance and their respective responsibilities (based on Constitución de la Republica del Ecuador, 2008; Ley Orgánica de Recursos Hídricos, Usos, y Aprovechamiento del Agua, 2014).

7.1.2 Competing interests between different water uses

At the national level of governance, responsibilities seem to be clearly defined, as MAATE is singlehandedly responsible for the distribution and conservation of the country's water resource, and thereby for the issuance and revision of water rights and concessions (Estrella, personal communication, April 2023). However, as water is a multi-purpose resource on which agriculture, mining and energy generation all depend, water allocation in Ecuador is contested between different authorities and juridical systems. Lalander and Merimaa (2018) reveal how the multisectoral dependence on water presents a severe challenge for environmental management. According to them, even though Ecuador presents one of the world's most progressive constitutional protections of its environment, the strong dependence of its economy on extractive industries complicates the implementation of progressive environmental reforms (Lalander & Merimaa, 2018). In defence of this discrepancy between on-paper rights and reality, the Ecuadorian government increasingly promotes a discourse that explains extractive industries as a means towards increased revenues for environmental protection (Kröger & Lalander, 2016). As a result, other laws and ministries in Ecuador have slowly overruled MAATE's authority, using their laws and authorities to weaken the capacity of the environmental laws that stand at the basis of MAATE's decision-making.

7.1.3 Lacking human and financial resources

In March 2020, the diminishing support of the Ecuadorian government for environmental authorities manifested itself through the proposal to merge the Ministry of Environment with the former Water Ministry of SENAGUA, which resulted in the formation of MAATE. According to many (Arroyo, personal communication, May 2023; Estrella, personal communication, April 2023; Pazmiño, personal communication, May 2023), this was a disguised austerity measure. Estrella (personal communication, April 2023) revealed how ever after, every province only has sufficient resources to employ one to three technicians. For example, in the province of Cotopaxi, currently only 2 technicians are responsible for the allocations in over 600 water systems, consisting of more than 3000 existing concessions and about 730 requests for new water allocations. This results in really slow procedures, and limited capacity to respond to newly developing conflicts and contestations over existing water allocations. The cuts in available budgets, however, do not only pose challenges at national level. Also at local government departments, significant reductions in budgets for environmental management are noted, as these trickle down from the national cuts in environmental budgets (Bautista, personal communication, June 2023). Estrella (personal communication, April 2023) and Pazmiño (personal communication, May 2023) both agree that this could be an important factor in explaining the high levels of distrust that exists within rural communities with regards to their water authorities.

7.1.4 Indigenous' authority in the waterscape

Although not incorporated in the formal structure of the Ecuadorian institutional waterscape, Ecuador's constitution does in its Art. 171 elaborate the communities' right to *justicia indígena*, or indigenous justice. This defines that indigenous nationalities and communities within their own territories are allowed to exercise their own right system to resolve "internal conflicts", and that the state should ensure that their jurisdiction is respected by public authorities. A decision taken by indigenous justice, as such, cannot be reviewed by ordinary or state law, except where the decision affects people outside the community's territory (Constitución de la Republica del Ecuador, 2008). Despite the lack of formal responsibilities towards water management, indigenous movements throughout the country in practice are actively involved in shaping local water management practices, resolving local water management conflicts, and demanding, establishing, and defending rules and regulations that recognize indigenous customs and livelihood practices. The Nagsiche river basin sits within the territory of two different indigenous movements: *Organización de Pueblos Indígenas de Jatun Juigua (OPIJJ)* on its left bank and *Corporación de Organizaciones Indígenas y Campesinas de Cusubamba (COICC)* on its right bank. These indigenous movements play a leading role in shaping

alliances between water users, and mobilizing large groups of water users in their battle to defend their water resources in the Nagsiche basin, especially in relation to the ever-growing interests of agribusinesses in the region (Chasipanta, personal communication, April 2023). However, simultaneously, water scarcity also enhances tensions between various indigenous communities within the basin. Millingalli (personal communication, March 2023), for example remarks that it has become very hard to defend the differing, sometimes even competing, interests of different communities, and more and more time is absorbed by the mediation between these different interests, rather than by demanding changes in the institutional landscape at a larger scale. As such, *agua de papel* is seen to place significant constraints on the action potential of indigenous movements.

7.2 Rules and regulations defining water scarcity

Overallocation of the rivers' waters is not an uncommon phenomenon in the Ecuadorian waterscape, nor did it develop recently. On the contrary, overallocations already exist for many years, and in many of Ecuador's rivers. Based on what legal mechanisms could these develop? And what mechanisms exist to counteract its consequences?

7.2.1 MAATE's water distribution mechanisms

For a long time, policies for water distribution based its allocations on rainy season river discharges, thus disregarding significant reductions in river flows in the drier seasons and inducing significant overallocations of dry season flows (Pazmiño, personal communication, May 2023). However, as these overallocations developed into a major source of contestation in Ecuadorian river basins, regulations got adapted. Currently, allocations have to be based on measurements of both dry season and wet season flows, thus defining allocations based on an approximation of the average annual flow (Estrella, personal communication, April 2023). Although this change should theoretically diminish the extent of overallocation, it undeniably does not end its mere existence. As Figure 18 shows for the discharge of the Nagsiche river, applying the average annual flow as a reference point for water right allocation limits overallocation to a dry season reality, but does not resolve water scarcity in its entirety.

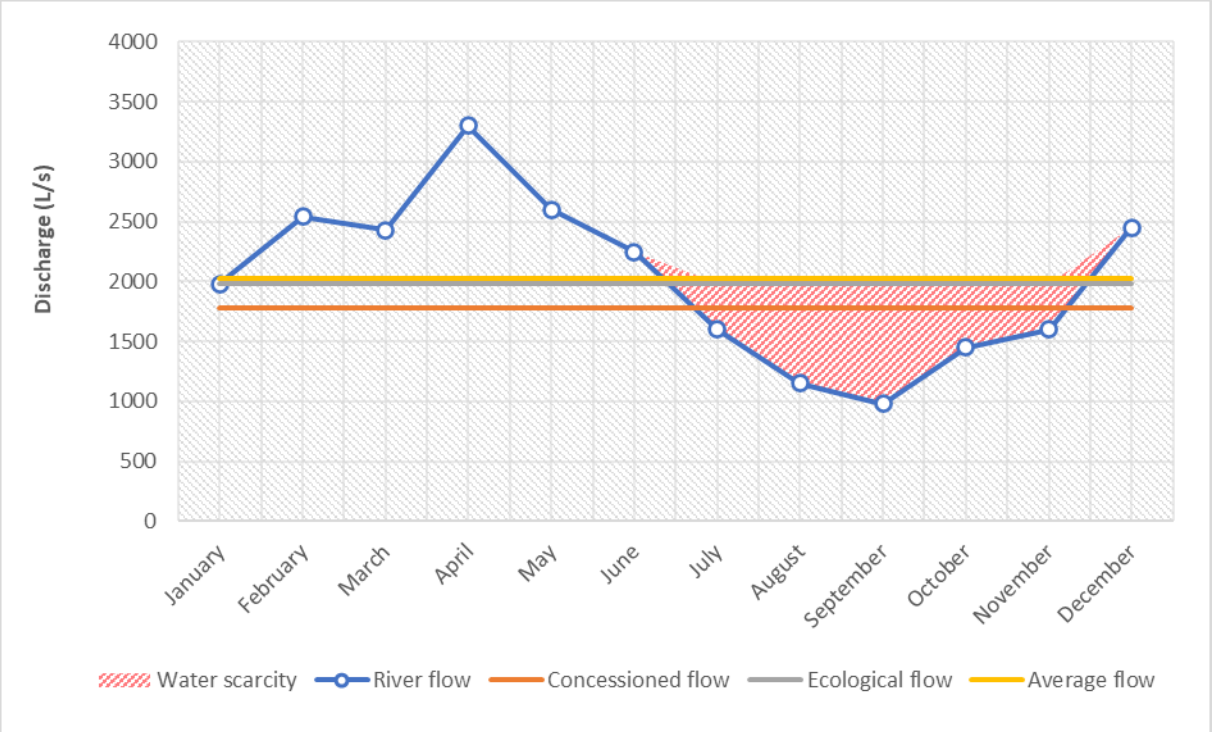


Figure 18 This visualisation of the measured annual average flow in the Nagsiche river (yellow line), and the existing water allocations (orange line) shows that despite a significant overallocation of actual flows from July to November, formally the allocations stay well below the boundaries to water allocation set by MAATE.

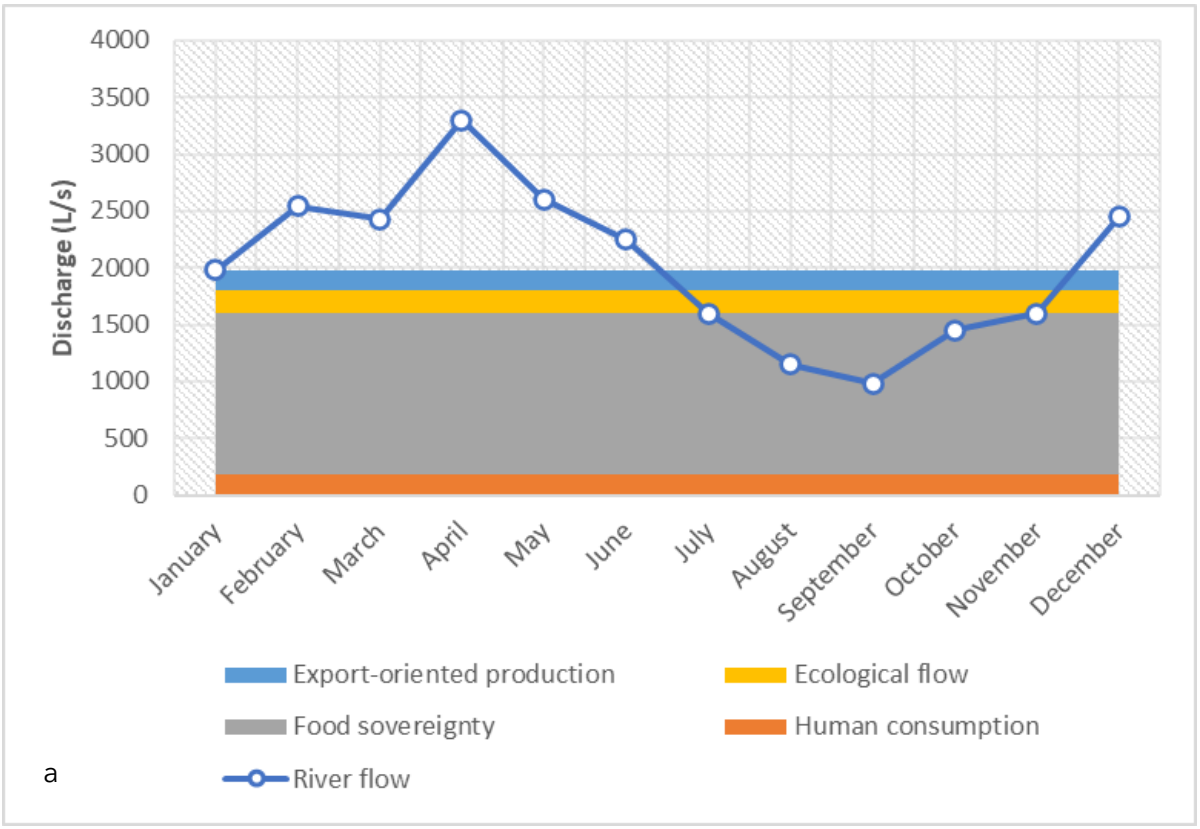
At the same time, Estrella (personal communication, April 2023) indicated that the new allocation mechanism did significantly extend allocation procedures, as discharges in many of Ecuador's (smaller) river systems remain unmonitored. Therefore, applications for new allocations generally remain stalled for at least a year, until both dry and wet season discharges are determined. Although not confirmed by MAATE, Pazmiño (personal communication, May 2023) raised the concern that in order to cut back waiting times, in practice, many allocations currently proceed without any measurements of river discharges. Similarly, the ever-growing pile of new water allocation applications that followed from the new extended application procedure, induces a heightened risk of incomplete or flawed registration of water allocations. These two pitfalls of the new allocation mechanism reveal that it may in reality result in more rather than less rivers suffering from water overallocation.

Nevertheless, considering the Nagsiche river basin, the application of a conceptualisation of overallocation based on average discharge-based allocation, means that the allocations in the Nagsiche river basin fall within the legal limits, through which MAATE can formally distance itself from any allegation of conscious water overallocation. Moreover, despite the potential for conflict that the overallocation of water produces, the action potential of communities against overallocation and subsequent water shortage remain relatively low and localised as the levels of internal conflict within and between many irrigation communities remains unchangingly high (Isch, personal communication, May 2023). Large scale manifestations specifically directed at the practice of conscious water overallocation therefore remain unheard of, which provides limited incentive for existing water authorities to change the current practice of water allocation, and allows for the development of an ever-increasing numbers of rivers that suffer from the consequences of *agua de papel*.

7.2.2 Prioritisation of water uses

Since Ecuador has invested in one of the world's most progressive constitutions and water laws, ample articles exist to deal with water scarcity, to limit its consequences and to combat an unequitable distribution of its impacts. Art. 86 from the National Water Law (Ley Orgánica de Recursos Hídricos, Usos, y Aprovechamiento del Agua, 2014), which in turn is based on Art. 318 of the country's constitution, is a key element in defining water distribution in times of shortage, as it defines a prioritisation of water uses. According to the text of this article, water allocations should ensure 1) water use for human consumption; 2) irrigation practices that secure food sovereignty; 3) ecological flow and; 4) other productive uses (which includes amongst others export oriented agricultural production). In other words, water for human consumption should be prioritised over water for food sovereignty, which in its turn is prioritised over ecological flow and water for other productive uses.

When subdividing the total allocated flow of the Nagsiche river over these four categories, and including a 10% additional flow to account for the minimal requirements of ecological flow, the picture as shown in Figure 19a would arise. This Figure shows the cumulative sum of allocated water rights for each user group following the order of prioritisation included in the National Water Law. However, many inhabitants of the Nagsiche river basin have indicated that their reality is different. They explain how, in practice, water flows to water users depend solely on the relative location of their water intakes along the river. This means that existing agribusinesses in the basin could take advantage of the river's discharge before the water arrives to communities further downstream, despite the fact that these communities largely consist of small-scale farmers producing for the national food security who rank higher according to the legal order of prioritisation. Figure 19b sketches this other reality, which reveals that agribusinesses generally would not be affected by limited dry season discharges.



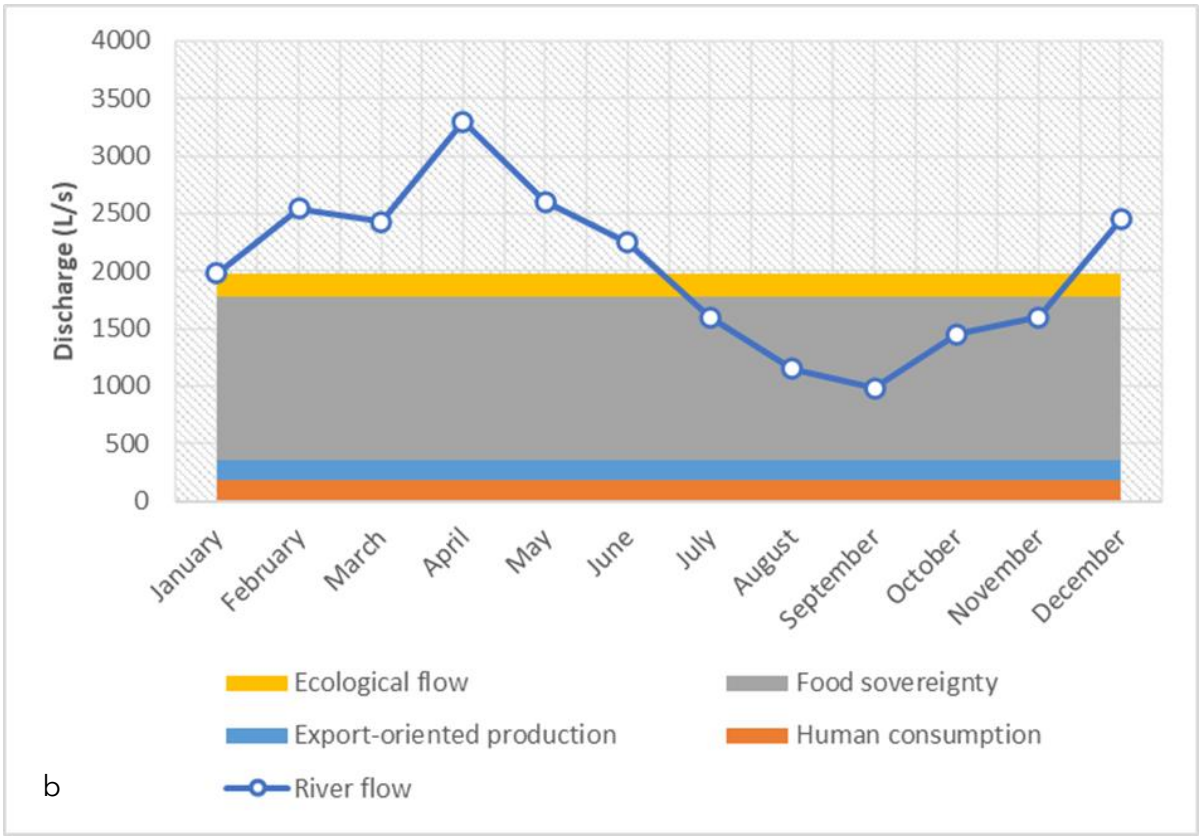


Figure 195 Graph a shows the cumulative sum of allocated water rights per water use, assuming that water is taken according to the approximate relative position of water intakes along the river. Graph b shows the situation if water users complied to the order of prioritisation as indicated in the National Water Law.

Suarez (personal communication, March 2023) explained that this reality exists since water authorities are not granted the authority to discriminate between existing water rights. As a result, the order of prioritisation could only be employed in situations where new water rights are granted, or where existing water rights have to be renewed.

7.2.3 Redistribution of water flows

Constitutionally, a redistribution of water resources in order to secure an equal access to productive resources and prevent the accumulation of these resources in very few hands is a well-defended principle. Even before the National Water Law used to be in place, the constitution (through its 27th transient) already ordered to review the access to irrigation water and to reorganize the granting of concessions, in order to guarantee a more equitable water access for small and medium agricultural producers. In this transient, it also defined that this review had to take place within two years after the Constitution entered into force (Constitución de la Republica del Ecuador, 2008). The National Water Law that entered into force 6 years later reaffirmed this need in its Art. 130, which grants the single water authority (currently MAATE) the authority to proceed with the reallocation of flows, in order to guarantee the human right to water and irrigation for the food sovereignty, and to ensure a socially equitable access to water (Ley Orgánica de Recursos Hídricos, Usos, y Aprovechamiento del Agua, 2014). However, nearly nine years after the implementation of the National Water Law, and over 15 years after the Constitution entered into force, actual application of these articles still lacks.

According to Arroyo, Pazmiño and Isch (personal communication, May 2023), this void between paper and actual realities could most likely be explained by the large economic interests of agribusinesses in sustaining current water distributions, which might point at the occurrence of corruption within the National Water Authorities in which agribusiness owners pay the employees of these Authorities to refrain from applying water redistribution principles. Estrella (personal communication, April 2023) added a potential additional restraining factor with regards to water redistributions, as he mentioned possibilities for redistributions are extremely limited due to the duration of the validity of existing water rights, which is legally established at 10 years for allocations provided for irrigation, and 20 years for allocations that serve drinking water purposes.

7.2.4 Proportional reduction of water allocations

On top of allocating an order of prioritisation, and opening up the possibility to redistribute existing allocations, the National Water Law elaborates an additional principle for dealing with periods of water shortage. In its Art. 97 it allows the water authority (currently MAATE) to proportionally reduce existing water rights to adjust them to the available flows during temporary or permanent water shortages, as such providing an opportunity to distribute the impacts of water scarcity over all water users. This article is unique in that it defines a so-called emergency procedure, which provides an opportunity for the water authority to directly respond to newly developing water shortages independent of existing granted rights. In doing so, the consequences of water shortage could be distributed more equally amongst various types of water users. Moreover, Figure 20 shows that if this article would be applied in the Nagsiche river basin, a 30% reduction in allocated flows could reduce water shortages to a period of 2 rather than 5 months. Moreover, for small scale agricultural producers, water shortage could be limited to less than a month per year.

However, in reality, this article so far has never been employed in the Nagsiche river basin. Three key mechanisms could explain the limited practical significance of this article. Firstly, Estrella (personal communication, April 2023) remarks that there is limited capacity at MAATE to monitor for each river system when shortages arise nor to adapt timely to these realities with temporal adaptations to existing concessions. Secondly, Pazmiño (personal communication, May 2023) questions whether

MAATE, even with sufficient capacity, would have sufficient authority to enforce such adaptations, stating that the high interests of the agribusiness industry against such adaptations would most likely hamper effective enforcement of this article. Thirdly, this article and its regulations provide limited practical guidelines to guide the implementation of this article in practice, nor to confirm its relation to other articles. For example, it should be noted that in practice, reducing flows for human consumption by 30% clashes with the Constitutional right to water (Art. 12). Similarly, question marks could be placed surrounding the equity principles that underly said proportional reductions, as the impacts of such reductions weigh much more heavily on small scale terrains that barely pass the threshold for sustaining livelihoods than it does on terrains of large-scale agricultural producers.

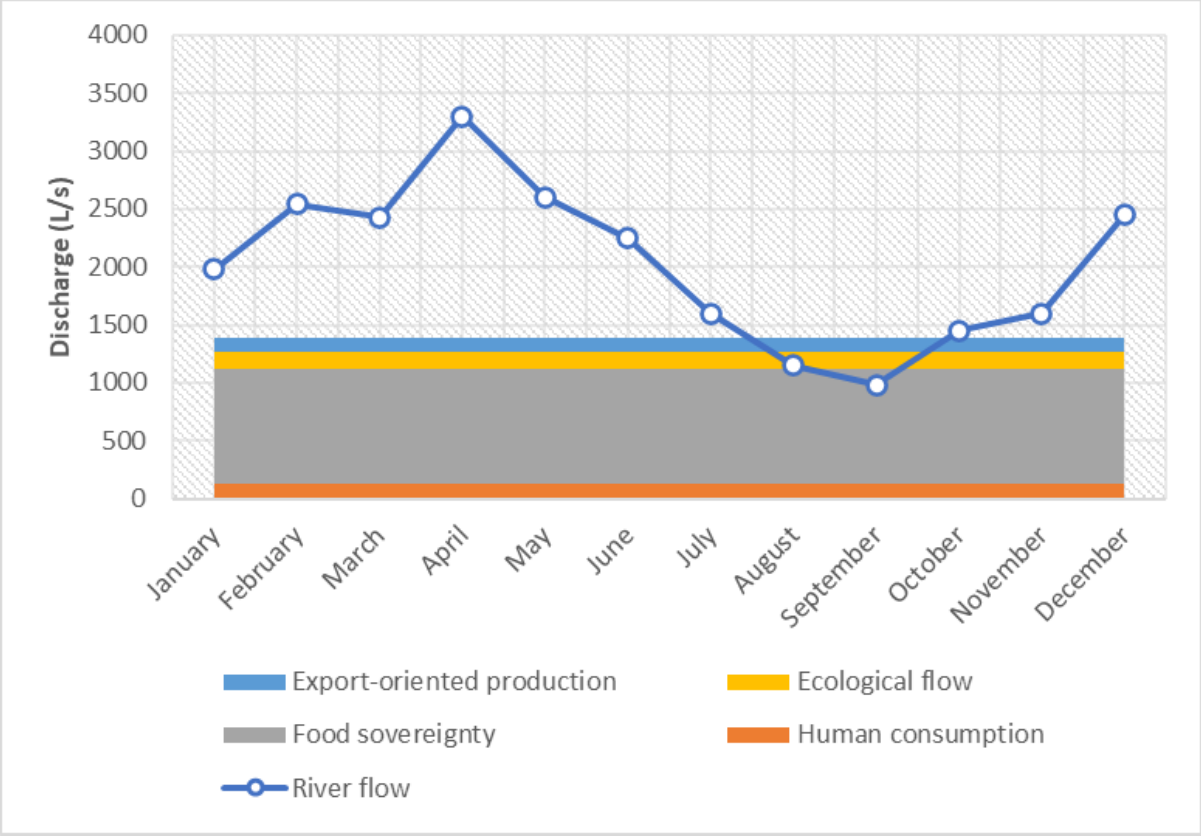


Figure 20 Visualisation of water shortage when applying Art. 97 with a randomly chosen reduction factor of 0.7 on top of applying Art. 86, i.e., the order of prioritisation.

7.2.5 Water protection areas

With ever diminishing water flows, and ever-increasing levels of water conflict all across river systems in Ecuador, water policies increasingly recognise a need to move the discussion on water rights allocation in Ecuador beyond the organisation of demand to also include the maintenance of existing water supplies. As such, Art. 72 of the current National Water Law defines that the single water authority (currently MAATE) is charged with the responsibility to establish and delimit *áreas de protección hídrica* (APHs, water protection areas) in areas with water sources that are of public interest due to their contribution to human consumption or food sovereignty. In many mountainous micro river basins, this refers to the *páramo* ecosystems, ecosystems within the Ecuadorian highlands that act as a water sponge and thus play a key role in maintaining water flows throughout the year, despite clear wet and dry season dynamics. Art. 78 further defines that the responsibility for identifying and establishing water protection areas, however, is not only carried by the state, but that also all (indigenous) nationalities in the country have the right to articulate policies and programs for

the conservation, protection and preservation of the water that flows through their lands and territories.

However, Figure 21 reveals that the actual value of the denomination as APH also remains subject to debate, as it visualises that many mining concessions have been granted for areas that have been formally recognised as being of significant importance for the supply of water resources.

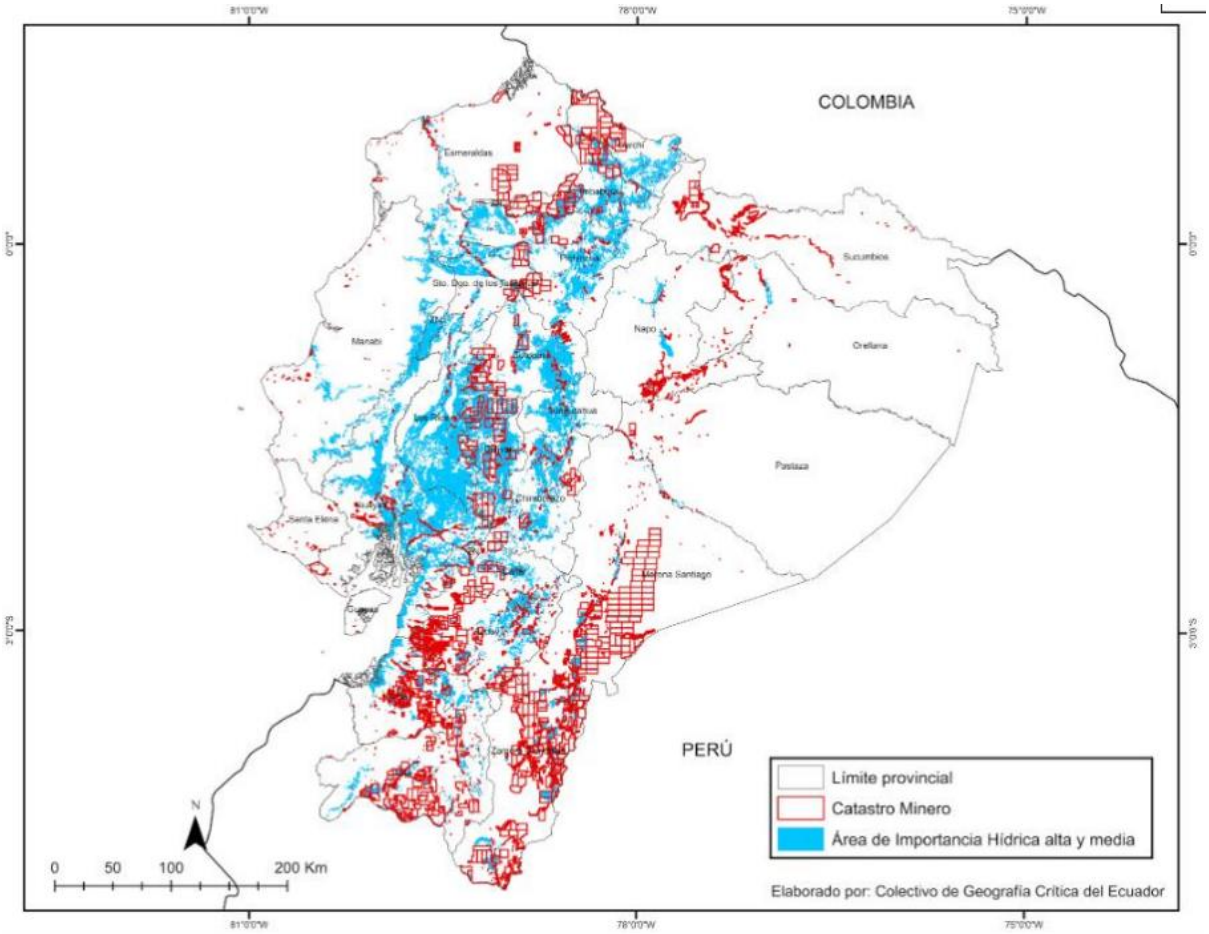


Figure 21 A critical map revealing significant overlap between mining concessions and areas of significant importance for sustaining water supplies (Colectivo Geografía Crítica, 2023).

7.2.6 Water regulations at local governance levels

It is not only at national governance levels that initiatives and rules have been drafted to address water scarcity. In the Nagsiche river basin specifically, also the municipal government of Salcedo has drafted locally tailored regulations to protect and conserve water resources in the basin. Since 2014, part of the Nagsiche river basin is therefore "protected" through the *Ordenanza de la microcuenca del río Nagsiche*, which has the objective to protect and conserve this micro river basin and states that all activities carried out in the basin should correspond with its principles. A key element of this ordinance is to maintain and protect the natural state of the *páramos*. As such, it also prohibits the division of properties at altitudes of over 3600 m.a.s.l (Ordenanza de la microcuenca del río Nagsiche, 2014).

Such ordinances are extremely important in Ecuador, as they allow to translate national policies into location specific regulations. However, the *Ordenanza de la microcuenca del río Nagsiche* suffers two important limitations. First and foremost, it deals with the limited availability of resources to execute and enforce its regulations as a result of nationwide cuts in the budget of environmental departments. Second, its geographical scope only includes the right bank of the river, as this is the territory that falls under the authority of the municipality of Salcedo (Bautista, personal communication, May 2023). The

left bank of the river is therefore not protected by the ordinance. This significantly hampers the effectiveness of the ordinance, as the majority of agrochemicals that enter the river, enter from the agribusinesses on its left bank, and the majority of water shortage arises as a result of the large concession granted to the system of San Antonio, which is also situated on the left bank (Bautista, personal communication, May 2023). Despite strict environmental regulations along the right bank of the Nagsiche river, inhabitants throughout the basin thus continue to deal with environmental degradation and declining water supplies.

7.3 Discourses maintaining water scarcity

The previous 2 sections reveal an extensive size of the institutional landscape surrounding water management in Ecuador, and a vast number of existing rules and regulations that this has drafted to deal with water scarcity and achieve an equitable water distribution. However, they also reveal that both the institutional landscape and its rules and regulations suffer significant shortcomings in turning on paper responsibilities and regulations into in practice realities. But how could this "incapacity" persist for so long? Which discourses legitimate the non-compliance with existing rules and promises?

A large part in understanding the persistence of rules, regulations, and institutional organisations despite failing to achieve an equitable water distribution, is understanding the power of the discourse that underlies this "failure". In the Nagsiche river basin, small scale farmers, agribusinesses and even the water authorities themselves all embraced the popular discourse that water authorities both at national and regional level suffer from a lack of financial and human resources, and therefore do not have the capacity to intervene in the current rise in tensions in the basin. For both peasant and indigenous communities, the lack of intervention by regional and local water authorities simply is perceived as an extension of their previous perception that many water authorities applied racial rules that disadvantaged the local communities. To them, the current discourse of an existing "lack of capacity" isn't much different from the previous "unwillingness to defend small-scale farming interests". The result, a disadvantageous access to water for peasant and indigenous communities, in the end, is not any different. As one of them states (Cusubamba, March 2023) "Here, we have always depended on ourselves." Estrella (personal communication, April 2023), however, raises the concern that this widespread firm perception of the "absence" of water authorities heightens the risk that communities take water control into their own hands, and limits the flow of information about water struggles between water users and water authorities, thereby even further seizing the capacity of MAATE to enforce existing laws and regulations in the waterscape, or to aid in conflict resolution.

On the other hand, MAATE itself is also actively maintaining the "lack of capacity" discourse, as it is their main response to complaints about long waiting times, limited involvement in conflict resolution, and limited proactive water governance initiatives. While formal proof is lacking on this point, many community members assert that the "lack of capacity" discourse provides a perfect cover for a lack in governmental actions and a general lack in initiatives to address water equity issues in the Ecuadorian water scape. According to them, the "lack of capacity" discourse provides a perfect cover for agribusinesses to actively maintain current inactivity of water authorities (and with that current favourable water distributions for large scale landowners) through "economic incentives" (Arroyo, personal communication, May 2023; Pazmiño, personal communication, May 2023).

7.4 Concluding remarks

This chapter aimed to provide an initial insight into how water overallocation and the current struggle for water access could arise, considering: 1) the chaotic structuring of the myriad of water authorities involved in water governance in Ecuador, and its limitations in terms of competing interests, lacking financial and human resources and strong indigenous resistance; 2) the lack of practical viability to

implement existing formal regulations for water distribution and water conservation, and; 3) the discourses that maintain the high acceptance rate of the current (unequitable) water governance system in Ecuador. It reveals that although the institutional landscape has the power to generate rules and regulations that create situations of overallocation, it does not have the power use related rules and regulations to manage the realities of *agua de papel* in local contexts. As a result, the Ecuadorian institutional waterscape seems to find itself at a crossroad. While progressive laws continue to exist and guide the formal regulation of water access and control, the legitimacy of authorities and the content of the rules that they establish is ever more contested. As such, the current formal institutional landscape mainly reveals a myriad of opportunities for non-formal, local dynamics to define what *agua de papel* comes to be in practice. The subsequent two chapters elaborate two local dynamics that surface in the Nagsiche river basin, and that drive some of the dominant imaginaries that define the actual realities of *agua de papel*: Chapter 8 reveals how economically charged power dynamics ensure and enhance skewed water access, while Chapter 9 reveals how geographically charged power dynamics create ever increasing dependencies in the basin, resulting in increasing levels of distrust between small scale farming communities.

8. Conflictive realities: inequalities in water access

Keywords: dominant river imaginaries, (economic) power dynamics, agribusinesses, alternative water resources, water conflicts

"En nombre del poder, no sé si es politico o economico, ellos (las brocoleras) manajon todo. Manejan el agua. Manejan la tierra." – unknown small-scale farmer (Cusubamba, March 2023)

Inequality in access to water resources finds its base in colonial times. However, in the more than 200 years that followed the end of the colonial era, subsequent governments and governance models all appeared unable to revert this reality. On the contrary, data from the Nagsiche river basin shows that existing water allocations continue to vary widely in size, ranging from 0.003 l/s/ha to 2.83 l/s/ha. With the region's crop water requirements being estimated at 0.3 to 1.0 l/s/ha, it thus appears that some allocations are far too small to support any viable production, while others are extremely excessive. Moreover, it appears that the 20% largest water users in the area have access to over 53% of the flow that is allocated for irrigation (Chancusig et al., 2012). As a result, the existence of high levels of water overallocation also seem to refuel conflicts over inequities in water access. These conflicts have increasingly been directed directly at those that seem to suffer less from the existing, institutionalised, water scarcity: the agribusinesses.

8.1 Nagsiche's history of unequal water access

Historically, the Nagsiche river basin has known a large presence of *haciendas*; large scale agricultural farming enterprises that were established under colonial rule and largely owned by the Spanish elite. But also, until long after the end of the colonial system, the hacienda structure remained in place in Ecuadorian society. Only by 1964, the Agrarian Reform Policy formally dismantled the hacienda system, and demanded their owners to redistribute their land amongst the indigenous and rural communities that for a long time had been supressed by its existence. Although this provided a potentially big change in the agricultural structure in the country, reality proved that in the Nagsiche river basin, the terrains that formerly belonged to the haciendas nearly all transformed directly into agroindustries (Figure 22; Yasig, personal communication, April 2023). Since the beginning of the 90s, the majority of them dedicates their production to broccoli cultivation, which makes them better known under the name *brocoleras*.

Figure 22 The Nagsiche river basin is characterised by a clear distinction between small scale farming communities on the mountain slopes, and large-scale farming practices on the more accessible locations (own picture).

As volumetric shares of water rights are based on land size, the majority of these agribusinesses still hold rights to large shares of the river's water. Chancusig et al. (2012) noted how one of the farmers in the Nagsiche river basin reflected: *"Cada 15 días recibimos 4 litros de agua por segundo. Pero la hacienda obtiene 184 litros de agua todo el tiempo. Esto es injusto."*. On average, the 5 (out of 124) concessions in the region that belong to agribusinesses provide access to an average flow of 0.42 l/s/ha, while the 82 concessions that are owned by local irrigation communities access an average flow of 0.29 l/s/ha, which is even below the region's minimal water requirements (Chancusig et al., 2012). However, the indicated differences are relatively small compared to the perceived differences in water access. What could, beyond historically existing differences in water allocations, explain these large differences?

8.2 Economic power in the Nagsiche river basin

Key in understanding the existing water abundance in the agribusinesses is understanding the marked differences in economic resource access between agribusinesses and rural communities. This difference has provided agribusinesses with a wealth of opportunities to exploit and explore alternative water resources. Broadly speaking, the situation in the Nagsiche river basin revealed three key mechanisms for alternative resource exploitation: 1) the construction of large water reservoirs to build up buffers against water scarcity during the wet seasons; 2) the construction of wells to exploit groundwater resources as an additional water source, and; 3) the use of advanced techniques to influence atmospheric processes. The first measure, which allows agribusinesses to continuously take their allocated shares from the river waters and build up a buffer, while rural communities with insufficient economic resources to construct such reservoirs can only take their shares during the dry seasons, is relatively harmless. However, the other two are increasingly being recognised for causing direct harm to the water flows to other water users, inducing significant tensions in the basin.

8.2.1 Groundwater exploration

The abundance of easily accessible economic resources has allowed many *brocoleras* to explore the presence of groundwater resources underneath their lands, to apply for the necessary permissions to exploit this water once encountered, and to invest in the necessary infrastructures to actually start the extraction of water. Therefore, many agribusinesses not only have the opportunity to supplement their water allocations with stored water from their reserves, but also with groundwater resources. In the meantime, many communities continue to suffer the consequences of their dependence on a single source of water. Although they are aware of the vulnerability that this dependence creates, the high costs of exploring groundwater reserves (estimated at about $5000-$8000), and the subsequent ongoing electricity costs for pumping this water and applying for groundwater allocations, provides limited scope to adapt to the new reality of decreasing water volumes from the rivers. Yasig (personal communication, April 2023) even reflects how the continuous need to save up for new steps in the groundwater allocation process in her community resulted in an application procedure of over 20 years. This economic inequity in opportunities to access groundwater is further enhanced by existing regulations in the river basin plan that state that groundwater exploration wells should be at least 500 meters apart (Allauca, personal communication, March 2023). As a result, with each new well, the potential to explore groundwater resources elsewhere diminishes. Therefore, communities in the midstream sector of the river, who are frequently surrounded by broccoli producing terrains, are afraid that the *brocoleras* will soon have captured all groundwater resources, leaving them with little opportunity to diversify their water resources (Yasig, personal communication, May 2023).

Concerns about this reality within the rural communities are even further raised by a growing consciousness about the interrelations between different water systems, which explains that groundwater extraction cannot happen in isolation from other water flows (Reinoso, personal

communication, March 2023). Not only may the rapid exploitation of groundwater resources by agribusinesses therefore enhance existing inequalities in water access, it may actually also enhance the vulnerabilities of communities depending solely on the river's waters, as the river's flows will increasingly drain into the depleted groundwater reserves. It thus appears that those with most economic power in the basin can actually use their economic resources to literally buy their secure water access at the cost of other communities. Combined with the first-come-first-serve principle that is ingrained in the country's legal structures surrounding groundwater use, this strongly favours economic powers in the basin, and reveals that economic capital plays a large role in directing water flows in the Nagsiche river basin.

8.2.2 Bombarding the clouds

From 2008 to 2010, the agribusinesses in the Nagsiche river basin experimented on a large scale with so-called anti-hail cannons, a $60,000-technology which is deemed to disrupt the initial formation of hail stones by "bombarding" the clouds with shockwaves (Misan et al., 2023). In doing so, crops in advanced crop growth stages could be protected from the potential damage caused by hailstones. Although limited scientific evidence exist for the effectiveness of this technology (Morgan, 2008; Wieringa & Holleman, 2006), and the World Meteorological Organization (WMO, 2001) even stated that "there is neither a scientific basis nor a credible hypothesis to support such activities", small scale farming communities throughout the basin remarked a reduction in local rainfall patterns over an area of 80 hectares surrounding each cannon (Juzgado Quinto de lo Civil, August 2009). And although no scientific relation can be drawn between the use of anti-hail cannons and the reduction in rainfall patterns, fact is that in 2009 the water flows in the river dropped to historically low levels, and downstream communities suffered extended periods of droughts and loss in crop production, not only in the "traditional" dry season between June and October but also in the period between January and March (Chancusig et al., 2012; Juzgado Quinto de lo Civil, August 2009). As a result, in March 2010 a group of small-scale farming communities decided blocked the intake of the San Antonio irrigation system, in order to prevent river water from entering the broccoli terrains. Within 10 days after these (violent) occupations, the agribusinesses agreed to withdraw all anti-hail canons.

However, recently, similar tensions resurfaced through widespread suspicion that these same agribusinesses have chartered provincial airplanes in order to spread chemical substances that would dissolve the clouds. And similarly as in the previous discussion, evidence for the existence and effectiveness of such technologies lack, as also local investigations initiated by the provincial water authorities reveal no known technique exists to stop rain from falling, no materials are found that would suggest that the agribusinesses in the area do have access to such a technique, and no permits have been granted by the airport to execute flights with any other objective than training pilots (Cusubamba, March 2023). However, community members do, also similar to the situation in 2009 remark changes in rainfall patterns, describing how "every time red planes pass by no afternoon rains arrive", and "day after day, we see the clouds gather, but it never rains". As such, also similar to the situation in 2009, the "bombarding of the clouds" has given rise to a significant level of "new" tensions between agribusinesses and rural communities in the basin, as community members perceive the (potential) access to these type of technologies as yet another way to favour the water needs of agribusinesses over those of small-scale farmers, thereby enhancing existing inequities in water access.

8.3 Communities' accounts of water inequalities

The previous section revealed some of the ways in which agribusinesses in the Nagsiche river basin can exploit their economic capital to direct more water flows to their territories, and to alter water

flows to their favour. But how do these investments reflect on small-scale farming communities' access to water?

8.3.1 Declining river flows

For many inhabitants of the Nagsiche river basin, one thing is very clear: river flows are declining rapidly, and nobody seems to be able to exactly pinpoint why. As some community members in San Antonio (personal communication, April 2023) shared with me: "20 years ago, we still used to swim in the river. Children learned to swim there. But have you seen the river now? There is no water left." This lack of water is a prominent problem for downstream agricultural producers. In the intercommunal meetings at the office of the *GAD Parroquial* of Cusubamba (Figure 23), producers from the right bank of the river convened to protest this reality. Their argumentations voiced a reality of ever-growing water scarcity, and ever more dire impacts: "There is no water, so there is no production." "In other countries, famers are supported. Here, small scale producers are suffering starvation."

Figure 23 Community members from all over the Nagsiche river basin have convened in the townhall of Cusubamba to discuss the distribution of water (own picture).

For many community members, this reality relates to one main culprit: "While the broccoli companies are growing and extending every day, we suffer a bit more every day." And "They use immense quantities of water, of our water sources, and for them it only supports one or two families, while we are waiting for water with many more." The only broccoli-representative present in the meeting, however, sketches a different picture: "The doors are open for you, you are free to see for yourselves that we do not have airplanes, we do not have chemicals, and just like you, we also do not have water. We are farmers, just like you." For many inhabitants, however, this comparison hits differently. "Here, small scale producers die from starvation, the *brocoleras* don't seem to suffer from that."

This also reveals that the reality of increasing water shortage is perceived to lead a chain of societal issues. "*No hay agua, no hay producción*." "Because there is no money, there is more insecurity and theft." As a result of this chain of events, people appear desperate to regain access to sufficient water, and take matters into their own hands. "We are tired, *amor con amor se paga*, but we have been here all this time, and nothing has happened." "They [politicians] think about money, not about us." "The

time to make excuses and do investigations is long gone, there is no water and no food, and we cannot eat from these airplanes. We need action now!" "*Vamos a sacar las brocoleras!*"

8.3.2 Water intake captures

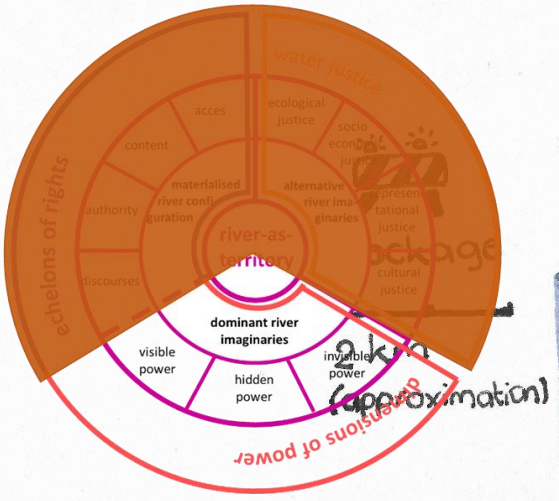
Since many of the community members in the basin feel unseen and unheard in their struggle for water access, they are increasingly keen on taking matters into their own hands. "Here, everything depends on us." "We have waited long enough, but we will not wait any longer, we are only losing time." As such, the quote "*Vamos a sacar las brocoleras!*" (Let's take down the broccoli companies) was heard more than once in the meetings at Cusubamba. The community members in San Jose de Alpamalag (personal communication, April 2023), who share their water intake with the companies, also shared this experience. They accounted that currently, nearly every dry season their intake gets blocked for days or weeks on end by downstream communities. As such, this action not only prevents water access for the broccoli farmers, but also affects the water access of the nearly 7000 families that share the San Antonio water system with these broccoli farmers. As this happens in the driest seasons, crop growth is usually severely affected in these periods, and sustaining a livelihood has become ever more challenging in the area. As such, it is revealed that the presence of the broccoli farmers in this specific part of the basin has a twofold negative impact on the water access of local communities: not only in the downstream regions, but also in the entire San Antonio water system in the midstream section.

8.4 Concluding remarks

This chapter reveals that economic capital is an important factor in defining water access in the Nagsiche river basin, and in directing the impacts of water overallocation. It explains that actual water access in Ecuador strongly depends on available economic means to 1) explore alternative water resources, and; 2) favour decision making processes towards large enterprises. As such, the defence of core principles of equity of the National Water Law lacks behind, while the exploration of new water resources occurs following a first-come-first-serve principle, which works into the hands of the economically strong actors in the basin and therefore further deepens existing inequities. As a result, many rural communities, especially in the downstream areas, don't have the opportunity to build up a buffer against periods in which the river's resources decline to its minimal level, explaining why the abundance of water resources on agribusinesses' terrains occurs simultaneously with large struggles for water in the rural communities. Although the current tensions in the area at first sight seems to be framed around the potential use of airplanes by agribusinesses, that discussion therefore only serves as a carrier for underlying sentiments about large inequities in water access between various actors and the neglect of the increasing vulnerability of indigenous and rural communities to water shortage.

9. Conflictive realities: conservation versus appropriation

Keywords: dominant river imaginaries, (geographic) power dynamics, indigenous struggles, territorial control, water conflicts



"Como ser humano, sí tengo miedo. Pero qué es lo que puedo hacer? Si yo me voy, no hay nadie que puede cambiar esta situación. Y qué pasa en este caso con mí familia? Con mí comunidad? – Allauca (March 2023)

The *páramos* are a unique ecosystem that define the landscape at altitudes above 3500m in much of the Ecuadorian Andes (Figure 24). At these altitudes, temperatures drop significantly, winds blow relentlessly around the mountain tops and the sun burns mercilessly. It is probably for these reasons that the Spanish invaders marked the *páramos* as wastelands: spaces of minor utility and minor economic value. However, in the Nagsiche river basin, 51% of all allocated water originates from these ecosystems, while only 26% is sourced directly from the river itself (Yasig and Allauca, 2008). Moreover, Yasig and Allauca (2008) found that the river's surrounding *páramos* together produce over 60% of the river's base flows. Considering the significant water shortages in the basin during the dry seasons, the abundance of water resources in the *páramos* has led to a revaluation of these ecosystems. However, this also induced a new realm of conflict, in which the resources, use and ownership of the *páramos* became highly contested.

Figure 24 The páramos of Zumbahua, on the opposite side of the mountain ridge that constitutes the Nagsiche river basin (own picture).

9.1 Nagsiche's *páramos* throughout history

During colonial times, the "unproductive lands" that are currently known as *páramos* formally belonged to the church and the owners of haciendas. They mostly only used the *páramos* for grazing their sheep and cows, and sent indigenous people up into these zones for months in a row to keep an eye on their cattle. As the haciendas occupied ever larger stretches of the more fertile, accessible zones in the valleys, many indigenous families were forced to move into the *páramos*. As these communities adapted to the complicated conditions in the *páramos*, a unique, highly adapted agricultural system developed that became strongly tied to indigenous identity (Mosquera et al., 2023; Yasig & Allauca, 2008).

9.1.1 Indigenous' battles for territories

For the indigenous communities, the *páramos* held important values. They provided them with a space to live, vegetation to feed their animals, materials to construct their main infrastructure, plants to provide medicinal characteristics, and most importantly: an ecosystem to supply water (Joslin, 2021). The *páramos* function as a natural sponge that retain water during winter and release it gradually during the dryer periods, thereby creating a constant supply of water throughout the year. Therefore, they play a crucial role in the generation, retention, and purification of water (Isch López, 2009; Mosquera et al., 2023). As Yasig and Allauca (2008) write: *El páramo es un lugar que nos purifica el alma, nos da fuerza y ánimo para nuestras luchas, es nuestro habitat natural donde reina el silencio y donde se respire el aire limpio; si no existiera esta parte de la Pachamama, no existiera la vida."* (p. 6).

As the end of the colonial era did not change much in terms of land distribution and ownership, indigenous communities started several battles to obtain ownership over the lands that had become so crucial for their survival. In the Nagsiche river basin, the community of San Isidro was one of the first to initiate such attempts. From the 1940s onward, they started a battle to reclaim the *páramos* as a reward for their century-long commitment to the haciendas (Allauca, personal communication, March 2023). However, it was only by the 1960s, as a result of the Agrarian Reform, that the political force to redistribute parts of the hacienda's lands to the indigenous communities really grew. As a result, many landowners decided to sell the low value *páramos* to the communities, while keeping the high value cultivated lands to themselves. On the 11th of May 1965, also the community of San Isidro (consisting of 34 families) received ownership of a piece of *páramo* of 900 ha, which was named the *páramo* of Chaupi Urco Chilca Tingo. In similar fashion, other communities of the basin also received ownership over stretches of *páramos*, of which the *páramos* of Yacubamba are most notable due to their large size of 3600 ha (Allauca, personal communication, March 2023).

9.1.2 Degradation of the *páramos*

However, in the meantime, the *páramos* find themselves in ever more severe states of deterioration. For the Nagsiche river basin, Chancusig et al. (2012) found an annual decline in *páramo* vegetation of -1.63% between 1979 and 2004 in the Nagsiche river basin, and an increase in areas under human intervention (mainly agriculture) by 2.18% annually in this same period. Major cause for this decline in *páramo* coverage is the significant rise in temperatures in the region, which allows for crop cultivation at ever higher altitudes and led to the expansion of the agricultural frontier at the costs of the *páramos*. Therefore, only 29% (6365 ha) of the river basin's territory currently remains covered by *páramos*, of which 558 ha experience significant levels of degradation. Chancusig et al. (2012) projected that if these changes continue, the river flow might reduce by another 40% in the driest months of September and October.

Many authors (e.g., Boelens, Hoogesteger & Rodriguez de Francisco, 2014; Lopez-Sandoval & Maldonado, 2019; Manosalvas, 2012; Yasig & Allauca, 2008) identify the ever-growing importance of capitalist systems within the Ecuadorian economy as one of the main factors explaining the rapid deterioration of the *páramos*, as this system changed indigenous relations with the *páramos* by modifying indigenous ways of life and imposing a logic based on consumption. This resulted in overexploitation, overgrazing and the impoverishment of soils, which forced indigenous communities to transform ever more grasslands into agricultural lands (Lopez-Sandoval & Maldonado, 2019). Aided by increasing temperatures in the region following climate change, increasingly more crops can also be cultivated at these ever-higher altitudes. As a result, Ecuador experiences a rapid expansion of the agricultural frontiers to ever higher altitudes, at the cost of the pre-existing *páramo* vegetation and its role in supplying water to Ecuador´s river systems. This has drawn many communities in the Nagsiche

river basin into a vicious cycle in which the permanent pressure to parcel up communal lands, erosion, loss of water flows, overgrazing, loss of biodiversity and intercommunal conflicts for access to water and land interact (Lopez-Sandoval & Maldonado, 2019; Yasig & Allauca, 2008).

9.1.3 Two narratives of *páramo* management

Increasingly, it is being recognised that the degradation of the *páramos* is critical not only for the indigenous communities living in the *páramos*, but also for communities downstream that depend on its waters for their survival (Boelens, Hoogesteger & Rodriguez de Francisco, 2014). Currently, the value of the once deemed "spaces of minor economic importance" is being estimated at about 2.2 million dollars, a value that is largely produced by the agricultural production it provides. In more and more communities in the Nagsiche river basin, a revaluation of the *páramos* has occurred, and actions are initiated in order to end the ongoing degradation of the *páramos* (Yasig & Allauca, 2008). However, simultaneously, the rise of a neoliberalist perspective on agriculture left its mark. As such, various families in the basin continue to promote an economic exploitation of the *páramos* through grazing, mining, and expanding the agricultural frontiers. In their perspective, this economic use of the *páramos* is their rightful reward after centuries of economic and cultural suppression. Already in 2008, Yasig and Allauca (2008) noticed that this duality in perspectives on the *páramos*, consisting of the potential for agricultural production on the one hand versus the need for conservation in order to supply existing water demands on the other, shaped great tensions over the role of the *páramos* in the Nagsiche river basin, as even within communities, internal disputes exist about these different perspectives.

For a couple of years, a fragile balance between conservation and production was established. In these years, upstream communities asked for a financial contribution from downstream communities in order to support the conservation of the *páramos* (Allauca, personal communication, March 2023; Chicanza, personal communication, March 2023; Toscano, personal communication, March 2023), an approach that is very similar to the existing proposals in academic debates on the implementation of payment for ecosystem services (e.g., Joslin, 2020; Manosalvas, 2012). However, in reality, many of the communities in the lower and middle zones remarked that very little concrete steps towards conservation were seen to be taken by the upstream communities, and numbers of cattle remained unchangingly high (Allauca, personal communication, March 2023; Chicanza, personal communication, March 2023; Padilla, personal communication, May 2023; Reinoso, personal communication, March 2023; Toscano, personal communication, March 2023). For this reason, the payment for ecosystem services system has been abandoned throughout the basin. In return, some communities now propose to conserve the *páramos* by applying for their recognition as *area de protección hídrica* (APH). However, as a result of the many tensions that exist with regards to the territorial boundaries of the various *páramos*, such proposals are seen to yield increasing levels of conflict between the various communities that own the *páramos*.

9.2 Geographic power in the Nagsiche river basin

The *páramos* have developed as an increasingly important space of conflict, following the renewed recognition for their importance in supplying the majority of water flows in the Nagsiche river basin. Key element in these debates is the contradictions that exist between ideas for communitarian organisation and collective and equative use of the *páramos*, and ideas for accumulation of the economic potential of the *páramos* for personal or familiar gain. Mostly, this contradiction simultaneously reflects a specific upstream versus downstream dynamic, in which upstream communities that live physically closer to the *páramos* favour their economic potential, whereas downstream community members advocate for their conservation in order to secure water flows. This reality subjects the conservation versus appropriation narrative to strong geographical power

dynamics, in which upstream communities usually stand to gain and repression of downstream communities has turned into a common phenomenon. In the Nagsiche river basin, the geographic power of upstream communities is expressed in two ways: 1) active repression of conservation initiatives, and; 2) the pricing of water supply services.

9.2.1 Repressing conservation

In the Nagsiche river basin, the community of San Isidro in the midstream section of the river is one of the key examples of a community that actively promotes the conservation of the páramos for future generations. Average land sizes in this community are less than one hectare per family. Therefore, any agricultural production in the community is mainly directed at self-sufficiency. Agricultural production in the community as such has remained highly diversified and independent of external inputs, but at the same time agricultural profits remain very low and the dependency on water for survival is very high. As such, the *páramos* are generally highly valued by the community members for their contribution to existing water flows. For many community members, the far stretching valuation of water resources, and the fear for further deterioration of water flows combined with the limited economic use of their *páramo*, and its distant location from the community centre provided sufficient incentive to apply for the status of APH for the *páramo* of Chaupi Urco Chilca Tingo (900 ha) in 2020. Although this proposal was quickly accepted by SENAGUA (the precursor of MAATE), four families within the community that access the *páramo* to graze their cattle were quick to resist and demanded a reconsideration of the granted permissions.

Soon after, their call was enforced by community members of Yacubamba, who claimed that the proposed boundaries of the APH conflicted with their property rights for the neighbouring *páramo* Quishpicasha (3600 ha), of which the property rights had been granted to Yacubamba during the Agricultural Reform. The community of Yacubamba counts about three times as much inhabitants as San Isidro. However, the distant location from any economic centres, and the high levels of soil erosion experienced in this community have led to limited economic productivity and large-scale outmigration to nearby cities. For this community, a loss of control over the páramos therefore symbolises a huge threat to the continued existence of their community, because the economic opportunities akin to the control over the *páramos* are often the only lifeline that still limits large scale migration to the cities. To pressure the community of San Isidro into withdrawing their proposal, Yacubamba denied all

Figure 25 Drinking water infrastructures in the páramo of Chaupi Urco Chilca Tingo (own pictures).

community members of San Isidro access to their territory, which includes the one and only access road to the *páramo* of Chaupi Urco Chilca Tingo, from where 22 kilometres of pipelines convey drinking water to San Isidro. This decision took a dramatic turn in April 2022, as a landslide eradicated parts of these pipelines, leaving the community without possibilities to restore this critical water infrastructure, thereby completely halting the inflow of drinking water (see Figure 25).

Although access to drinking water is declared a human right in the country's constitution, most water authorities have been very reluctant to intervene, and over 14 months passed before the community's access to safe drinking water sources was reclaimed. On the one hand, this could be explained by the strong geographical position that the community of Yacubamba holds over the main governmental (water) authorities in the region. For example, the water access of the municipality of Pujilí, which is formally charged with potable water management within its cantonal boundaries, directly depends on the water that passes through the territory of Yacubamba itself. As such, intervention from their side is complicated for a fear of being cut from water supplies themselves, which reveals a great weakness of the authorities in resolving tensions over access to water in Ecuador's micro-watersheds.

Textbox 23: An Acta de Paz – a resolution for San Isidro's water shortage?

On June 9th, 2023, 14 months after the earth slide that disrupted the drinking water flow to San Isidro's territories and just days after a severe intoxication struck more than 100 community members, regional water authorities convened a meeting in Yacubamba to resolve the existing tensions between both communities. In a day full of tensions, both communities in the end managed to come to an agreement, which resulted in a signation of an Acta de Paz (Figure 26). This Act mentions that San Isidro will refrain from their attempts to create an APH in exchange for access to the territories of Yacubamba that would serve to restore the existing pipelines in these territories. While this Act will resolve the immediate water shortages in the community of San Isidro as it partially restores their relationship with Yacubamba, it should be noted that the four families within their own community that initiated the resistance against the APH did not sign the Act, and the social relations within the community thus are likely to remain complicated and conflictive for a while to come. As the community leader of San Isidro stated: *"Ya hemos terminado un etapa, y ahora somos con la otra. Pero nunca dejaremos de seguir defendiendo el páramo y el agua, qua ha sido nuestra esencia de vivir."*

Figure 26 The community leaders of San Isidro and Yacubamba, after signing the Acta de Paz on June 9th, 2023 (own picture).

9.2.2 Water pricing

While the dire situation in San Isidro may have reached unprecedented heights, it appears that more communities in the basin suffer from a dependency on the favour of upstream communities. Although water pricing for the so-called conservation of the *páramos* has been abandoned, Padilla (personal communication, June 2023) reveals that he knows of at least five communities in the basin that pay a yearly allowance of $3500 per year to the upstream communities, as a so-called contribution to the maintenance of the pipe systems in the upstream territories. Although Art. 6 of the National Water Law specifically prohibits the commercialisation of water supply, Padilla explains that, following the developments in San Isidro, the fear of upstream communities cutting of water supply is very high amongst other communities in the basin, thus "forcing" them to consistently pay these yearly allowances.

This practice, in reality, seems to develop even beyond the sole practice of water pricing. In the water user meeting of May 2023 of the La Marquez irrigation system at the utter downstream end of the basin, a request was received for a contribution of $500 to Cusubamba's annual community celebrations. Although none of the participants in that meeting agreed with this payment, one of the board members at some point remarked: "We should not forget that we depend on their water flows. We have to think about the risk that they cut of our flows if we disobey this request." Soon after, it was decided to contribute 150$ to the festivities in Cusubamba, stressing once more the dominant role of upstream communities in the basin, which apparently does not only come at the cost of water access, but also at the cost of decision making in the interest of downstream communities.

9.3 Communities' accounts of denials to water access

9.3.1 Living without drinking water

Although the provincial government quickly reacted to the loss of access to drinking water in the community of San Isidro, by announcing biweekly truckloads of tanked water, water shortage and an increased consumption of contaminated water surged in the months following the landslide. Ronda (personal communication, May 2023) declared that while the tanks could provide sufficient water on paper, in reality, many families don't have sufficient family tanks to store water for a period of two weeks. Moreover, the truck only passes through the main road of the village and at irregular times, as a result of which the many families that live on the mountainous slopes that surround the centre, frequently arrive too late and miss their biweekly water supply. To diminish this pure lack of water access, within a couple of months after the loss of access to drinking water, the community leaders denounced a *minga* to allow to couple all taps and showers in the village to the still incoming irrigation water supply. However, with large parts of the community having trouble to access the water from the tanks, the consumption of irrigation water rose extensively. As this water is conveyed through open canals, it is frequently contaminated with agrochemicals and animal faeces, and during periods of extensive rainfall also conveys large volumes of eroded sediments. As such, a significant rise in severe illnesses and skin conditions occurred in the community's elderly people and young children.

9.3.2 Living with limited irrigation water

Apart from these physical impacts, the structured use of irrigation water for household purposes, also resulted in a reduced access to irrigation water. Many community members reflect how their crop yields have reduced, and how they had to reduce their crop variety as a result of the high-water consumptive needs of some crops like tomatoes. Not only does this directly affect the nutritious values of the local diet, but also does it seem to affect the economic stability of many households, that within the community has largely been built on the production of guinea pigs. One community member reflected: "As the production of herbs and grasses dropped, I had to prematurely sell the majority of

my guinea pigs. But now that I sold so many, I can only fertilise parts of my field, and on other parts the production seems to have reduced even further." The situation in San Isidro thus seems to become ever more dire, as the lack of water traps them into a vicious cycle of ever lower returns on agricultural production, leading to ever less food availability for their livestock, resulting in ever more limited fertilisation of their fields, which in its turn further reduces agricultural production.

This economic instability seems to stretch to ever more aspects of daily life in San Isidro. Frequently, men in the community shared that they left their family for days or weeks at end, to search for a job in Quito, or work at the petroleum extracting businesses in the Amazon. Similarly, students of the community studying in the nearby cities of Ambato and Quito shared that they frequently lack funds to return to their families over the weekend, keeping them in the city for weeks at end. On the other end of this spectrum, I encountered the very personal story of Ronda (personal communication, May 2023), for who the lack of economic resources for years on end has hampered the organisation of her wedding, which according to local Ecuadorian traditions, also prevents her and her boyfriend from settling in together and providing a home base for their family.

9.4 Concluding remarks

This chapter revealed that, although the upstream part of the river basin in itself is not necessarily affected by water overallocation in terms of its water access, its territories form the scene of increasingly fierce debates due to the presence of the *páramo* ecosystems. In these debates, two different discourses fight for priority: one to protect the *páramos* in order to secure its water flows, the other to use the *páramos* as a space for economic development. Although the first discourse is more closely linked to the discourses presented in the country's National Water Law, the second discourse seems to be more dominant in the Nagsiche river basin. This chapter reveals that this could largely be explained by the strong power position that the geographical location of the communities defending the second narrative provides. Being located in the upstream part of the basin, they developed a strong politics of repression and control over other communities, as the one vital resource for survival in the basin (water) passes through their territories. Yet, this not only impacts local communities, but increasingly also seems to affect the legal decision making surrounding *páramo* conservation. As such, this case has developed as an example of the limited protection that water institutions could offer against the geographic power of communities in the highlands. Contrary to common perspectives of local communities versus government, or local communities versus large enterprises, the situation in the upper part of the territory thus reveals a strong source of internal conflict between communities that develops largely outside of the control and vision of water authorities.

10. Counterbalancing existing inequities

"No queremos violencia, queremos condiciones humanas." – President of the indigenous movement of Cotopaxi (MICC; Cusubamba, March 2023)

The previous chapters revealed that the limited institutional capacity in the basin has played out in severe conflicts over water that centred the impacts of *agua de papel* within the already vulnerable groups within Ecuadorian society. However, despite ever larger tensions surrounding the shortage of water within the Nagsiche river basin, the hopes and perspectives for a brighter water future within the basin have not faded. Currently, more and more ideas are coined to revert the current situation, and to look for alternative water futures characterised by a more just and more secure access to water. This chapter discusses four key proposals that resurface time and time again in the Nagsiche river basin. However, it also reveals how these proposals run the risk to be captured and reframed by the same power plays that initially created the unequitable water access, and how the perceived absence of governmental water authorities reflects in the framing of existing proposals. Nonetheless, although each of these proposals might face its own challenges and counteracting powers, they do provide an insight into potential strategies towards a more just water future (Figure 27).

Figure 27 Counterbalancing existing inequities, a focus on water justice.

10.1 Water storage through in-river dam construction

After the enormous water shortage of the years 2009-2010 in the Nagsiche river basin, a plan was developed for the construction of a dam in the river. The basic idea behind this plan is that such a dam could help capture the large fluctuations in river discharge and in doing so could even out the available water flows throughout the year (Suarez, personal communication, March 2023). Over the years, elaborate studies were carried out to identify the basin's geographic and geometric characteristics and define its suitability for dam construction. Through this research a potential location for dam construction was indicated at the confluence of two river flows just upstream of Cusubamba. Ever since, many communities in the downstream regions of the river basin have held high expectations for the dam's arrival, stating that they perceive the dam as "the only solution for the existing water shortage" (Padilla, personal communication, June 2023) in the basin.

However, a multicriteria analysis (Cangahuala Janampa, 2016) of the dam proposal in terms of 9 criteria ranging from ecosystem impacts to economic costs and from water quality to conflict resolution, revealed that dam construction would come with significant ecological impacts and economic costs. As such, this study ranked the dam's construction as the least favourable option for mitigation of water shortage in the basin compared to the two other measures included in the study: irrigation modernisation and reductions in water losses. Especially the ecological damage that this research revealed caused many NGOs, including CESA, to keep their reservations towards the project (Roman, personal communication, February 2023). As a result, they put a hold on their economical

support for the project, until more clarity could be retrieved about the exact ecological impacts. Thus, currently the project remains without sufficient economic funds to be carried out, and further actions have been postponed for the last 5 years.

In the meantime, dissonating voices have had time to establish a more prominent position in the debates about dam construction. Padilla (personal communication, June 2023), for example, mentions how ever more communities in the upstream zone expressed their dissent with the construction of the dam. While these communities do not struggle from water shortage, they do currently deal with their own set of environmental problems. Considering the steep slopes on which these communities depend, high rates of soil erosion are registered. As such, many areas have become unsuitable for agriculture since high losses of fertile topsoils left only bare rock on the surface, leaving very little opportunity to sustain local rural livelihoods in this zone. As a result, many community members have migrated to nearby cities, and the upstream communities witness rapid depopulation rates. Considering that the construction of the dam would take place in their territories, they demand that other projects should be developed to help them battle the challenges of the upstream zone in return. As Padilla (personal communication, June 2023) details, they feel disadvantaged by the prioritisation of water related projects in the region and the large sums of money that are invested in battling this downstream-specific problem.

On another note, Padilla (personal communication, June 2023) notes that even though a reservoir could solve the existence of *agua de papel* and thus could help to reduce tensions in the area, there is a risk that the presence of more water could benefit the most powerful actors, since the reservoir in itself does not resolve the inequalities that are present in the basin. For this reason, it would be important to reflect on who would operate this reservoir, under what rules, and with what type of access rights, something which, until now, has not been part of the discussions about the dam's construction in the basin.

10.2 Redistribution's power in addressing local inequalities

Second in the list of ever returning, predominant demands by smallholder farmers in the Nagsiche river basin is the demand to undo age-old inequities in water distribution in the basin. As such, community members use the increasingly dire situation in which they try to pursue their agricultural lifestyle in order to demand with increasing persistence for the redistribution of water allocations in the basin (Cusubamba, March 2023). These demands are backed by Art. 130 of the National Water Law, which articulates the need for water redistributions and provides authority to MAATE to initiate such efforts. However, as already mentioned in Section 7.2.3, the actual occurrence of such redistributions is very rare.

Arroyo (personal communication, May 2023) reveals how this could largely be explained by the fact that such redistributions generally are against the interests of the largest, and economically most powerful, producers in the basin. As such, the whole redistribution discourse induces a high risk of the use of bribes to prevent the actual implementation of these legal principles. Suarez (personal communication, April 2023), on the other hand, mentioned that the lack of redistributions could also be ascribed to the current regulation's limited possibility to reflect practical realities. Currently, the main mechanism for defining legitimate sizes for water allocations namely bases itself on crop water requirements, in other words: soil types, crop types, evapotranspiration rates, and land size. In the Nagsiche river basin, these four indicators resulted in an estimated water requirement ranging between 0.3 and 1.0 l/s/ha. Since none of the farmers nor agribusinesses access a concession that exceeds this quantity, the regulations do not find a need for water redistribution in the Nagsiche river basin, nor do they provide a practical guideline for making another, more equitable, distribution.

MAATE itself, however, focuses their explanation for the lack of water redistributions in the zone on yet another institutional gap. According to Estrella (personal communication, April 2023), a real redistribution as demanded by the communities in the Nagsiche river basin is currently impossible as a result of the longevity of existing allocations, which are set at 10 years for irrigation water and 20 years for drinking water. As such, water can only be redistributed once the allocations free up, which will only occur bit by bit, making it harder to create an overall sensible water allocation. However, Art. 111 of the regulations that belong to the National Water Law specifically states that an early withdrawal of existing allocations is allowed when it is clear that there are needs to be covered in relation to the guarantee of human rights to water or irrigation for food sovereignty. Thus, the longevity of existing water rights in itself could, according to legal predicaments, not be the only reason for denying the opportunities for water redistribution. This would indicate that both the argumentation of Suarez and that of MAATE are based on illegitimate legal groundings, and raises the likelihood of allegations made by academics and community members that larger economic interests may interfere with MAATE's decision making process.

10.3 Public policies for *páramo* conservation

Although the dam construction project for a long time had the support of the majority of the river basin communities, the large delays in the project's outline have degraded the invincible trust in the resolution potential of the project. Whereas the dam project initially was the most clearcut and most favoured solution to issues with water scarcity, the community members of San José de Alpamalag (personal communication, April 2023) currently reveal another sentiment as well: "Only 20 years ago, we used to swim in the river's waters. Now, the river is nothing more than a small stream. Even in the upstream regions, people already suffer from degrading water supplies. With the current rate of *páramo* degradation, a dam would probably only resolve the problem for five, maybe ten years, until the water flows from the *páramos* will have disappeared forever." On that note, the community members concluded that "knowing the limited resources available, it would probably be better to invest in the conservation of the *páramos*, as a more long-term solution to our water shortage." Therefore, a group of downstream communities has now started initiatives to buy out current landowners within the *páramos*, in order to take the management of the *páramo* ecosystems into their own hands. This because, as Padilla (personal communication, June 2023) stated: "We can only trust the real value of the conservation of the *páramos*, when it is implemented by the communities that in the end really have an interest in their adequate conservation."

For most of the downstream communities that have obtained property rights over the *páramos,* the next logical step is to try and conserve them (see Figure 28), usually by applying for their recognition as *área de protección hídrica* (APH), a legal structure that already owned its weight in conservation discourses throughout the country. However, at the same time, the situation in San Isidro reveals that the lack of governmental authority over the *páramos*, and the limited registration of the territorial delineation of the various *páramos* in practice hampers the practical validity of such claims. Therefore, many communities (Allauca, personal communication, March 2023; Padilla, personal communication, June 2023; Reinoso, personal communications, 2023) argue for the need to establish a stronger public policy on *páramo* conservation, as currently 1) insufficient financial resources are available to support local communities in their efforts to conserve the *páramos*, or to compensate upstream communities for the loss of livelihood opportunities that *páramo* conservation may entail, and; 2) internal conflicts between communities about conservation practices develop largely around unclarities in existing regulations or incompliance with these regulations, which in the worst case can lead to severe security issues (see also Chapter 9).

It is in this context, that communities across the Nagsiche river basin plea for rolling out a national framework to support *fondos de agua* (water funds). Based upon the concept of Payment for Ecosystem Services, governmental actors, (international) NGOs and downstream water users would contribute to a fund that "finances conservation activities in rural communities existing in and around ecosystems important for water" (Joslin & Jepson, 2018, p. 10). In practice, this means that many funds actively seek to incentivise different land use practices. Since the decentralisation of environmental management in Ecuador in the 1980s to 1990s, the idea of non-state funded conservation gained significant traction in the country. However, the examples of effective implementation of Water Funds in the Ecuadorian context remain limited. Nonetheless, many community members in the basin refer consistently to setting up a water fond similar to the *Fondo de Manejo de Páramos Tungurahua* in their neighbouring province. They perceive this fund as a key example of how the responsibility for *páramo* conservation can be shared and financed cooperatively. However, despite its successes at first sight, Duarte-Abadía, Suárez and Hidalgo-Bastidas (2023) warn that the (Tungurahua) water fund is still highly susceptible to reproducing existing power imbalances and provides fairly limited real decision-making power to indigenous communities. As such, they reveal a need to discuss a proper framework for establishing such funds before initiating them as a panacea for *páramo* management throughout the country.

Figure 28 A mural at the central square in San Isidro, pointing out the community's battle for water, the protection of the páramos, and for life (own picture).

10.4 Community organisation

Lastly, a consideration that frequently resurfaced in the basin is the power of communities to communicate and defend their needs and wishes in the face of ever-increasing power dynamics (Allauca, personal communication, March 2023; Padilla, personal communication, June 2023). In these contexts, community members often emphasised the need to strengthen the intercommunal organisation within the basin. Although this does not provide a direct relation nor resolution to experienced water shortages in the area, there exists a growing realisation that the failure of existing proposals to address these water scarcities relates to the lack of a strong representation of communities' shared perspectives. Padilla (personal communication, June 2023), for example remarked that communities are currently only organised by their respective water users' associations. Amongst the many water users' associations in the basin, many tensions exist over the distribution of water, especially in periods of shortage. Over the years, this has resulted in the existence of a strong control culture, whereby water users' associations control and reprimand the water intakes from the one association directly upstream of theirs. These internal struggles hamper the formation of a strong intercommunal organisation of downstream communities that could confront existing power dynamics in the basin and could define their own strategy to defend their water access against such dynamics (Allauca, personal communication, April 2023). Pazmiño (personal communication, May 2023) therefore remarked that the resolution of internal conflict between communities and water users' associations could be key in enhancing their capacity to demand compliance with existing legal structures, and to demand participation in water authorities' decision making about the resolution of water scarcity.

Figure 29 A mural at a school building in the centre of San Isidro, representing how the community's resistance allowed them to break free from repression (own picture).

Padilla (personal communication, June 2023) additionally remarked that the potential for a successful implementation of such a regional organization is relatively high due to the shared interests and challenges that these communities face, and the large constitutional power that is vested in communal

and indigenous organizations. However, he also remarks that for any intercommunal organisation to function properly, financial contributions are a prerequisite. Only with such contributions, a professional micro river basin advisory board could be established, in which its members could dedicate sufficient time to identifying existing challenges in the basin, and in which sufficient participation of all communities could be ensured, and a real action potential exists. So far, despite the large constitutional value that is granted to community initiatives, such specific support systems do not exist in the Ecuadorian context.

10.5 Concluding remarks

This chapter revealed that inhabitants of the Nagsiche river basin promote a variety of options to come to a more just waterscape. Their solutions, however, reveal an interesting dynamic. On the one hand, priority is given to large, technical, projects like dam construction and redistribution, which heavily depend on the financial and legal resources of the state. This focus reveals that resolutions to water shortage in the Ecuadorian waterscape continue to be perceived from a fairly technocratic perspective, with relatively little consideration for the fact that large part of the water scarcity in the basin is socially constituted. On the other hand, community members ever more strongly declare their distrust towards the role of these same state authorities in the resolution of water scarcity and demand for more and stronger communal organisation and action potential. As such, this chapter reveals how the distorted relations between the various actors in the basin complicate any solution frame. As a result, many of the proposed solutions form a potential new source of conflict, and actual problem resolution and concrete actions towards water justice lack behind. Therefore, it seems that the battle for water justice continuously moves to new spaces, in which it is not just about contesting existing water injustices but also about finding ways to prevent the capture of resolutions thereto by these same power plays.

11. Discussion

Much research on conflicts surrounding the defence, protection and conservation of rivers and the local rural livelihoods that they sustain, has been focussed on anti-dam and anti-mining campaigns. These campaigns are often characterised by large scale protest and a resistance that is highly visible to the general public, as they disrupt day-to-day life and are frequently met with a violent response from the state. Therefore, environmental conflicts have largely been framed as conflicts that revolve around a dynamic of community interest versus state interest (e.g., Boelens et al., 2023; Hoogesteger et al., 2023). However, in the Nagsiche river basin, conflicts surrounding environmental protection and water access occur as a more hidden reality, since the extent of the problems is largely masked due to limited large scale resistance against the existence of *agua de papel*, and the annual differences in the extent of its impacts. As a result, also the relations between various actors, and their relation to the state, are not always as clearcut. This chapter aims to clarify the dynamics at play in the Nagsiche river basin through a conceptual reflection on the practices and realities described in this thesis.

11.1 Echelons of rights: a search for authority

In the Nagsiche river basin, *agua de papel* has induced strong tensions in the relations and dynamics between various water users in the basin (Figure 30). While most of these tensions (e.g., between communities and agribusinesses and between upstream and downstream communities) are openly addressed through conflict and resistance, the relation between communities and state (law) reveals a slightly different dynamic. In this dynamic, communities on the one hand actively deny the role of the state, stating that "they think more about money, than about us" and that "they said they would stand up for us, but where have they been?" (Cusubamba, March 2023), which reveals that years of limited water access and little to none state interventions have left their mark with regards to the trust in the capacity and willingness of the state to help medium and small agricultural producers sustain their livelihoods.

11.1.1 Interacting with state authority

On the other hand, however, Padilla (personal communication, June 2023) remarks high levels of paternalism in the basin, where communities are still actively depending on and aligning with rules, regulations and resolutions initiated by the state. As such, while formal water rights allocation mechanisms have been the main driver behind the creation of institutionalised water scarcity and the internal tensions in the basin, communities throughout the basin have continued to accept its existence and follow its prerequisites. In water rights literature, this dynamic is well known under the denominator of "forced engagement" (Boelens and Seemann, 2014) or "shotgun marriage" (Boelens, 2013). These concepts indicate the existence of a mutual dependence between communities and the state, in which state laws are seen to incorporate customary rights principles in order to find legitimation for their existence amongst local communities, while these local communities accept the state laws in order to prevent further marginalisation.

This dynamic has created a void for the interaction between communities and the state in the Nagsiche river basin. While outright resistance is out of the question, collaboration is too. The result thereof is that the communities' interactions with the state have become very limited. As they, for example, reveal that "we could use financial support from the state, but it takes a long time for them to process such requests. It is just faster and easier to not involve them at all" (Reinoso, personal communication, March 2023). Hoogesteger et al. (2023) also recognise this approach, stating that "river commoning takes place by consolidating community and the commons locally and by avoiding spaces of engagement with the state" (p. 287). However, in their investigation, they perceive this as a strategic choice to keep the state out. This requires a "strong culturally defined level of self-

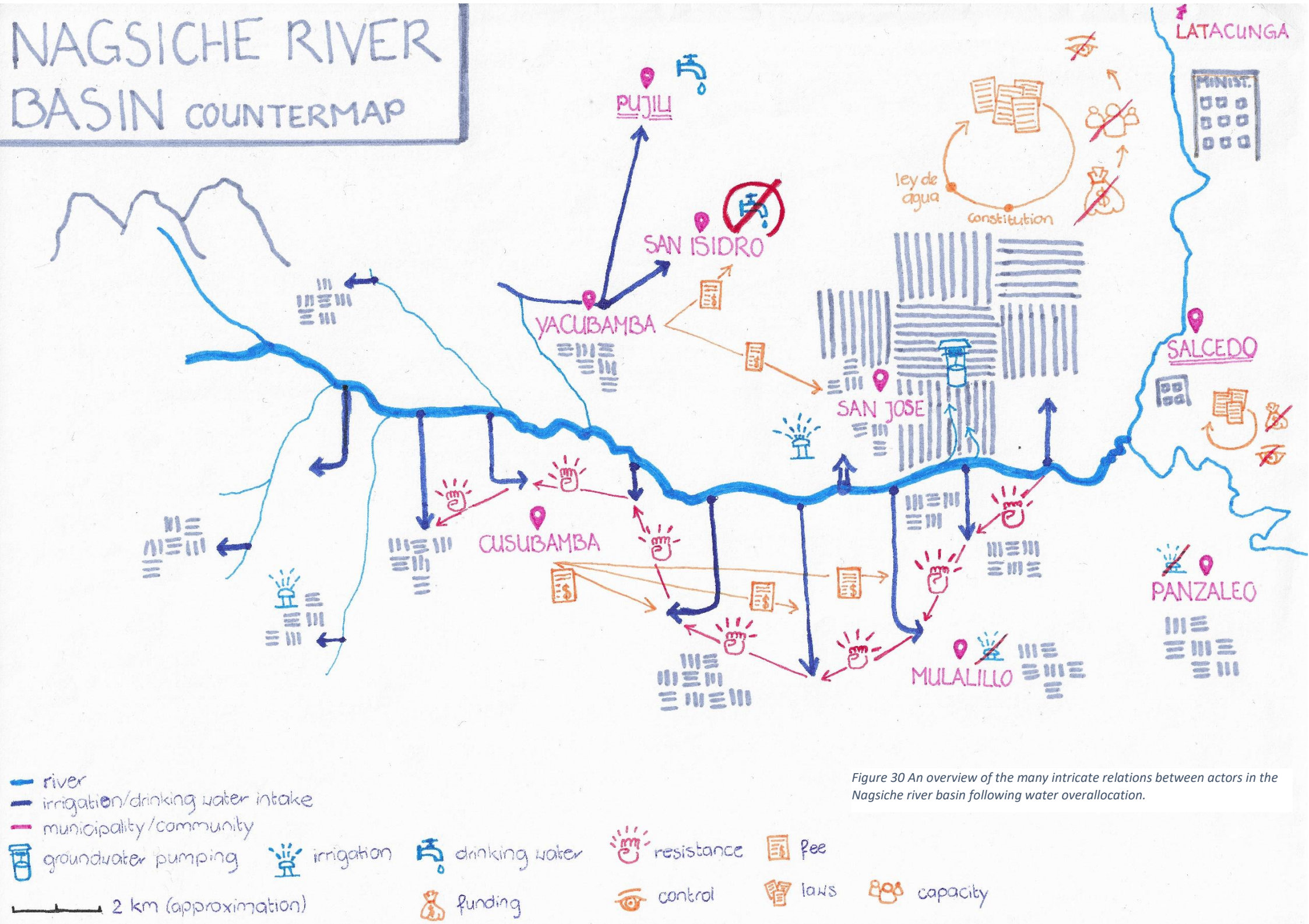


Figure 30 An overview of the many intricate relations between actors in the Nagsiche river basin following water overallocation.

governance and autonomy" (p. 287). In the Nagsiche river basin, rather than a strategical choice, the decision to not engage with the state is mainly informed by a complete lack of faith in both the capacity of the state to intervene, as well as their willingness to stand up for smallholder interests. This explains how, in the Nagsiche river basin, a situation could arise in which the state is actively present in creating state law, allocating water concessions, and creating *agua de papel*, while being remarkably absent in mitigating its consequences. Hendriks (2010) recognises this dynamic for the entirety of the Andean countries, as he writes that "[i]t seems that legal attention tends to focus on legalizing the right more than on actually enforcing the use of the volume of water to which the user is entitled" (p. 168).

11.1.2 Redefining rules and regulations locally

In practice, communities' limited engagement with and thrust in the state does not necessarily mean that the state-defined rules and regulations to define water allocation are free of contestation. While the lack of capacity of the state may have ruled out direct demands for compliance with existing rules, the principles that underlie current water allocation regulations, and that provide strong evidence for discrimination against smallholder rural communities, are heavily contested on a day-to-day basis (Boelens & Bustamante Zenteno, 2005). In fact, many communities in the basin actively question the fairness of the current distribution principles, as they question the predefined link between water allocation and land size, and the technical principles underlying current water allocation mechanisms. According to them, both the link to land size and the strong focus on crop water requirements normalise practices in which large shares of water are nearly "automatically" directed to the agribusinesses, as the large landholdings of these businesses and the high-water consumptive needs of broccoli favour their rights over those of small-scale farming communities (Allauca, personal communication, March 2023; Padilla, personal communication, March 2023).

Boelens (2015a) also remarks the strong normative power that is vested in the technical approaches of state-defined allocation mechanisms. All the while, these technically oriented state-led allocation principles resonate very little with local realities, in which water user organisations generally lack the capacity and means to monitor water flows (Hendriks, 2010), and water flows are largely defined based un labour inputs (Boelens, 2015). As such, it could become interesting to investigate alternative water allocation mechanisms that base themselves on locally existing norms and practices, and that could allow small scale-farming communities to not only contest existing "technical" norms in water allocation, but also provide viable alternatives. Throughout the Andean countries, a wide variety of locally applied water allocation mechanisms exist (Boelens, 2015a). While not all of them would align with the situation in the Nagsiche river, which is characterised by an extremely high number of irrigation inlets, allowing the various *juntas de agua* to define water turns and inflows independently, it appears that a myriad of allocation mechanisms remain that could undo the discrimination against small scale farming communities that seems to be engrained in Ecuador's current state-defined water allocation mechanism. In random order, these include, amongst others, mechanisms to 1) provide water proportionally to existing irrigation areas, but only up to a pre-established limit; 2) provide equal volume rights, which provides water flows completely independent from irrigation area; 3) provide water according to the size of the family unit, and; 4) provide water with a priority for crops that provide livelihood security (Boelens, 2015a).

However, it seems that the contestations of the principles underlying current water allocation mechanisms have, in practice, mainly incentivised a counterreaction by the most powerful actors in the basin to rapidly strengthen their legitimacy for the formulation of new "rules". As such, the contestation of rules mainly provoked reactions from actors and collectives that have an interest in defending the status quo, either because existing regulations favour the water allocation to their properties, or because water scarcity increases the value of water resources. As such, pre-existing

economic and geographic power positions have amplified in the Nagsiche river basin, and the main source of authority now exists in the new, unformal, rules (e.g., payment for water infrastructure) and practices (e.g., bombarding of the clouds) that these installed in Nagsiche's waterscape. Thus, while in many cases surrounding social and environmental movements visible power is executed through mass protests and demonstrations and governmental (violent) responses to such gatherings, the omnipresence of the invisible power that is exerted through the strong discourse of the lack of institutional capacity in the Nagsiche river basin seems to have ruled out large scale resistance before it even existed. Instead, visible power is taken over by the "new" geographic and economic authorities in the basin, who installed their own rules and regulations for water management and control.

11.2 Mobilizing alternative imaginaries

The strong presence of non-formal authorities, and the rules and regulations they have defined to direct water access in the basin has a significant impact on local perceptions and actions for increased water justice. However, despite these dynamics, ever-larger groups of rural and indigenous community members currently voice their dissatisfaction regarding the lack of water and the inequity in water distribution. This power of the masses is becoming increasingly more effective in the Nagsiche river basin, where regular meetings currently take place between the agribusinesses, communities, and water authorities to discuss the communities' concerns and interests and potential ways to achieve them, adding another level of authority to the already complicated interrelations in the Nagsiche river basin. All these "new" authorities have found a way to back their presence with a strong legitimating discourse. Whether it is "crop water requirements" for the formal water authorities, "employment opportunities" for the *brocoleras,* "compensation" for the upstream communities, or "livelihood security" for the downstream communities, all of them have found a way to direct water flows in a specific direction.

Despite an abundance of ideas to address local inequities in water access, actions towards these resolutions therefore remain continuously stalled between the widely varying interests in the basin. As a result, the interests of the geographic and economic powers in the basin continue to prevail, and the strive for water justice in the Nagsiche river basin in reality reflects a strive for more justice in general, in which also historic distributions of land area, discriminative legal structures and socioeconomic hierarchies in society are considered. In terms of water justice specifically, most community members in the Nagsiche river basin primarily emphasise their right to have a larger equity in water distribution and access. As such, water justice in the basin aligns strongly with the realm of socioeconomic justice, where distributive equality and the opportunity to succeed in supporting one's livelihood are the key principles (Zwarteveen & Boelens, 2014). However, increasingly, community members are rallying in other realms of justice to support and strengthen their claims for a more just water distribution. Primarily, this could be seen in the strong revaluation of the *páramo* ecosystems that is taking place in the Nagsiche river basin. Through this revaluation, concerns for future water access and intergenerational sustenance have been coupled to a need for ecosystem protection and conservation. Despite not being a primary interest of local communities, they thus strategically integrated ecological justice into their framing of water justice, which allowed them to connect other interests and stakeholders to their search for enhanced distributive equity. In academics, this strategy is increasingly recognised as one of the key strategies for local communities and grassroot initiatives to upscale their concerns, and generate greater mobilisation, through the concept of *grassroots scalar politics*. This concept acknowledges that access to water is "embedded in broader regional and national politics, legal frameworks and water policies" (Hoogesteger & Verzijl, 2018, p. 13), and as such demands communities to create new networks and alliances that enable them to overcome their spatial constraints in defending this water access (Hoogesteger & Verzijl, 2018).

However, despite this recognition for the need to search for cooperation with actors from different interest groups and at different levels of the state institutional framework, the majority of paths that community members propose towards a more just waterscape reflect a highly technical approach to (irrigation) water management. Whether this is a result of a strong historical tradition of technical water management in the country, or whether this follows from ever degrading levels of trust in governmental institutions remains unclear, but key is that important social drivers for the water shortage experienced in the Nagsiche river basin are kept out of the problem resolution frame. For example, the idea to construct a reservoir in the river, overlooks the potential it provides for existing power dynamics to appropriate the "additional" water availability as long as the lack of a strong water authority continues to persist. Similarly, the idea to redistribute existing water rights ignores the existence of the water scarcity that is institutionalised within these existing rights, therefore not addressing the actual source of such socially constructed shortages. The proposal to enhance community organization is a positive exception to this general dynamic. A significant limitation to the mobilisation of voices for enhanced water justice in the Nagsiche river basin, however, is the small size of this basin. As such, even once communities would organise a larger intercommunal mobilisation, the risk remains that their voices will fade at larger institutional levels (Hoogesteger & Verzijl, 2013). As such, it is critical to scale up existing resistance movements, by connecting across river basins and analysing more stories of *agua de papel*.

11.3 Agua de papel: the value of a new conceptualisation of overallocation

This thesis developed the concept of *agua de papel* as a tool to study the dynamics between various water users in a river system that develop in contexts of water overallocation. It understands the river systems as a system in which certain wished for hydrosocial territories are materialized, challenged, or enforced by different actors operating in that system, and as such allows to unravel the interrelations between dominant, existing, and alternative river realities and the power dynamics that drive these connections. Therefore, one of the major contributions of employing the concept of *agua de papel* is that its strong focus on the relational aspect between various users in the river basin allows to understand the river basin as a space that connects to a wide variety of dynamics, uses, and geographical spaces. As such, it allows to define rivers beyond the flow in the river itself to include the *páramos* and the canals of the irrigation systems that convey the river's water deep into the human territories, and it also allows to define the river as a source that provides services to an area that stretches way beyond the geographical boundaries of its basin. As such, it provides an opportunity to call attention to the struggles for water of communities that are not a part of the formally established geographical boundaries of such territories.

Moreover, *agua de papel* allows to visibilise the role that state-defined rules and regulations have in defining the realities of water distribution and water access experienced in Ecuador's rural communities. By connecting this "materialised reality" with a tool to understand power dynamics, the suggested conceptualisation of *agua de papel* allows to move beyond the paper realities in the Ecuadorian water scape, in order to understand how voids in these paper realities open up a myriad of possibilities to define and defend existing water rights in the context of water scarcity. By employing power dynamics as a mode to understand dominant river configurations, I could establish that not only the capacity-discourse, but also a strong focus on values instilled by capitalist systems enhances the status quo in water distribution and access in Ecuador. For example, the situation in the Nagsiche river basin displays a high likelihood of the use of corruptive measures by the agroindustry in the basin to refrain authorities from complying with their own rules and regulations with regards to orders of priority and needs for the redistribution of existing rights. This reveals that markets, and their related market values, are a key feature in defining the rules for water allocation. As such, the dominance to

maintain existing water realities is with the most geographically and economically powerful actors, while alternative water realities struggle to break through the tight entanglement that is created between the absence of formal authorities and the rise of economic and geographical powers.

However, it is not just power dynamics and state rules that define the dynamics in river basins suffering from water overallocation. As such, the proposed conceptualisation of *agua de papel* also includes a reflection on the alternative river configurations that may challenge the strength of the dynamics between dominant and existing river configurations. While the current conceptualisation of these alternative river configurations emphasises water justice, considering the framework's focus on the actions that drive both the materialised and the dominant imaginaries, it could be worthwhile to conceptualise the alternative imaginaries through a more actor-oriented instead of goal-oriented perspectives. For example, in the Nagsiche river basin, one of the main struggles for alternative imaginaries to gain some ground appears to be the lack of organisational capacity of those that promote the alternative realities. Rather than organising themselves as a strong front against dominant powers, most communities are organized only within their separate *juntas de agua*. As such, they lose out on possibilities for developing an integral perspective of the river basin, the shared struggles for water access, and the potential for cooperation. For that reason, it could be worthwhile to develop a conceptualisation of the alternative imaginaries that would allow to look at the different possibilities to promote water struggles from an individual battle to a large-scale mobilisation, for example through employing grassroots scalar politics (Hoogesteger & Verzijl, 2018) in this part of the framework.

11.4 A future research outlook

At the *Foro Nacional de los Recursos Hídricos* in Quito (July 2023), CAMAREN shared a list of at least 16 rivers in Ecuador that are known to run completely dry during parts of the year. This marks a significant indication for the existence of overallocation in these basins, and thus subsequently for tensions surrounding water distribution, water allocation and water access. Moreover, also once rivers do not run dry completely, *agua de papel* could be a prominent feature in defining water access. For example, along the Chimborazo river in Chimborazo province, small scale farming communities remarked how the flows of one of their springs were allocated twice, and to different right holders. Also in this situation, dynamics similar to those in the Nagsiche river basin developed, in which different communities are constantly battling with each other for access to sufficient water resources. *"Es el estado que nos hace pelear entre las comunidades"* (unknown farmer, July 2023).

However, contrary to the situation in Nagsiche, there is no formal legislation like the concessioning of average annual flows that could explain the overallocation in such springs. It thus seems that, although the reality of *agua de papel* exists in several water systems, the mechanisms behind it might vary significantly. According to Silva (personal communication, June 2023), in the case of water overallocation from springs, a lack of proper registration of assigned concessions in combination with restraints in institutional capacity and a rapid runover of technicians at MAATE is the key driver for overallocation. However, he also notes that communities increasingly seem to realise this void in institutional organisation, and use it to strategically apply for concessions they know have already been granted to others, in order to gain a formal right to contest and demand water access. As such, overallocations seem to be a persistent feature in the Ecuadorian water scape, and a high remaining potential for studying *agua de papel* in other river systems across Ecuador can be identified. Ideally, such studies could help to unravel the dynamics of these, currently still largely hidden, realities. Key in these kinds of analyses would be to establish common (conflict) dynamics and tensions, which could allow to scale up the isolated battles for water justice that currently take place in each of these basins.

12. Conclusion

The occurrence of water overallocation in the Nagsiche river basin reveals that the consequences of institutionalised water scarcity stretch way beyond the occurrence of water scarcity itself. In practice, the process of *agua de papel* that it initiates, initiates, and validates discussions on equity in water distribution that challenge centuries-old principles of water allocation in the Ecuadorian waterscape. However, as formal water authorities find themselves in a position in which their capacity to guide these discussions and enforce the existing equity principles is minimal, economically, and geographically powerful actors in the river basin actively seek opportunities to consolidate the current state of water distribution, as this favours their access to water, or their potential to benefit from the ever-higher valuation of remaining water resources. Therefore, a reality arises in which Ecuador's water institutions and legislations portray a power to assemble *agua de papel*, while simultaneously lacking the power to deal with its consequences.

Consequently, the Nagsiche river and the people who depend directly on its resources for their survival, are trapped in a vicious cycle (Figure 31) in which the limited institutional capacity of formal water authorities opens up possibilities to employ economic and geographical power dynamics in the basin, and to adapt the situation in favour of the most powerful actors. As a result, water injustices in the Ecuadorian water scape only seem to grow, thereby greatly impacting the viability of agricultural livelihoods in the downstream communities of the Nagsiche river basin. The limited governmental response to prevent these violations of the human right to water have grown an increasing distrust amongst rural communities in the capacity and willingness of the state to defend these livelihoods, leading to ever lower reporting of the dire water situation that these communities experience. As institutional knowledge about the experiences of water scarcity therefore decreases, so does the capacity of the authorities to intervene and react, opening up even more possibilities for other powerful actors to control water access in the basin, and potentially further worsen water injustices.

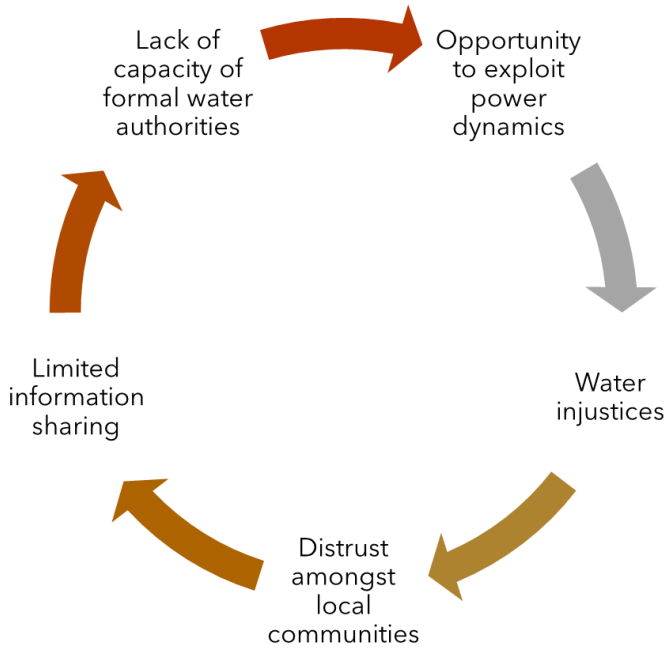


Figure 31 The vicious circle of agua de papel in the Nagsiche river basin.

As such, it appears that *agua de papel* constitutes way more than just a bundle of fictitious water rights. In practice, *agua de papel* reveals a new reality, in which people continuously reconfigure the balance between resistance, acceptance and cooperation for water access, and as such continuously redefine their river territories.

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Annex 1: Participant observation

Name	#	Position	Date	Keywords
Meeting *GAD Paroquial* Cusubamba	250	All interest groups	08-03-2023	Bombarding the clouds Relation to agribusinesses Water conflict Water justice Water shortage
	100		17-03-2023	Future outlook Relation to agribusinesses Water conflict Water justice Water shortage
	100		04-04-2023	Future outlook Relation to agribusinesses
Community meeting San Isidro	70	Community members of San Isidro	13-03-2023	Community organisation Alternative water resources Future outlook Water conflict Water shortage
	120		21-03-2023	Drafting a community plan Future outlook Water conflict Water shortage
	100		31-03-2023	Drafting a community plan Future outlook Water conflict Water shortage
Interview Radio Latacunga	30	Community members of San Isidro	18-03-2023	Community organisation Water conflict Water shortage
Foro Provincial	200	All interest groups	25-04-2023	The state of water resources in Cotopaxi Province
Junta de Riego La Marquez	20	Water users of the La Marquez irrigation system	28-05-2023	Community organisation Water shortage
Foro Nacional	1000	All interest groups	06-07-2023 07-07-2023	The state of water resources in Ecuador

Annex 2: Semi-structured interviews

Name	#	Position	Date	Keywords
Allauca, P.	1	Community leader of San Isidro	03-03-2023 16-03-2023	Water conflict Water shortages
Arroyo, A.	1		06-05-2023	Institutional limits National Water Law Future outlooks
Bautista, J.	3	Environmental director Municipality of Salcedo	25-05-2023	Institutional limits Local water governance mechanisms
Chasipanta, V.	1	President of COICC (indigenous movement of Cusubamba)	29-03-2023	Indigenous movements' responsibilities Water conflict
Chicanza, M. *[3]	1	President Junta de riego San Antonio	28-03-2023	Relation to agribusinesses Water conflict Water shortages Future outlook
Estrella, M.	1	Technical director MAATE	11-04-2023	Decision making mechanisms Institutional limits National Water Law
Gomez, M.	1	Director Social Program Nintanga	01-06-2023	Agribusinesses' responsibilities
Isch, E.	1	Academic expert on water allocation in Ecuador	28-05-2023	
Millingalli, S.	1	President of OPIJJ (indigenous movement of Pujilí Jatun Juiga)	26-03-2023	Indigenous movements' responsibilities Water conflict
Muñoz, K.	1	President Junta de Riego La Marquez	28-05-2023	Water conflict Water shortages

[3] Interviews indicated with this sign were conducted as a group interview.

Padilla, M.	1	President of the Nagsiche River Basin Committee	02-03-2023 30-05-2023	Future outlook Water conflict Water shortages
Pazmiño, D.	1		08-05-2023	Institutional limits National Water Law Future outlooks
Reinoso, G. *	3	Community leader San Jose de Alpamalag	28-03-2023	Relation to agribusinesses Water conflict Water shortages Future outlook
Roman, F.	1	Director CESA	31-01-2023	Institutional limits Future outlooks Water conflict
Ronda, T.	3	Community member of San Isidro	19-03-2023	Water conflict Water shortages Future outlook
Silva, J. S.	1	Former employee SENAGUA	10-05-2023 03-06-2023	Decision making mechanisms Institutional limits
Suarez, R.	1	Director CESA Cotopaxi	02-03-2023	Institutional limits Future outlooks Water conflict
Toscano, E. *	1	President Junta de Agua Potable	28-03-2023	Relation to agribusinesses Water conflict Water shortages Future outlook
Yasig, E.	1	Community leader	10-04-2023	Relation to agribusinesses Water conflict Water shortages Future outlook
Yasig, M.	5	Community member of San Isidro	20-03-2023	Water conflict Water shortages Future outlook
Total interviews 21	30			