Participatory Management: Guayllabamba case study

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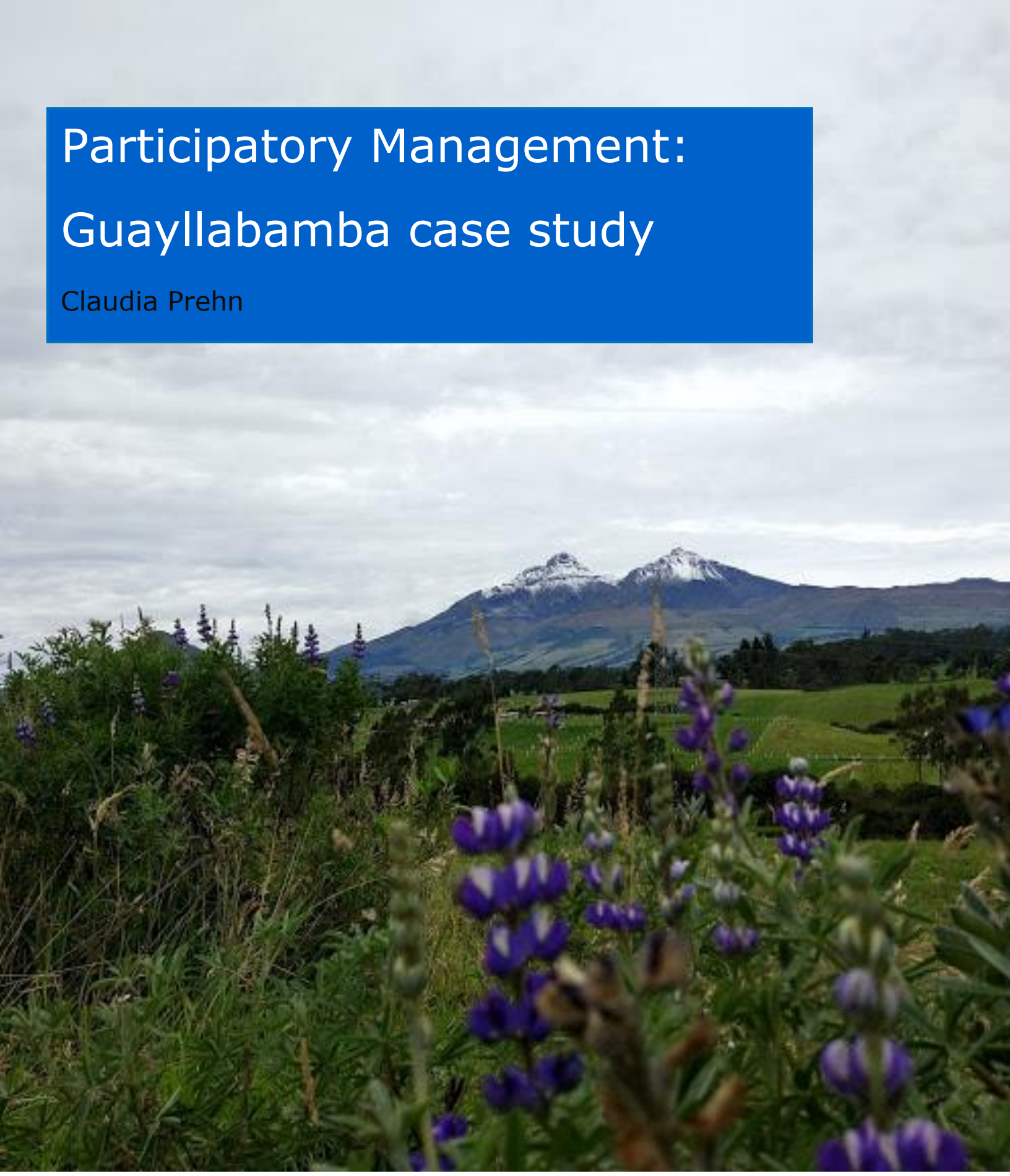

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Participatory management: Guayllabamba case study

By

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in partial fulfillment of the requirements for the degree of

Master of Science
in Civil Engineering, Water Management track
at the Delft University of Technology

and the degree of

Master of Science
in Hydraulic Engineering and Water Resources Management
at the National University of Singapore

To be publicly defended on 28th February 2019

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ACKNOWLEDGEMENTS

I would like to thank the SENECYT (Secretaria Nacional de Educación Superior, Ciencia, Tecnología e Innovación – Ecuador) for supporting me with a scholarship that allowed me to take on this amazing opportunity. All the amazing organizations and the people there who gifted me their time and experiences. In particular, FONAG and Senagua who aided me to understand better water management in my own country.

I would like to thank all my professors at TU Delft and NUS who were so understanding and inspiring, in particular, my advisor prof Erik Mostert for his guidance and help throughout this very arduous process and, the very much appreciated, jokes. Cecilia and Yuniar at NUS CEE office, thank you for going above and beyond your duty.

Last, but certainly not least, I would like to thank my parents for all their support, both financial and especially and most importantly emotional, my husband for putting up with the melt-downs and being by my side no matter what, my family for their unbreakable belief in me. And above all, I would like to thank God.

Dedico este trabalho a minha vó Ivone, gostaria que estivesses aqui.

Claudia Prehn

Quito, February 2019

ABSTRACT

The social dimension in water management and the interaction of stakeholders is a challenge when modeling hydrological systems. Case studies are essential to uncovering relations and unexpected results. In this research, a case study of the Guayllabamba basin in Ecuador is proposed. Mainly, the interactions, perspectives, and relations between key stakeholders are analyzed. NGOs, water management government institutions and water users' associations are the main focus.

The political changes in Ecuador, the creation of new institutions and the new water law have shaken up the relations between these stakeholders and have provided a great opportunity to see what factors have affected the interactions of these stakeholders and have exacerbated some issues. Moreover, the capital of the country, Quito, is located in the Guayllabamba basin which allows the governmental institutions to be more hands on, thus generating interesting exchanges among all stakeholders.

An assessment of the current legal framework is carried out to understand how the relations (mainly with the governmental stakeholders) should work, then interviews and surveys were applied to get a grasp on how the different stakeholders perceive each other and the main issues in the basin. Finally, direct observation was crucial to see the different stakeholders interacting and draw conclusions as to whether the responses to the interviews and survey are coherent with the observations made by the researcher. The methods used were mainly qualitative and the research followed an emergent design, meaning that modifications to the research were done along with the gathering of the data.

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1 INTRODUCTION

Ecuador has been going through several political changes in the past 20 years, a new constitution was established in 2008 and a new Water Law in 2014. In this context, water management was forced to adapt to the ever-changing Ecuadorian politics and the discussion of the best models for water and basin management was reignited in the country. Different interests clouded the discussion, especially concerning the government and the various indigenous communities. The debate of a state-centric or community management approach to water resources was central to the protests. Another critical factor was the privatization of water and the recurring issue of a few influential people holding most of the water rights. All of these conflict and changes have had an effect on the relations between key stakeholders in water management.

The present research aims to understand the relations and communication between policymakers, NGOs, and water users and how have these relations been modified with the latest changes. A case study of the Guayllabamba basin is proposed to limit the scope of the research and enable an in-depth study of these relations. Additionally, this project aims to propose alternatives to improve the relations between these pivotal stakeholders.

When dealing with the human dimension in water management, case studies often bring attention to important details that would go unnoticed in other types of research. This project contributes to the field by attempting to describe how different types of stakeholders relate to each other and how they perceive each other and the issues in the basin. Also, there are not many studies like this in the Andes region, which due to its historical and cultural characteristics, has had multiple conflicts arisen from stakeholder's different points of view and hindered relations. Moreover, the unusual political context of the country at the moment could help understand how a particular type of politic agenda can affect the relations between policy makers and users.

The case study

The Guayllabamba basin is located in the highland region of Ecuador and encompasses the country's capital, Quito. The basin originates in the paramo region, a highly diverse and fragile high mountain ecosystem comprised between permanent snow and Timberline (Buytaert *et al.*, 2006), in which many communities still live and depend on for their livelihood. Fonag is a water fund concerned with the preservation of the paramos. The fund also educates stakeholders on relevant issues and provides the necessary information for decision making. This research was conducted with the help of Fonag.

The basin has an area of around 9100 $km^{2,}$ and around 2,5 million people live in the basin (CISPDR, 2016). Although Quito is located within the basin, the city is not a major consumer of the water resources since it gets most of its water from other basins. This research focuses on the rural side of the Guayllabamba basin, where agriculture and irrigation water are vital.

Objective and research questions

This thesis aims to understand the relations between policy makers, NGOs and water users in the Guayllabamba basin.

To reach this objective, we need to answer the following research questions:

1) What are the formal institutions for river base management and the current legal framework relevant to the case study?
2) How do these stakeholders perceive each other? What are their main concerns with each other?
3) What are the main issues in the basin according to each stakeholder? Are all of them on the same page?
4) What do the stakeholders perceive would be the advantages of improving the relations between them?

Report structure

This report is structured in six chapters. The second chapter contains an explanation of the methodology followed in this research. The background information, analysis of the relevant legislation and the current management structures are presented in chapter 3. Afterward, background information on the particularities of the case study basin is given, as well as a justification for the stakeholders chosen for this research. Finally, the results of interviews and surveys are giving along with a brief analysis of their meaning are presented in chapter 5. A discussion of the results obtained and the concluding remarks finalize the main body of this project.

2METHODOLOGY

A case study approach was chosen to understand the relations and perception of different groups involved in water management in Ecuadorian river basin management. Case studies are particularly useful when understanding the decision-making process and uncovering different mechanisms. Moreover, the flexibility inherent to case studies allows an exploratory research approach (Mostert, 2018). The Guayllabamba basin was selected for this case study due to its unique characteristic of encompassing both a big city (Quito) and a rural sector that largely depends on small scale agriculture. Additionally, the basin is home to various NGOs and data is more easily available. Also, the physical proximity to the policymakers (based in the city of Quito) might make communication easier between the different stakeholders and could represent the best-case scenario for relations and communication among stakeholders.

Due to the large number of stakeholders and the chosen approach to gather the qualitative data (interviews), it was not feasible to consider every single stakeholder. Thus, some organizations were chosen as representative of each group.

POLICY MAKERS: In Ecuador, policymaking is exclusively reserved to the Sole Water Authority as it will be explained in section XXXX. Thus, Senagua was considered in this study. Some complementary interviews were done with other government bodies, such as municipal and provincial governments and the Ministry of the Environment.

NGOS: For this research, the FONAG, Consorcio Camaren, and Fundacion Futuro Latinoamericano were interviewed. This NGOs were chosen due to their availability and extensive experience in the Guayllabamba basin. Moreover, most of the interviewees participated in different aspects of the formulation of the 2014 Water Law and/or previous attempts to establish a basin management plan.

WATER USERS: Members of different Water Users' Associations (groups of water users, see section 3.3.1) were interviewed, both users and water users' associations' board members. Participants were chosen with maximum variation criteria; different geographic locations and sizes of the associations were important factors when choosing the interviewees. Additionally, due to this being the most extensive and diverse group, surveys were conducted to confirm the results obtained in the interviews.

2.1 MIXED METHODS APPROACH

Qualitative data was essential to identify the perceptions of each stakeholder and concerns. In fact, the qualitative data gathered helped select the direction of the research design. Nonetheless, in order to confirm the findings of the qualitative data a survey was designed. Thus, a mixed method approach was chosen, with a qualitative priority and quantitative methods as a complement (Creswell and Clark, 2011).

Due to the exploratory nature of this research, an emergent research design was adopted. This method consists of an iterative process in which the research design can be modified along the gathering of information. After empirical observations, conclusions are drawn through an inductive process (Hesse-Biber and Leavy, 2008). In the case of the present research, the focus of the research shifted along with the gathering of information, what remained constant was the chosen case study.

Initially, the research intended to take the Guayllabamba basin as a case study of participatory water management and study how/if social learning could aid in the implementation of the new legislation and improve participation. However, unsurprisingly, the fact that the law establishes water management in Ecuador as participatory does not mean it is the reality on the field. After some interviews and observations were carried out, the researcher started to question whether there was, in fact, a participatory management approach in the Guayllabamba basin. Moreover, the main concerns of the stakeholders contacted initially was to know how does the information flow works, especially within the government stakeholders. Thus, the approach of the research was changed to understand how does the communication and

cooperation works between the chosen stakeholders, as a starting point to later suggest how participatory management can be better implemented.

Nonetheless, when researching how communication and cooperation worked, it was found that there were no official or clear channels of communication. Moreover, the cooperation between stakeholders was highly punctual and could not be generalized enough for the proposed study. Thus the objective was once again changed to understand the perceptions among stakeholders and how they interact. This was considered a necessary step back from the previous objective, a clear view of the perceptions among stakeholders and how they interact with each other was needed first to later assess how to improve (or establish) communication and cooperation between them.

The main stakeholders' groups (NGOs, government and WUAs/users) were maintained throughout the changes in the research objective mainly because they were the ones who experienced the most changes with the new law and were the ones working the most on the basin. The big agriculture producers/industry were also considered for this study but none of the representatives contacted were willing to participate in this research.

One could question why the changes in the objectives instead of changing the case study. The basin was kept constant due to the interest of the author to study Ecuadorian basin and water management. The basin was chosen because of the high activity of the different stakeholders, some basins do not have NGOs working there and others are so far from the central government that users and WUAs do not have much contact with the national government stakeholders. Due to the presence of the capital Quito in the basin, there is more data available and it was assumed the different stakeholders were more likely to collaborate than in smaller basins with fewer resources.

2.1.1 Data collection

First, an inventory of the data freely available online was assembled. Afterward, a thorough analysis of the legal framework was conducted to understand the theoretical water management structure in the basin. Then, interviews were conducted with water users, NGOs and government stakeholders. From these interviews, and to confirm the results obtained, a survey was elaborated. News articles were used to complement the interviews and reinforce the overall position of different stakeholders.

2.1.1.1 Document analysis

The documents analyzed for this research were obtained mainly from interviewees, official websites and libraries. The documents can be grouped into categories:

Legislation: The different legislation mentioned in this research were thoroughly analyzed as well as the previous counterparts. The main bodies of law examined were the Montecristi Constitution (2008), the Organic Law of Water Resources Uses and Water Exploitation (2014) and the Organic Law of Citizen Participation and Social Control (2010)

Reports: Statistical data reports and technical reports were essential to understand the reality of the basin. The primary reports used in this research consist of the National and Regional Water Resources Plans (CISPDR, 2016)(CISPDR, 2015), previous reports on the Guayllabamba basin governance (FFLA, 2007)(FFLA, 2011) and statistical reports from the Ecuadorian National Institute of Statistics and Census (INEC, 2010).

Publications: A variety of scientific literature was studied to establish the theoretical framework.

News reports: Since perception plays an important part in this research, well-known news sources in the country were used to establish the concerns and opinions of different stakeholders, especially regarding conflicts and the approval of the 2014 Water Law. To avoid bias, both pro-government and opposition sources were consulted.

2.1.1.2 Interviews and surveys

The primary tool to better understand the different perceptions were interviews. These were configured as open-ended interviews with a few base questions that were repeated with all the interviewees. However, since the main objective was

to identify the opinions, perceptions, and concerns of each stakeholder, each interview unveiled different topics and took independent paths. On average each interview lasted two hours and was recorded, due to anonymity the transcripts are kept private. The standard questions on the interview were:

- How does basin and water management work in the Guayllabamba? Has the recent legislation altered it? If yes, how so?
- What are, in your opinion, the main issues and difficulties in water and basin management in the Guayllabamba?
- How do you see the relations with [the other stakeholders]? Do you believe they could be improved? – *Here NGOs were mentioned if not brought up before*
- How would you rate the level of cooperation and communication between the different stakeholders in the basin?

These questions (or some variation of them) were only asked when they were not addressed by the interviewee at some point. Usually, only the first and second questions were asked and the interviewee would address the other questions at some point of the conversation. None of the interviewees needed much guidance, they would voluntarily cover the main points studied by themselves.

Due to time and resources constraints, the number of interviews was limited, thus, as an attempt to avoid skewed data, a survey with a more substantial amount of participants was done to verify the conclusions reached with the interviews. The survey consisted of paper-based questionnaires composed by multiple choice questions, yes or no questions and Likert-type scale questions (with 5 categories ranging from strongly agree to strongly disagree) — Annex (A) shows the English and original version of the survey used.

2.1.1.3 Direct observation

During the course of the research, the opportunity to see the reality of different stakeholders and their day to day was presented. Both observation and active involvement were made possible during the events attended, in section XXX those events are specified. Direct observation was vital to refine and redirect questions, to obtain the qualitative data required and to understand better the challenges faced by each stakeholder. Often the answers given would differ from the observations made.

2.2 DATA ANALYSIS

To analyze the qualitative data gathered, and due to the iterative nature of the research, inductive coding of all the information was carried out. This method consists of first reviewing all the data generated and noticing patterns and repeated statements. Then short codes are developed that represent the information gathered on the first part of the process. Afterward, all the information is reviewed and the chosen codes assigned to where they appear (Thomas, 2006). The codes chosen in this research were then grouped into themes.

The coding process was done with the aid of the software ATLAS.ti (version 7.5.10). Interviews, surveys, and some relevant documents were uploaded to the software to identify the relevant themes and codes. The following steps were taken:

Step 1: import all the relevant data into the software Atlas.ti (interviews files, direct observation notes, news articles, and reports)

Step 2: re-read all the information and sketch the prevalent codes

Step 3: go through interviews and documents highlighting (or coding) the parts were the previously identified codes/themes appeared

Step 4: refine the overall codes and identify the themes

Step 5: generate Excel files with data relating the codes and the primary documents (sources of information)

With the software Atlas.ti, it is possible to generate reports for analysis showing how many times certain codes appeared or what sector mentioned it the most. Moreover, the main software advantage is the ability to organize different types of data and files in the same environment.

According to how many times each code appeared in an interview, a number was assigned. The scale chosen was 0 to 3, with 0 being not mentioned at all, 1 mentioned once, 2 mentioned more than once and 3 mentioned repeatedly or being singled out as a major issue by the interviewee.

Finally, a survey was constructed in order to confirm if the opinions and perceptions perceived in the first part of the research were shared among a larger group of individuals, mostly water users and some members of water users' association boards. The results of the surveys were grouped and interpreted.

3 WATER MANAGEMENT IN ECUADOR

Ecuador is located in South America's north-west. The country has a total area of 256.370 km^2 according to the Geographic Military Institute with a total population of almost 14.5 million inhabitants (INEC, 2010). People can self-identify in six ethnic groups: Mixed, White, Indigenous People, Montubios, Afro-descendants, and Others. Note that the indigenous people category encompasses over 25 different groups with different traditions, culture, language, and idiosyncrasy. Montubios are mixed people from the countryside of the Ecuadorian coast.

Ecuador is still highly dependent on agriculture, around 110 000 km^2 and 150 000 km^2 are productive land that has some sort of irrigation structure (Román *et al.*, 2017). That represents between 40 and 50% of the country's total area. While the country is the main banana exporter in the world, the petroleum and mining industries are an important source of income for the country that is the third Latin American exporter of petroleum (CISPDR, 2015).

Most of Ecuador's water resources come from surface water, with only 4% being groundwater. Ecuadorean rivers can be grouped into rivers that flow to the Pacific Ocean (west of the Andes) and rivers that flow into the Amazonian River (east of the Andes). Around 88% of the country's population settles in the area of the Pacific watershed but has only 11.5% of the water potential (FAO, 2016). This disparity generates water-stressed regions, especially in the dry season, even though it would seem the country as a whole has enough water resources (Senagua, 2017). Figure 1 shows the water distribution; the red colors represent deficit and the blue colors excess.

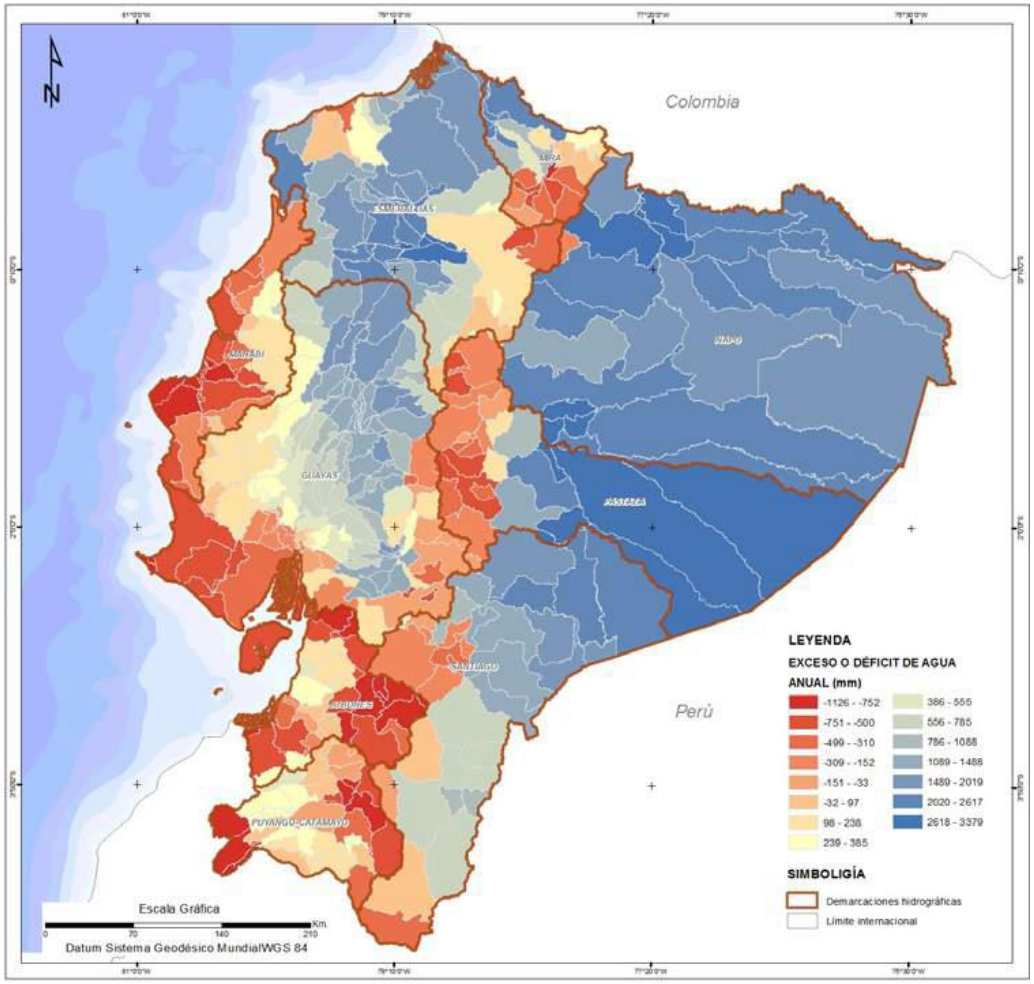


Figure 1 National water balance (source: Senagua, 2017)

Territorial divisions

It is important to understand how the country is divided and the different political levels to comprehend the following chapters and the particular laws regarding water management. The COOTAD (Organic Code of Territorial Organization, Autonomy, and Decentralization) establishes the political and administrative organization of the Ecuadorian State. The country has four levels of territorial organization: regions, provinces, cantons, and parishes (COOTAD, 2010). Parishes are the smallest territorial circumscription and are always integrated into a canton. The cantons are formed by various parishes. There are 24 provinces in Ecuador, and they are formed by a combination of cantons. Regions have yet to be established in the legislation. However, historically, Ecuador has been divided into four regions: coast, highlands, Amazon and Galapagos Islands (Pouget et al., 2008). Figure 2 shows the different regions and provinces.

Figure 2 Regions of Ecuador (source: http://www.forosecuador.ec/imgfe/mapaecuador.jpg)

These territorial organizations have a corresponding Decentralized Autonomous Government (GAD), who is in charge of the political, legislative and administrative functions to varying degrees according to their attributions and have political, administrative and financial autonomy. It is important to clarify that the corresponding GAD to cantons is the Municipal GAD, all the others keep their names (e.g., Provincial GAD, Cantonal GAD).

Political Context

Ecuador has been known for its political instability in the last couple of decades (Massal, 2006), from 1996 to 2007, nine presidents were elected. In 1999 one of the greatest economic crises hit the country, several banks closed their doors, the inflation rate was the highest it had ever been, and a lot of Ecuadorians fled to Europe and North America. Due to inflation, the country was dollarized in 2000.

In 2006, economist Rafael Correa entered the ballot as a presidential candidate. His populist (de la Torre, 2013) discourse seemed to appease the tired and skeptical Ecuadorian people. He won by 56,7% of the votes in the second round (CNE, 2006). One of his campaign promises was to pass a new constitution that would recognize the rights of the people and end the oligarchies and monopolies, the socialist. Correa held the presidency for the next ten years, which his party denominated the *gained decade*. Infrastructure, a massive investment in hydropower and other mega-projects (as they were called) were essential features of Correa's government. In this period, the price of the petroleum barrel was very high, and Ecuador saw a considerable increase in the GDP. However, the country went into considerable debt.

While the constant fighting with the press and opposition(El Universo, 2012)(El Tiempo, 2009), the increasing the country's debt and incongruences diminished Correa's approval rate, he still managed to elect his candidate in the 2017 election, Lenin Moreno. Since then, both have distanced themselves from the other and Correa is now considered Moreno's opposition. Moreno still considers himself a left-leaning politic but has opened more ways of communication.

3.1 HISTORICAL BACKGROUND

Ecuador has gone through much change regarding natural resources and water management. As in other parts of the world, water management followed the corresponding political movements. Perceptions of who should manage water and who "owns" it has changed throughout history. Annex (B) shows a detailed timeline of significant changes in the legislation and institutions in the country's history.

Public participation and indigenous customs

In pre-Columbian times, water was already transported through complex structures for human consumption, irrigation, and recreation. The indigenous inhabitants generated customary water rights systems, which were transmitted from generation to generation, although this was not absent from conflicts (Foro de los Recursos Hídricos, 2013). Water management was mostly a public affair, with strict rules for usage.

In colonial times, the indigenous structures were still used. However, the Spanish approach to water management was implemented, adopting local control over water. The Spanish also introduced the idea of private water rights and inheritance; mostly water rights were granted to the landowners, either Spanish or their descendants. Cities started developing its water supplies systems, although they were not managed by any institutions yet (Global Water Partnership, 2003).

From the First Ecuadorian Constitution until the 1972 Water Law, water was often seen as a private good or state asset, this dichotomy was often a source of conflict and made the laws ambiguous. From the 1972 Water Law onwards it is forbidden to privatize water, at least on paper (Vallejo, 2008). However, most of the campaign and justification for the creation of the 2014 Water Law was the perception that water was still held in the hands of a few, which resulted in practical privatization since small farmers did not have access while agro exporter and big industries hoarded water rights.

A constant through both periods is the dispersion of responsibility through different institutions, something that various laws and the creation of different institutions have tried to fix but have not been entirely successful yet (Vallejo, 2008) (Hermosa, 2014).

A significant figure throughout history to Andean water management, especially community management, is the mingas (Boelens, 2014). The whole community gathers to build, restore or repair any structure needed, in case someone could not work on the minga they pay a fee or send someone else in their place. A lot of the community's water structures have been built this way, this not only builds a sense of responsibility for the water systems but also a better sense of community.

3.2 LEGAL FRAMEWORK

The current legal framework for water management and basin management mainly consists of the new Water Law approved in 2014 and the 2008 Ecuadorian Constitution, a summary is presented in this section.

Ecuador has had 20 constitutions and numerous revisions since the first signed in 1830. The most recent is the Montecristi Constitution approved in 2008 by then president Rafael Correa, and it overruled the 1998 constitution. The Montecristi Constitution was the first ever to grant nature inalienable rights. Numerous constitutions show environmental awareness, but none has approached the matter from this perspective (Whittemore, 2011). From Art. 71 to 74 the constitution establishes that nature has the right to exist, persist and to be restored and respected, it also allows all people to demand the fulfillment of nature rights by the public authority. All relevant articles of the Constitution related to water resources and water management are summarized in Annex (C), but mainly the most essential development is the declaration of water and sanitation as a fundamental and inalienable human right and holds the Ecuadorean State responsible for guaranteeing its access for all (*Constitución de la República del Ecuador*, 2008).

The constitution categorically prohibits the privatization of water and the hoarding of water rights. Water is considered a strategic sector, which means that the State has the right to regulate, control and manage it, and productive use of water requires a State authorization. The constitution also establishes some roles relating to water management to the different government levels (Figure 3). However, the detailed attributions are better established in the 2014 water law.

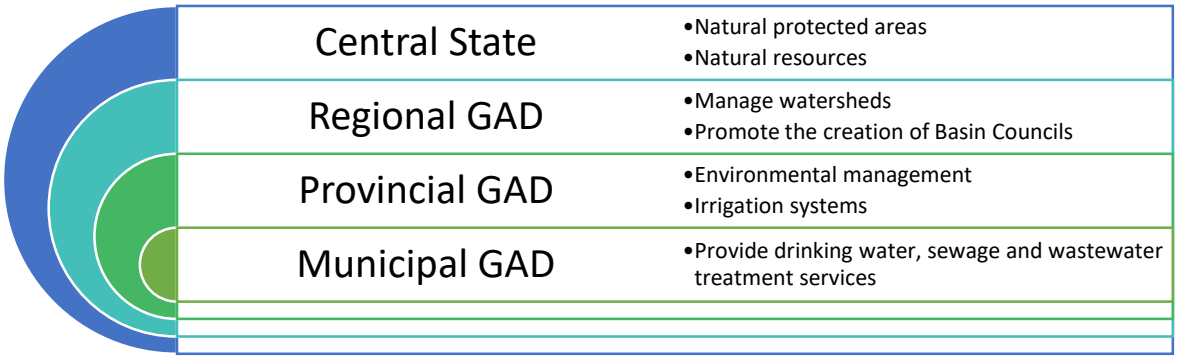


Figure 3 The faculties of the different government levels (source: Ecuadorian Constitution 2008)

A public or community approach should be adopted for water management, and only the State or communities can provide public sanitation, drinking water, and irrigation services. It prevents the private sector to enter into water services and take the place of the municipal water companies or the communities.

The Constitution states that citizen participation in all matters of public interest is a right. Taking this premise into account, the Citizen Participation Organic Law passed in 2010. The law's main objective is to promote, encourage and guarantee the participation rights of Ecuadorian citizens. The law establishes mechanisms and procedures for public deliberation between the State and society, for the monitoring of public policies and the provision of public services. The two main forms of participation relevant for water policy are citizen sectorial councils and advisory councils. The first is composed of citizens only and has more weight in the decision-making process, while the second is advisory-only and can be formed with different levels of government institutions as well as citizens.

Moreover, the Constitution recognizes in Art. 57 the right of indigenous communities, peoples, and nationalities to maintain, develop and strengthen ancestral traditions and forms of social organization. They also have the right to participate in the use, administration, and conservation of renewable natural resources in their land.

Water Law

The Organic Law of Water Resources Uses and Water Exploitation was approved in 2014, although the Constitution established 360 days for the formulation of the legislation. In 2015 the Regulation of the law was published.

The primary objective of the law is to guarantee the human right to water pledged in the Constitution. It also aims to regulate and control the authorization, management, preservation, conservation, restoration of water resources, use and exploitation of water, among other attributions. All of these attributions are delegated to the State.

The water law prioritizes the uses of water in the country as follows: the first priority is human consumption, followed by irrigation that guarantees food security, ecological flow, and productive activities, in this order. State authorization is required to use water for productive purposes by the public and private sectors. This is the first time that the need for an ecological flow for nature preservation is recognized in Ecuadorian legislation.

The State is responsible for guaranteeing a comprehensive, integrated and participatory water management. To reach these goals, it establishes the National Water Strategic System, that is explained in detail in section 3.3, and the Sole Water Authority who directs it. This institution is created to represent the State; it is led by the water secretary who is appointed by the Ecuadorian president. A more in-depth analysis of the current legislation, especially regarding community management is shown in annex (D).

Water Law controversy

The water law faced hard critic, mainly from indigenous groups and some scholars. CONAIE (Confederation of Indigenous Nationalities of Ecuador), Ecuarunari (a group representing Kichwas indigenous people from the Highlands region), and different groups representing small farmers staged several protest and manifestations against the water law ever since the first drafts presented in the National Assembly. The indigenous groups in Ecuador are crucial political actors; they are well-known for voicing their complaints in protests. Most of them were Rafael Correa allies but cut ties in 2010 and became the main opposition to the new legislation.

The central issue was state management versus the ancient community management model. The creation of a Sole Water Authority composed only by the government was seen as undermining community management, and the indigenous leaders demanded the creation of an Intercultural and Plurinational Water Council that had a voice and participation in the decision-making process. The redistribution of water and the de-privatization were also concerns since the law did not establish a clear mechanism to end the water monopoly (*El Telégrafo*, 2014).

Some of the concerns voiced in the pre-legislative consultation were taken into account to an extent, such as the creation of an Intercultural and Plurinational Water Council, even though it only acts as an advisory body without a real vote. The whole information and consultation process regarding the law was poorly executed, several groups of water users complained that they did not even see the drafts of the law and could not contribute with their perspectives (*El Comercio*, 2009). Indigenous leaders and representatives of NGOs also claimed that the law passed was not the same that went through the pre-legislative process and feel the whole consultation was a scam (Ecuavisa, 2014).

With the approval of the water law, the backlash did not end. Ecuarunari presented a lawsuit against the water regulation in the Constitutional Court (Castillo, 2015). The main complaint against the regulation is the weakening of the community management model, transferring all the control over water management to the state.

Another controversy derives from the fact that in Ecuador, organic laws have to pass through the National Assembly with at least 50% of the votes, the regulations (sort of complements to the law), however, can be altered by the executive. The water law leaves a lot of critical factors to the regulation, which worries some stakeholders since the regulation can be easily altered by the government in place. Additionally, the law already leaves most of the decisions to the Sole Water Authority and does not clarify what the basis for the decisions is. For instance, the law establishes the sustainable use of water, guaranteeing the right of the future generation. However, how the Sole Water Authority determines the necessities of the future generation is not explained (Acción Ecológica, 2015).

It seems that the new government is more inclined to listen to the needs of the people regarding water resources, at least on paper. One of the requests presented in the consultation process before the approval of the water law was the creation

of the Water National Fund; the current president has said that they will support its creation (*El Telégrafo*, 2018). In fact, Moreno named Humberto Cholango, ex-leader of CONAIE, as water secretary, which appears to be an effort to include the indigenous people in water policy decision-making. Although the political climate seems more suitable for discussions and public participation, the economic crisis is just beginning, and resource allocation is going to be problematic.

3.3 MANAGEMENT STRUCTURE

With the new legislation, a centralized approach to water management has been adopted. As mentioned before, water management is delegated to the National Water Strategic System, which is integrated by:

1) The Sole Water Authority
2) The Intercultural and Plurinational Water Council
3) The institutions of the Executive Function that fulfill competencies related to the comprehensive management of water resources
4) The Water Regulation and Control Agency
5) Decentralized Autonomous Governments
6) The Basin Councils

The National Water Secretariat (Senagua), along with the Water Regulation and Control Agency (ARCA) and the Public Water Company (EPA), is the Sole Water Authority. They are responsible for all attributions given by the law to the Ecuadorian State, such as: granting water use authorizations, setting rates, generating records, etc.

Senagua is the director of the National Water Strategic System and is in charge of overseeing, coordinating, planning and executing water policies. One of its central roles is to coordinate and generate the Water Resources National Plan. This serves as a guideline for all the basin management plans in the country. Senagua also coordinates the management plan of each hydrologic demarcation, and the basin council is responsible for the basin management plan.

ARCA is the technical-administrative body affiliated to the Sole Water Authority that has administrative and financial autonomy. Its primary role is to develop technical standards according to the requirements and institutional needs. It is also responsible for creating a methodology to carry out an optimal control of the water quality and quantity, its uses and exploitation, rates and the quality of public services.

The third component of the Sole Water Authority that is not listed in the law but was created via a presidential decree is the Water Public Company (EPA). Its primary function is contracting, administrating and supervising water infrastructure under the competence of the Central Government.

The institutions of the Executive are the relevant ministries and are expected to support Senagua in their respective fields. For instance, the Health Ministry should aid with the water quality standards for human consumption and the Agriculture Ministry with the amounts of water necessary for the irrigation of different crops.

The Decentralized Autonomous Governments (GADs) are the main link between public and Senagua; they are the executors of Senagua's policies and usually the ones bringing issues to Senagua's attention. In the Guayllabamba basin, four provincial GADs and 13 municipal GADs are present. However, most of the basin is located in the Pichincha province.

Intercultural and Plurinational Water Council is one of the participatory bodies, and its central attribution is the social control to guarantee the human right to water and its equitable distribution. It should also participate in the formulation, evaluation, and control of public policies on water resources and the formulation of guidelines for the Water Resources National Plan, as well as generate public debate about water policy and IWRM. It should be elected every two years, but, as of 2018, has not been formed yet.

The second participatory body acts at the local level, the Basin Councils. Their central attribution is to serve as direct representatives of the public in the formulation of the basin management plan. The law establishes the Councils as advisory bodies and has two levels, the Councils of the demarcations and the local Councils.

	GOVERNMENTAL	PARTICIPATORY
NATIONAL LEVEL	• Sole Water Authority • Ministries	• Intercultural and Plurinational Water Council
LOCAL LEVEL	• Decentralized Autonomous Governments	• Basin Councils

Figure 4 National Water Strategic System

Figure 4 shows how different management bodies are classified. The law created participatory bodies in both the local and national level.

The law establishes the basin as the planning unit for water resource management. Senagua divided the country into nine hydrologic demarcations, as shown in Figure 5. These demarcations correspond to the more prominent river basins in the country. They are further divided into smaller river basins.

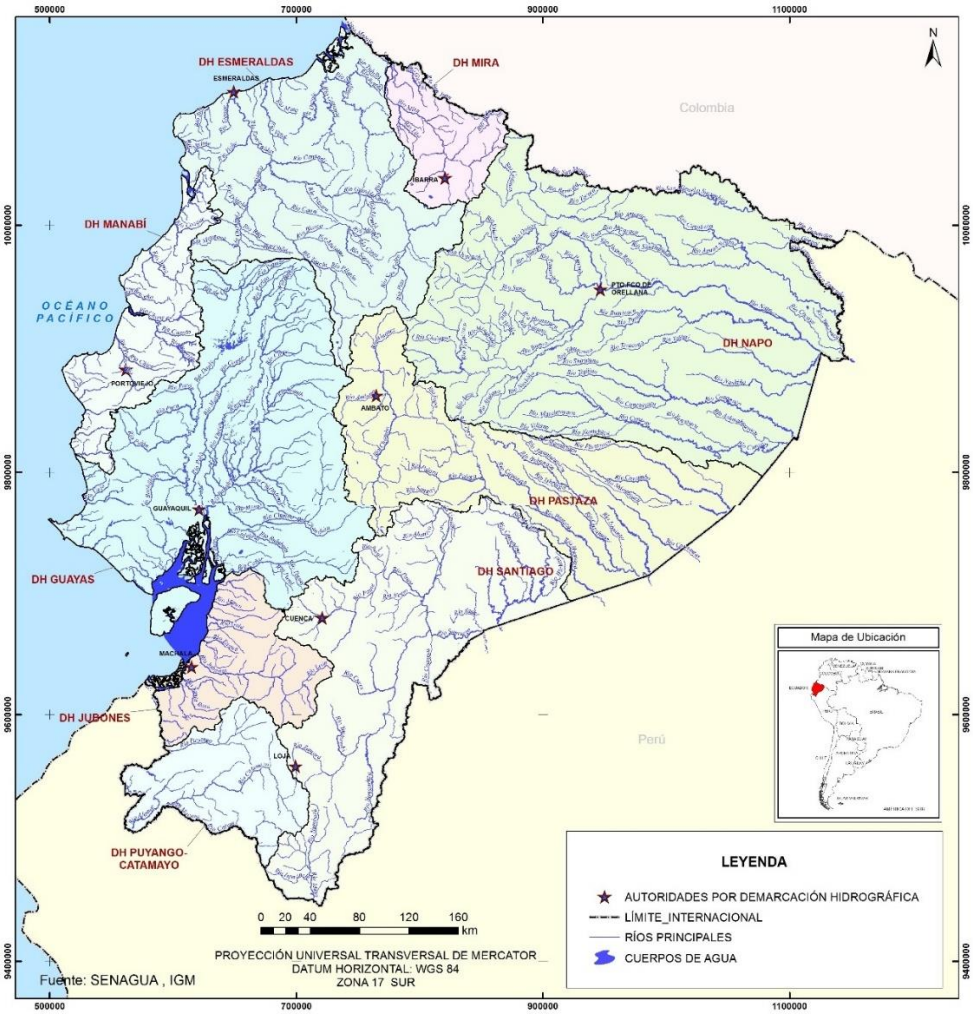


Figure 5 Hydrographic demarcations (obtained from CISPDR, 2015) *(original source: IGM)*

For the national hydric planning, Senagua has three national strategies: The National Strategy of Drinking Water and Sanitation, the National Strategy of Water Quality and the National Strategy of Irrigation and Drainage (Senagua, 2017). The latest one is still being made.

In Figure 6, the different management planning levels are shown. The Water Resources National Plan has been done by the Chinese Changjiang Institute of Survey Planning Design and Research (CISPDR). This institute was also responsible for the management plan of each demarcation. Currently, basin management plans are being created.

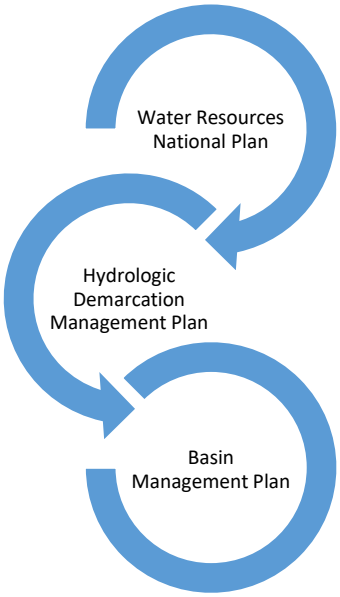


Figure 6 Management plans (made with data from Senagua, 2017)

The Basin Management Plans should be created in conjunction with the Basin Councils. However, the Basin Councils elected in 2014 have already finished their term, and in 2018 a new Council should be elected. The first councils did not have many responsibilities and did not accomplish much due to the lack of interest from the government and their consultative status. It is also worth mentioning that the Council does not receive funding from the government, which limits, even more, their influence.

Now, the process of electing a Basin Council is more complicated. The Basin Councils are elected among the water users' associations, mainly Drinking Water and Irrigation Community Companies. This election process requires resources and mobilization by the public if they do not see that they have an actual impact they might not think the hassle is worth it.

3.3.1 Water Users Associations

The figure of the commonly known Juntas de Agua (water users' associations) is the backbone of the Ecuadorian community water resource management. These model of water management can be traced back to pre-Columbian times. Currently, these water users' associations (WUAs) are nonprofit organizations, run and financed by water users. The WUAs can be formed anywhere in the national territory where a corresponding GAD does not provide water services. The boards are subjected to evaluation and control from both Senagua and ARCA. Thus they are required to keep a record of any information related to their activities, such as minutes of assemblies, economic reports, audit reports, etc.

There are two types of WUAs, the drinking water and sanitation WUAs and the irrigation and drainage WUAs. The primary role of the first is to provide drinking water to their communities; some boards also provide sanitation services. The irrigation and drainage boards are in charge of the structures required to transport the irrigation water to each user and to distribute the available water according to the necessities of each user; they are also responsible for coordinating the maintenance of these structures. Some of these boards also provide drainage solutions, but not most.

This form of aggrupation has had varying degrees of legality. In the current law, the boards have to be registered at Senagua and to do so, the members of the forming board have to elaborate a statute that contains the vision, mission, objective, directive, how the services will be financed, penalties among other requisites. The water boards are subject to evaluation by the Sole Water Authority of their operation and the quality of service. The boards define themselves the water tariffs, which often lead to conflict with the users.

A first-degree board can be formed anywhere the corresponding GAD does not provide drinking water services. In case two or more neighboring communities form a board, it is known as a regional board, these type of boards have yet to be created. A second-degree board is formed by five or more first-degree boards, and the third degree is formed by five or more second-degree boards. The irrigation boards can be formed by the owners of land placed in an irrigation system area.

Any conflict within the operational area should be resolved by the board and in case conflict rises between the board and the community, the Sole Water Authority emits a written resolution.

4THE GUAYLLABAMBA BASIN

In this chapter a brief overview of the particularities of the case study basin are given, as well as the thought process behind the selection of interviewees and stakeholders.

4.1 BACKGROUND INFORMATION

The Guayllabamba basin originates in the highlands central region. The rivers forming the basin are part of the Ecuadorian rivers that flow to the Pacific. The basin is part of the Esmeraldas' HD, further information on the Esmeraldas' HD can be found on annex (E) and a detailed map of the Guayllabamba basin can be found in annex (F).

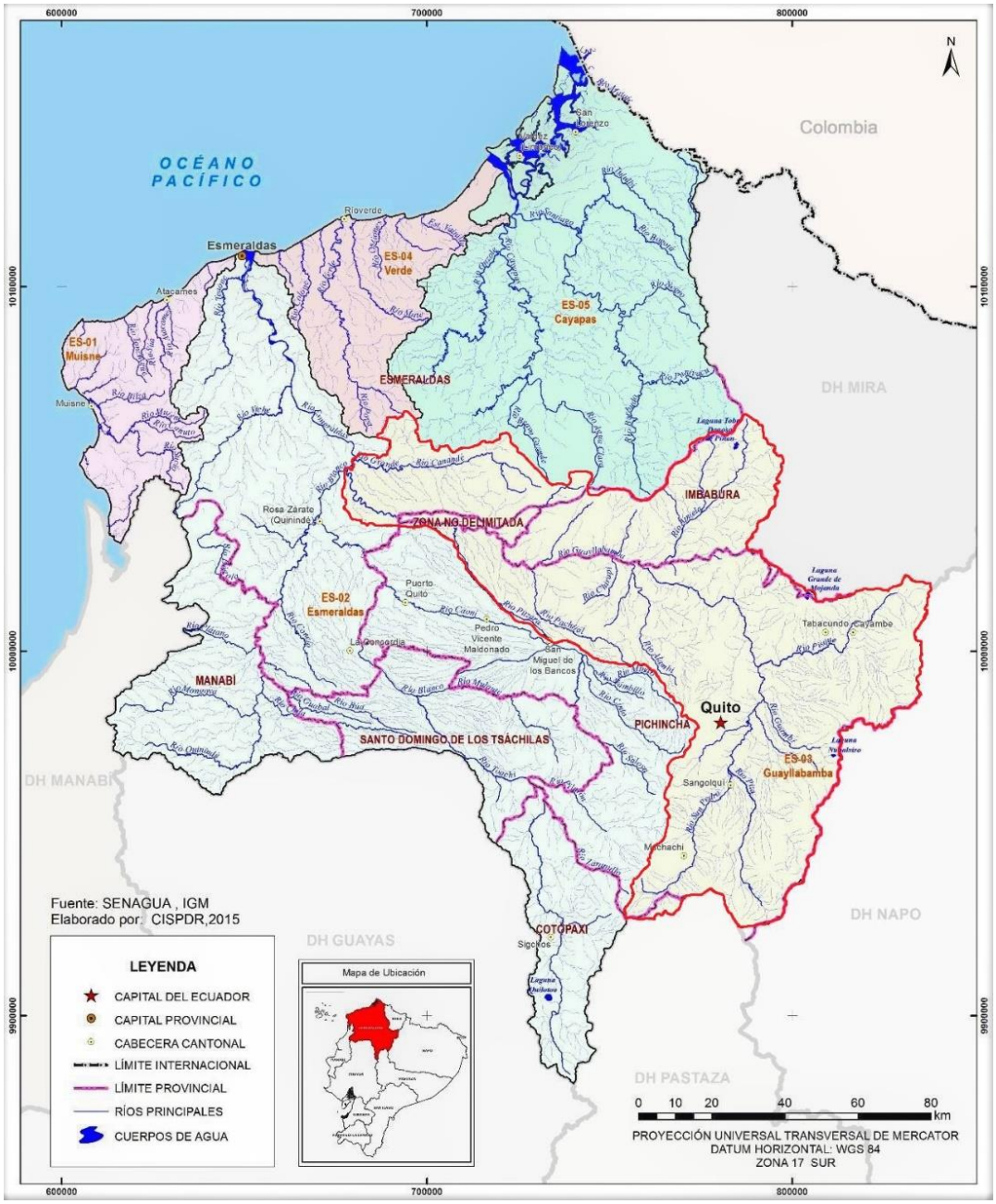


Figure 7 Location of the Guayllabamba basin within the Esmeraldas HD (source: CISPDR 2016)

Figure 7 shows the Esmeraldas' HD with the location of the Guayllabamba basin highlighted in red. The basin has around 9182 km^2 (CISPDR, 2016) and a population of 2,566,732 as of 2010 (INEC, 2010). It is mainly located in the Pichincha province but includes areas of the Cotopaxi, Esmeraldas and Imbabura provinces as well; Figure 8 shows how much each basin affects the overall area and population of the basin. The non-defined areas in Ecuador are the portions of land that different provinces are disputing; no official decision was reached as of 2010, the year of the last census.

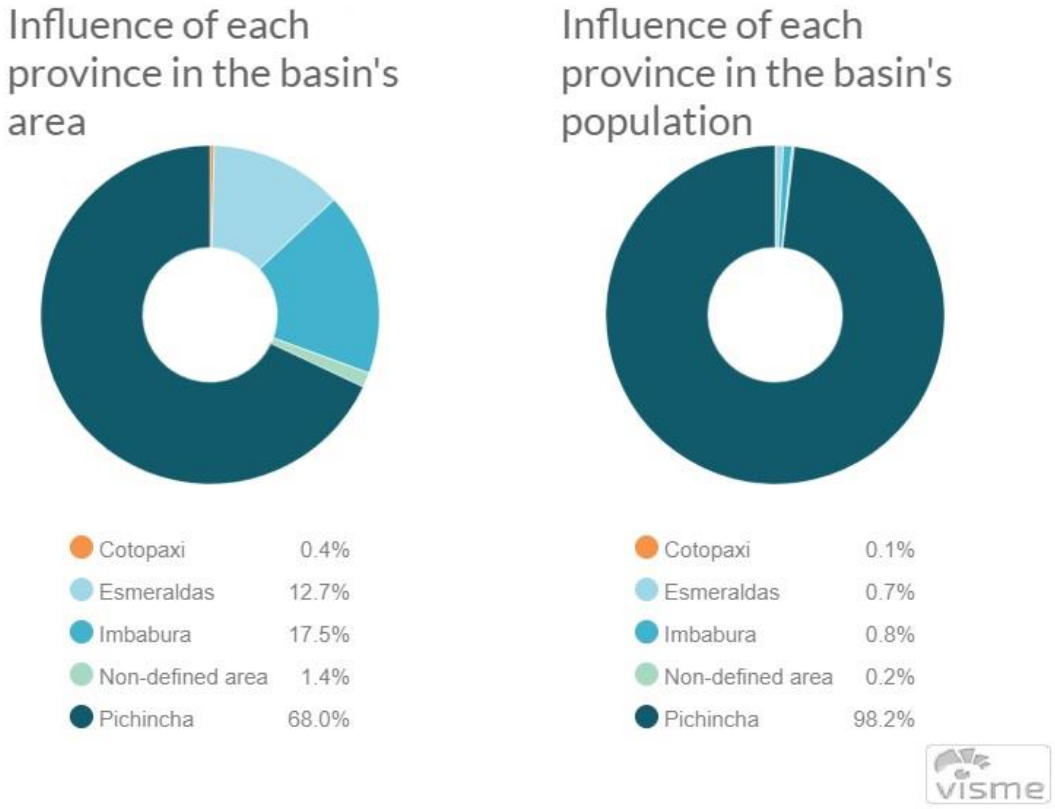


Figure 8 Influence of each province in the Guayllabamba basin (created with data from CISPDR 2016)

The basin has 2.3% of the total national water resources. The average amount of annual rainfall in the basin is 1610 mm. The area that receives the least amount of rain annually in the Esmeraldas HD is the sub-basin of the Pisque river in the Guayllabamba with 600 mm (CISPDR, 2016). Figure 9 shows the areas prone to drought in the Esmeraldas HD in light yellow; these droughts are mostly seasonal (June to September). The region, as well as the whole country, have a stable climate and temperature with a rainy and dry season. Although Quito is in the middle of the drought-prone area, it is very susceptible to flash floods in the rainy season.

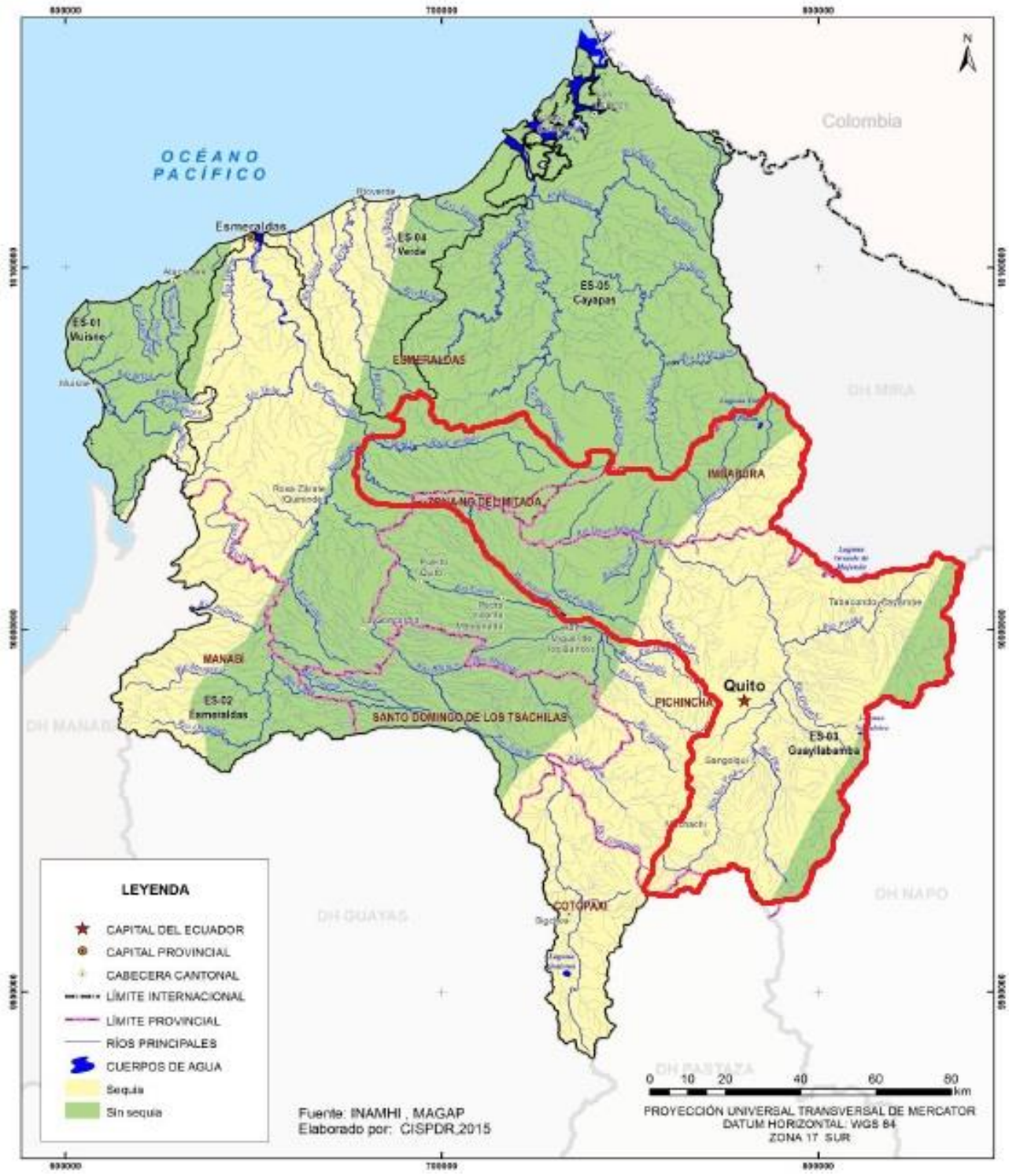


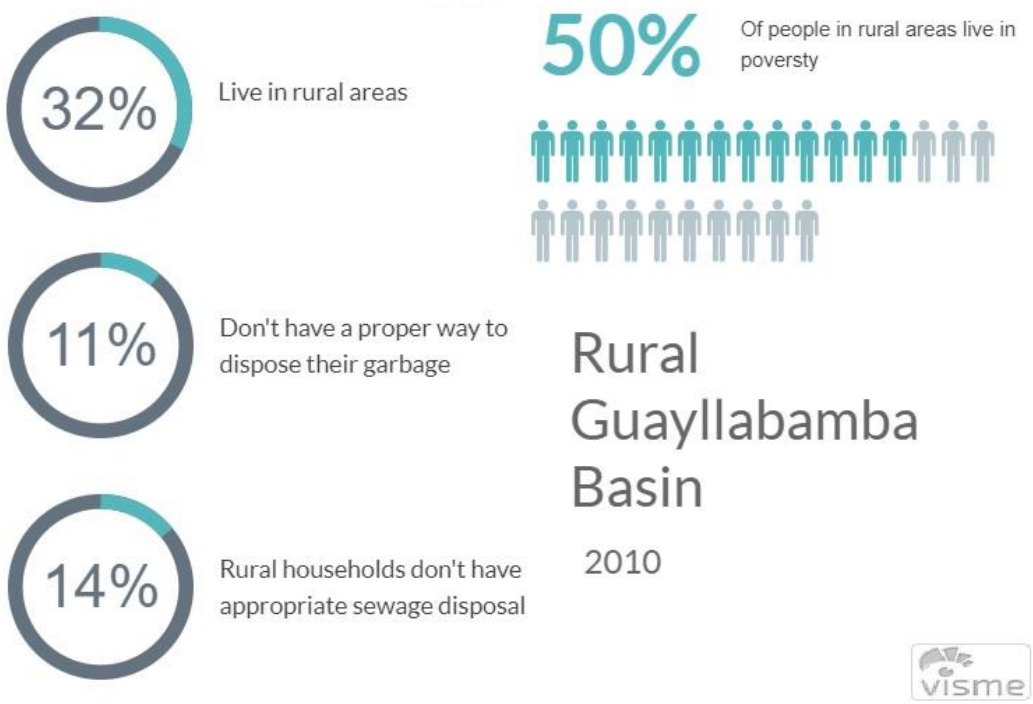
Figure 9 Drought prone areas (source: CISPDR 2016)

Population

The basin is home to the country's capital, Quito. The city corresponds to less than 4% of the area of the basin but more than 87% of its population, which significantly impacts the population density (280 people per km^2) of the basin and the urbanization rate (68%).

The INEC (National Institute of Statistics and Census) uses the Unsatisfied Basic Needs measurement to indicate poverty. Five dimensions are considered:

1) Economic means
2) Access to basic education
3) Access to decent housing
4) Access to basic services



5) Overcrowding

Figure 10 shows the percentage of rural distribution and the rate of poverty. The average rate of poverty in the basin is 33% (CISPDR, 2016). Although the urban population represents 68% of the people living in the basin, they account for 86% of the water demand for human consumption.

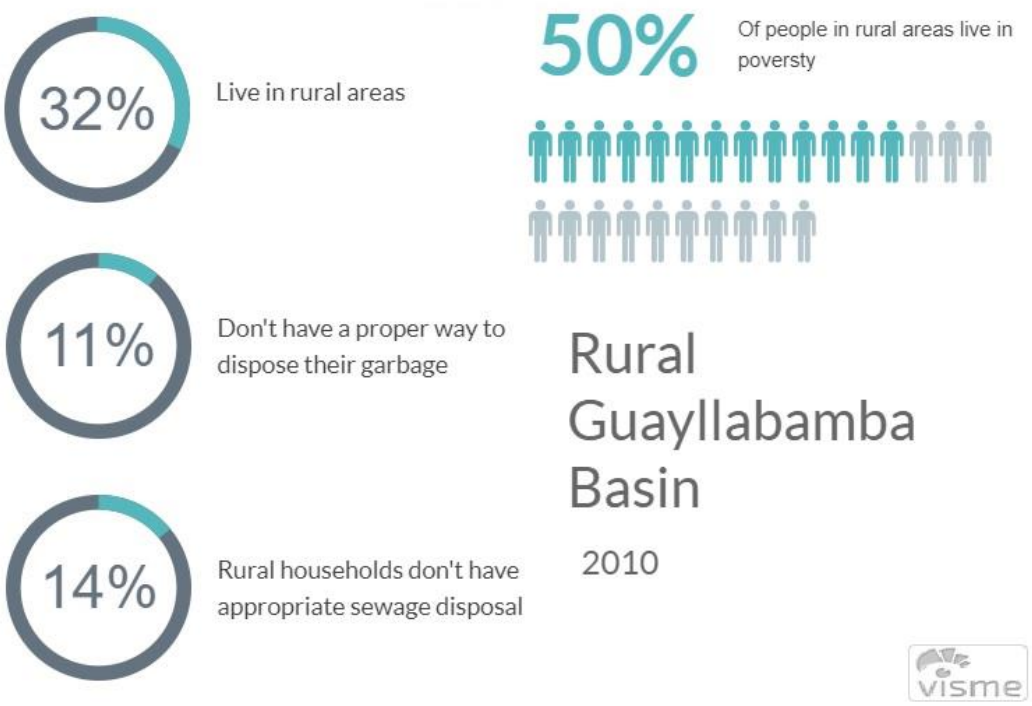


Figure 10 Rural Guayllabamba (created with data from CISPDR 2016)

It is worth mentioning that 11% of households that do not have proper disposal options are within the whole basin. If there were data of only the rural area, the percentage would undoubtedly be higher. This information is essential, as contamination of ditches and canals is a prevalent topic of conflict in the country.

There is no data on the ethnography of the basin. However, there is data on each province. Figure 11 shows the results of each relevant province. Considering that more than 98% of the total population in the basin corresponds to the Pichincha province, one could use that data as representative of the basin. All the other provinces only have rural settlements in the basin, and when talking about the urban population, we refer solely to the Pichincha province. Also, when referring to indigenous people there are numerous different groups and the indigenous people from Imbabura, Cotopaxi and Pichincha have very different cultures.

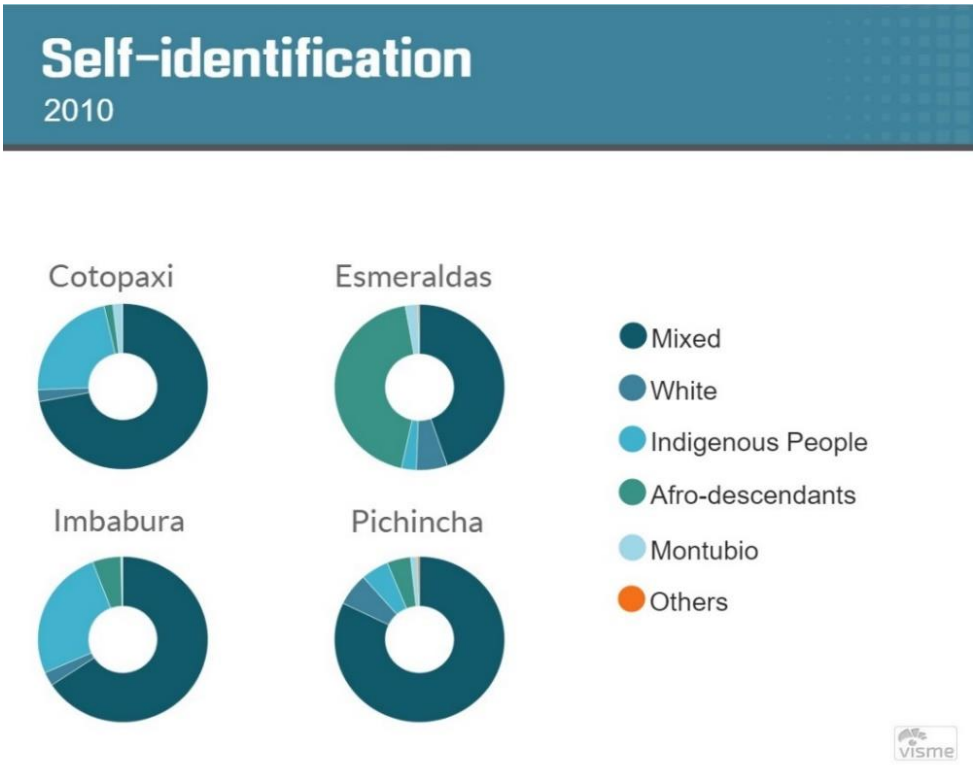


Figure 11 Ethnography by province (source: INEC 2010)

Economy

Due to the presence of Quito, the basin has a representative industrial and services sector. Figure 12 shows the water demands of the different sectors and its influence in the basin's GDP. The industry sector consists mainly of manufacture and construction in the basin, while the service sector includes commerce and other sources (real estate activities, entertainment, recreation, etc.).

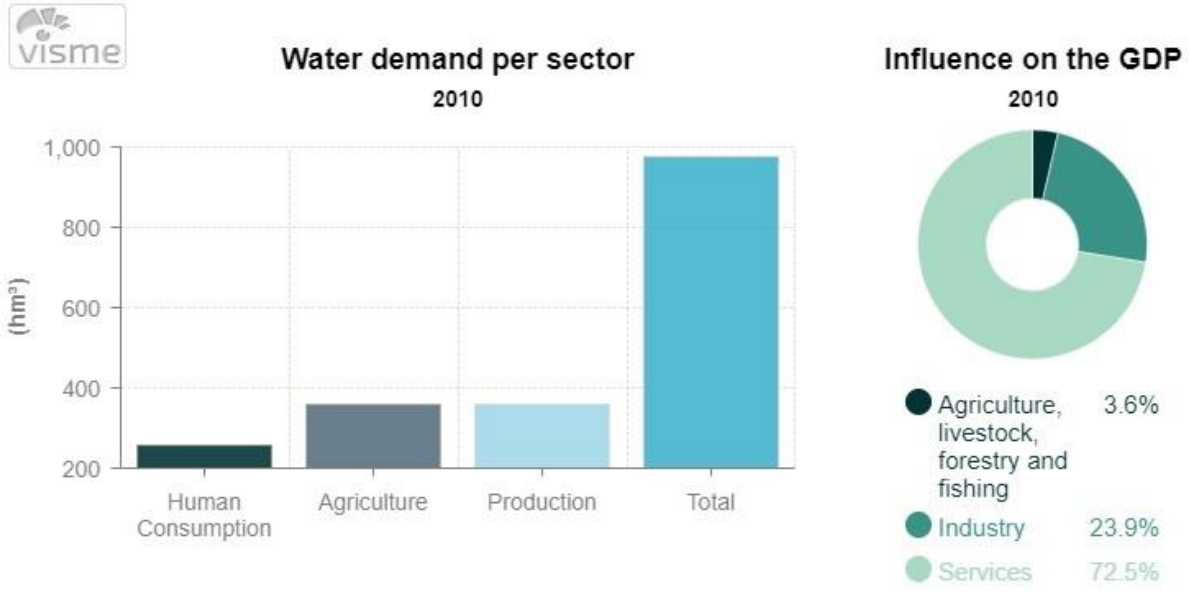


Figure 12 Water demand and influence on the GDP per sector (created with data from CISPDR 2016)

While agriculture is vital in rural areas, the agricultural export sector is a significant source of income for the whole basin. From all the water demand for the agriculture sector, almost 83% is destined to export crops, leaving 17% for crops destined for food sovereignty (national consumption). The crops vary widely (flowers, corn, wheat, legumes, potatoes, avocados, etc.), with 54% of the agricultural land of the basin being temporary crops and 46% permanent. Livestock is included in the agriculture sector, roughly 18% of the total basin area is dedicated to grasslands for livestock (CISPDR, 2016). It is interesting to note that most of the exported crops in Ecuador are water intensive, which means water is being "exported" as well.

4.2 IDENTIFYING STAKEHOLDERS FOR THIS RESEARCH

The main focus of this research is understanding the relations between 3 groups of stakeholders in the basin. However, in practice, it is impossible to hear and make all stakeholders forming the 3 groups participants of the research. Therefore, representatives of each group were chosen based on maximum variation and availability; news reports were used to obtain a better understanding of the position of the different institutions.

This dilemma when choosing representatives for the stakeholder's groups is fairly common in water management since the few delegates that represent a group represent their own interested and have their own set of experiences (Borowski, Bourhis and Pahl-wostl, 2008). This is a challenge not only for this research but for the representation of stakeholders in basin councils and water user associations as well. In total 15 interviews were conducted, were 6 pertained to the NGO group, 4 to government and 5 to WUAs and users.

Although the academic sector was not directly considered in this research, 3 interviews were conducted with academics that work in the social programs (aid to rural communities) departments of their universities. To analyze the data, they were included in the NGO category given the aid offered to different communities. The unique perspective of these stakeholders that work with users and WUAs in projects that are financed by GADs was deemed important for the research.

The NGOs representatives were part of the following institutions: Fonag, Consorcio Camaren and the Fundacion Futuro Latinoamericano (FFLA). In the next few paragraphs, a brief overview of the main objectives of the NGOs is shown and justification as to why they were chosen for this research.

The Fund for the Water Protection (FONAG) is one of the several water funds present in South America. These funds work as trust funds, with long-term prospect and autonomy (Goldman-Benner *et al.*, 2012). Fonag originated from the need to protect and preserve the watersheds surrounding the city of Quito, and it was established in 2000 with seed funds from The Nature Conservancy (NGO) and the EPMAPS (Metropolitan Water and Sewerage Company of Quito). Later, the EEQ (Electric Power Company of Quito), Cervercería Nacional S.A. (private brewery company) and Tesalia Springs Co (private beverage company) joined the fund and pledged to donate varying amounts yearly. Fonag was created with the intention of lasting 80 years (Echavarria and Arroyo, 2002)(Chiramba *et al.*, 2011). These companies that contribute financially to Fonag form the board of directives. Fonag's technical secretariat acts as a monitoring organism. The fund works with five programs: communication area, water management, recovery of vegetal coverage, sustainable water conservation areas and environmental education.

The FFLA is a nonprofit concerned with promoting a culture of collaborative dialogue among multiple actors and sectors so that they can find alternative solutions to their needs with the community. Fonag and the FFLA worked together in the high Guayllabamba basin on various topics, mainly governance and IWRM. The initiative started in 2007 with a stakeholder analysis and progressed into an IWRM plan in 2011, the forming of a basin council was also suggested. This council would have authority within the basin and decision-making ability; it would be formed by the main stakeholders identified in the four years the project lasted. Moreover, the project consisted of various meetings and aimed to create a sustainable decision-making process with an open and collaborative environment between stakeholders (FFLA, 2007)(FFLA, 2011). Unfortunately, due to the high staff turnover of the institutions involved and the new configuration of the sector with the

new water law, this initiative was prematurely ended and could not entirely reach its objectives. One of the interviewees was part of this process.

Lastly, a representative of the NGO Consorcio Camaren was also interviewed. This NGO self-identifies as a training consortium for the management of renewable natural resources and was created in 1994. It is constituted by ten members between public organisms, universities, international organizations, and national NGOs. Their guiding principles are:

- Sustainable management of natural resources
- Integration between the social, the technical and the political
- Equity
- Collective construction (multiple institutions and organizations participating and collaborating)
- Support for the construction of a democratic society
- The dialogue of knowledge (integration of ancestral knowledge with the experience accumulated by institutions and their technicians)

The main activity of Camaren is the training events for communities, users, managers, local government officials, etc. They focus on the day to day activities and have various manuals with procedures ranging from drinking water treatment to establishing a community management system. Besides their training activities, Camaren is also the organizer of the Water Resources Forum that is a national encounter of various stakeholders in which discussion of ideas is fostered and proposals drafted (further explained in 0).

5 PERCEPTIONS AND RELATIONS AMONG STAKEHOLDERS

In this chapter, the themes presented in the methodology section are discussed, and the findings of the interviews, document analysis, surveys and events attended are presented. First, an overview of the results obtained from the interviews is presented, then the survey's results. Lastly, a brief explanation of the results obtained from the other research methods is given.

5.1 INTERVIEWS

The interviews conducted were semi-structured as explained in the methodology section. The following sections show the main points raised by each stakeholder group, the common concerns, and views. Table 1 shows the interviews conducted and their ID.

Table 1 Interviewees and corresponding stakeholder group

Stakeholder Status	Interviewee ID
NGO	I-1
National Government	I-2
NGO	I-3
WUA (board)	I-4
Local Government	I-5
NGO	I-6
Academic-NGO	I-7
National Government	I-8
WUA (user)	I-9
WUA (board)	I-10
Academic-NGO	I-11
WUA (board)	I-12
National Government	I-13
WUA (board)	I-14
Academic-NGO	I-15

The interviews took place in various locations; the average interview lasted over an hour. Due to privacy reasons, no transcript is provided, however, supporting evidence can be provided upon request.

5.1.1 Governmental stakeholders

The interviewees from the government consisted of both national and local (municipal) level authorities. Interviewees from Senagua were both from the field and the planning units in charge of Esmeralda's hydrographic demarcation and were actively working on the Guayllabamba basin. The overall impression when speaking to the authorities was of openness to suggestions. However, it seemed that they were not aware of the previous work done in the basin, especially regarding the work of NGOs. The interviewee in charge of planning stated that they are trying to cooperate more with Fonag, but they do not cooperate with any other NGO directly. Still in the topic of cooperation, when asked about the easiness to cooperate with other governmental institutions they responded that it varies case by case. For instance, Senagua has been working with drinking water WUAs for some time; they know how to support and train the boards. However, irrigation was the competence of the Agriculture Ministry, and they are still learning how to help irrigation

WUAs. In this topic the lack of coordination of government institutions was clear, the interviewees stated that, even though the water law stipulates that the relevant ministry should assist Senagua, they have not received much support in this aspect. Instead of using the years of experience from the Agriculture Ministry they have to figure everything out for themselves, and they lack the technical expertise to regulate and grant water authorizations for irrigation.

Besides, there is a lack of knowledge of how the other government institutions work. There is not an overall format for policymaking between, for example, the Environment Ministry and Senagua. Even though water and environment are closely related, there is not much cooperation between institutions. Although there is some communication (people assist each other events), there is not much true cooperation.

The lack of continuity within institutions was often brought up. The municipal water company is often considered an example among public institutions; when asked about the secrets for their continuity and long-term planning the interviewee stated: "The main issue is the dependency we have on political stakeholders that are constantly changing. This makes long-term planning almost impossible. Institutions, and water management in general, should not be so tied down to the government/political party in power". She argued that processes should be strengthened instead of individuals within organizations. If somebody leaves or there is a change in personnel, there should still be clear processes in place that allow for a smooth transition, and lessens the dependency most public institutions have on certain individuals. Although culture and idiosyncrasies should be considered, planning needs to be done long-term, independent of who is in power at the time.

On the other hand, the interviewees that had more contact with fieldwork thought that an approximation of the government institutions and the field reality is essential and more important than cooperation within governmental institutions: "You cannot make public policy without knowing what the public is concerned about. […] It is important not only to generate debates and organize events, but each stakeholder should also know what their functions and role are within water management. This means them [water users and WUAs], but us [policymakers] as well as them". WUAs and other community managers should have appropriate training, not only on the technical aspects but also on how to properly manage water.

The topic of Basin Councils was also mentioned time and time again. Although Senagua argues that the previous Basin Council was elected, they admit it was a mere formality. Moreover, there was some criticism of the water law within Senagua itself. Mainly the lack of regulations regarding irrigation water, meaningful participation and conflict resolutions among communities. One of the interviewees suggested that if the law is not changed, then Basin Councils should assume different attributions since the law gave them very limited influence and even more limited resources. He stated: "basin councils could have an important political influence. When considering the sheer number of participants in WUAs, they could make or break a local (or even regional) candidate election. They should use this influence to make themselves noted and become more than only an advisory body". Even though they recognized the water law has many flaws, they argued that: "we should just learn to work with it. When the government changes, maybe we can alter the parts of the law that do not make sense in practice".

The interviewees felt Senagua lacks the tools necessary to make the management plans, law and overall policies more practical. They felt the current management plans where overly technical and abstract at the same time, especially the people working on the field.

5.1.2 NGOs

The NGOs interviewed were selected due to their active participation both I the approval of the constitution and the day to day work with WUAs. There were 3 academic professors interviewed as well in this category since they are responsible for the social work within their institutions. These universities work directly with communities, providing technical support. The financing is normally done by either local or provincial GADs and the WUAs themselves.

One of the soar points with NGOs was how the water law was approved. The constitution was actually an advance in the interviewee's point of view, a lot of the suggestions were taken into account (basin as the planning unit, participatory management, water as a right, etc.). The water law, however, was approved suddenly and without input. Most of the NGO interviewees recount that the first drafts of said law were indeed discussed and various groups contributed with ideas and suggestions. However, there was a point in the drafting process of the law were they stopped being consulted. Most of the interviewees claimed that the final law approved was not the same they participated and contributed to. Thus feeling their contributions were merely a requirement that did not matter to lawmakers and the government in general, affecting the trust among stakeholders.

Sharing of information between NGOs and government institutions was a highly discussed topic. Interviewees felt that even though they had signed partnerships with policymakers and had more time working at the basin than the newly organized government institutions, the information they provided was not being used. The information, data and previous studies got lost in the bureaucracy and lack of institutional memory. An interviewee shared that often NGOs, with the help of international cooperation programs, perform studies that they later share with policymakers. Only to find out later that the exact same study they already concluded was being commissioned again. Perhaps the best example is the basin management plan formulated by the FFLA and Fonag, the study took years and involved hundreds of people, the main objective was to teach local WUAs how to manage water and empower them. And now, even when they have repeatedly offered their findings, the basin management plan feels like its starting from zero again. As one interviewee put it: "Centralized information is necessary. Not only raw data but also studies and experiences so we can build on from previous knowledge instead of having to start all over again every time there are changes. […] Policies should be done with all the previous knowledge acquired in mind."

Likewise, the people associated with university complained about the lack of general information for their projects, mainly in remote locations, and added that sometimes information does exist, but it is not easily accessible, and it can take a long time to locate whom you should speak to in order to have the data needed. Moreover, there is no inventory of the current structures used and managed by the WUAs. The academic interviewees also felt there is a lack of cooperation with the technical faculties of the universities. Usually, the discussion and participation of universities are limited to non-technical faculties; thus some of the proposals are not feasible.

Another important point mentioned by NGOs was the training of local leaders, most interviewees agreed that participation only for the sake of participation is pointless, sharing knowledge and providing training to communities is fundamental for meaningful participation. Lack of meaningful participation is not only mentioned in the law-making process but in the policy and decision-making process as well. An interviewee from this group also pointed out: "We have to strengthen the community leaders not only on technical subjects but on conflict resolution and different realities as well."

Another interviewee stated that participation has often been merely a requirement that has to be fulfilled, saying: "[the previous government] considered participation to be a field full of people. It didn't matter if the people that were there were actually representing who they should be representing. It didn't matter if everyone present was from the same community and did not represent the whole region. It didn't matter territorial representation or sectorial representation. What did matter was having a paper full of signatures. Participation was rigged, the supposed collective support created an idea of legitimacy, so the government could do what they pleased."

The scaling issue is also very important for this group of stakeholders. One of the interviewees thinks that the current law allocated responsibilities that are not fitting to the scale, he considers the national level to be too broad to advise a management plan, "actions and actions' plans should be conceived and executed at the local/community level, management strategies should be created at the basin level and policies and management plans should be done at the demarcation level. It is simply not possible to create a general management plan for a country with such different regions. […] In the previous study of the Guayllabamba basin management plan, the scale was an important part and was extensively studied, but the conclusions reached have been ignored in the current policies. In fact, Senagua realized the water law messed up the scales and called for help, but, as always, the things we taught them got lost when the people

we trained moved on to other government positions." Other interviewees also agreed that most of the time the scale in which decisions and planning are made are not ideal and some even pointed out that planning units do not match between institutions

All interviewees agreed that, even though there is still inequality, especially in remote locations where communities have to compete against agro-businesses, CBWM is a valid management model for the basin and should be empowered and encouraged.

5.1.3 Users and water users' associations

The differences in the size of the WUA seems to impact the views of the interviewees and their main concerns. For one of the smaller WUAs interviewed the participation and engagement of its members was a huge point of concern. It should be noted that participation does not only refer to the relation between the WUAs boards and the government. Participation is important between WUAs boards and members, CBWM only works with the full support of the community. However, as long as people are receiving their water and tariffs are not increased, meetings are often empty, and no one really cares about the decisions being made until they are affected. One of the interviewees stated: "I've been board president (of the WUA board) for over 20 years. I want to retire, but no one wants to take my place, so I just keep going. I feel we need young people to take care of the irrigation canal, but there is no interest. I believe that when I retire, we will simply be dissolved and the GAD will have to take care of the water." The lack of interest from users is apparent on the debts they accumulate with the WUA. There are members of this particular WUA that have not paid their tariffs and fines in over 10 years, but due to the debilitated state of the WUA, they simply keep getting their irrigation water. According to the interviewee, people with larger estates and more economic power are more likely to miss payments. It is worth mentioning that this WUA is located in a heterogeneous rural area. There are properties that do not depend on irrigation and agriculture for a living, being more vacation homes to their proprietors, there are also large farms and small farms that depend on agriculture for their livelihood.

Another interviewee, who is part of one of the larges WUAs in the basin, pointed out that the back and forth between a community management model, and state-centric management approach has been going on for years; he stated: "We simply do not learn from history, especially in water-related topics, we do not look back to see what happened before". He recalled that when the WUA was first formed, there were almost no resources. The small-scale farmers were in charge of the management but had no resources. Nowadays, due to the growth of the WUA, there is enough money for management and even investment, there is no need for government financial support. The government should listen to the years of experience of this WUA, instead of dismissing it and trying to rediscover what has already been tested here. One of the biggest problems of the new legislation is the fact that the law sees the whole country as a small community. It does not take into account the differences between WUAs. For instance, this WUA has enough money to stand on its own; however, there are smaller WUAs that desperately need financial help to get started. But, according to the law and the regulation, they receive the same proportional help from the government. Besides, some WUAs do not need the extreme control that other, newer ones, need, "it seems that nowadays we need to ask permission to the water secretary to drink a glass of water."

Interviewees seem to think that although the law seems fair; it has had little effect on their daily lives. "The law is nice in theory, but it is very far from the reality we live day-to-day. […] If there's no water, it does not matter the status of water as a right, nature does not care what the constitution says. To have real change, Senagua needs to get to know the field and work with us on the issues we present, instead of resolving issues that are not that serious for us". Moreover, the interviewees from this group agree with the interviewees from the NGO group that the approval of the law did not include their observations, one of the interviewees detailed: "All that [the WUA] contributed to the law was thrown in the trash. They approved a law that none of us ever saw before the approval, even when the debates were going on we did not saw the final draft. In fact, they invited us to a debate about the law, but how can you actively participate and say anything valuable if you did not have the opportunity to read the law you were discussing first?".

Nowadays, participation still evokes some distrust due to the apparent lack of interest when approving the law. Although Senagua and the parish GAD have organized some events and now seem interested in talking to the communities, they do not consider the local idiosyncrasies. An interesting example is how it is usually advised not to use drinking water to provide water to farm animals, due to the cost of treatment. The interviewee commented that the farm animals (especially cows) are almost part of the family on that community, they provide milk and income. When cows drink the treated water, they get sick less often, and people would rather drink less themselves than to stop giving the water to their cattle. This disconnection from the local reality and the government authorities has been cited by all of the interviewees who are a part of a WUA.

One of the most cited issue within the WUA interviewees was the users' lack of accountability, and most agreed that a solution to this would be a stringer WUA, with more authority. Some interviewees believe WUAs lack authority to regulate, especially industries, in practice. Although they try to discuss their effluents disposal, they lack the proper resources to be able to regulate the industries' effluents. They mostly feel overpowered by them. One user commented: "Fines should be strict and WUAs should either gain more authority among their users or be backed by the government authorities. The new law and the excess of centralization ended up debilitating the authority of the WUAs in the eyes of users.". The user also complained that the events and meetings held by his WUA, usually end up as a social event. "There is not much training or knowledge transfer to users. There is an overall lack of awareness of how their actions impact nature, others and themselves. People go as far as dumping burned oil in the ditches." When referring to pollution and environment concerns, other interviewee shared: "Garbage is a huge problem, and the issue is not only a lack of awareness from the people. There are some places where the municipality does not recollect garbage. Also, how can we demand consciousness from the people and condemned the garbage disposal in the ditches if the municipality does not treat the cities' water before discharging on the rivers?"

One of the unanimous topics discussed by the WUAs interviewees, and possibly related to the lack of accountability, was the importance of the *mingas* and the sense of community they entail. *Minga* has been a common figure in Ecuadorian community-based management for centuries; they consist of events where every household volunteers workers to complete a certain task (usually maintenance or construction of infrastructure) that serves the whole community. Lately, people are opting to pay workers to put in the work instead of going themselves, and this disconnects them from the WUA and the water sources. "The sense of community is being lost, but we have not reached another management model yet. So we end up with a crumbling management model. I believe that if you teach people, they understand, especially if you accompany the training with supervision and fines." Another interviewee recalled that when the WUA was starting out, they would often call for *mingas* because they did not have enough money to hire outsiders to do the work. Now, *mingas* are less frequent, and this translates into less engagement from the community, he added: "if [people] do not know where their water comes from and are not the ones digging the garbage out of the canals, they are less likely to care about the water system and more likely to throw garbage into the canals and ditches." This loss of the sense of community also translates into a lack of solidarity, according to some interviewees, people clean their own part but do not care about what happens downstream.

Another point that seems to worry the interviewees was the renovation of the WUAs boards and interest of the younger generation. "We, the older people, we built the canals and ditches. We walked along the canal and inside the tunnels. The new generation and the government do not know the structures like we do, and are not interested in knowing. As soon as we are gone, all the fight and the history of this canal is lost".

5.2 THEMES IDENTIFIED

As explained in the data analysis section, coding is often used to analyze quantitative data. For this research, 29 codes were identified and grouped into 4 themes. The codes were selected based on the repeated mention, importance for the stakeholders, and relevance to the topic of the research. Some stakeholders gave more emphasis on certain topics than others. Thus an importance scale was developed where 0 means not mentioned at all, 1 signifies mentioned once or briefly

mentioned, 2 means the code is mentioned more than once throughout the interview and 3 means the code was given great importance by the interviewee. This scale was developed to try to give more significance to the codes, to differentiate the most important topics to the briefly mentioned ones. Table 2 shows the coding for each individual interview.

Table 2 Coding and importance for each interview

		I-1	I-2	I-3	I-4	I-5	I-6	I-7	I-8	I-9	I-10	I-11	I-12	I-13	I-14	I-15
Cooperation and coordination	Sharing of information	3	3	3	1	3	3	3	3	1	0	3	1	1	0	3
	Understanding different perspectives	1	2	1	2	3	2	1	1	3	1	2	2	1	3	2
	Events	3	2	2	3	2	2	1	0	3	1	1	0	2	0	1
	Training	3	3	2	2	1	2	3	0	3	2	2	2	3	0	2
	Interinstitutional coordination	2	3	3	0	3	3	3	3	1	2	1	1	3	1	3
	Mingas	1	1	0	3	0	2	1	1	3	3	0	3	3	0	1
	Trust	1	2	3	2	3	3	0	2	2	1	2	2	2	1	3
Conflicts	Environment	2	1	2	2	2	1	1	3	3	2	1	3	0	3	2
	Garbage disposal	1	2	1	3	1	0	2	1	3	3	2	1	2	1	1
	Pollution of water bodies	2	2	2	3	3	1	2	2	3	3	2	3	2	3	2
	Monopolization of water authorizations	3	3	0	2	1	1	3	0	2	2	0	3	3	0	3
	Inequality	2	2	2	3	2	2	3	2	1	2	1	2	2	0	2
	Tariffs	0	1	0	2	0	1	2	0	2	1	2	2	3	0	1
	Fines	0	1	0	2	0	1	2	0	3	1	1	2	3	0	0
Management	Lack of interest from users	1	1	1	3	1	2	2	2	3	3	2	3	2	1	3
	Lack of control/supervision	1	2	2	3	2	1	3	3	3	3	2	3	1	2	3
	Long-term planning	3	3	3	1	3	3	3	3	1	3	3	1	0	0	3
	Planning scale	2	3	2	0	3	3	3	3	2	2	1	1	0	0	2
	Collective memory	2	1	1	3	0	2	1	1	3	2	2	3	2	1	2
	Institutional memory	3	3	3	0	2	3	3	3	0	3	3	2	3	0	3
	Community	3	2	2	3	1	3	3	1	3	3	1	3	2	3	2
Institutions and politics	Legislation	3	3	2	0	1	3	0	2	1	2	2	1	1	0	2
	Financial resources	2	2	2	3	2	2	3	1	2	3	2	2	3	2	1
	Centralization of water management	2	3	3	0	3	2	1	3	2	3	3	2	0	0	2
	Representativeness	3	3	1	2	2	3	1	2	1	2	1	2	1	0	1
	Participation	3	3	2	3	3	3	2	1	3	2	2	3	3	0	2
	Continuity	2	3	2	1	3	3	3	3	1	3	3	2	2	0	3
	Public policy and the reality on the field	2	3	2	2	3	2	3	3	3	3	3	3	2	3	1
	Influence of politics	3	1	3	3	1	3	2	3	3	3	3	3	3	1	3

An average of the codes' weights is presented by stakeholders' groups in Table 3, and the average for the themes is shown in

Table 4. It is important to notice that the stakeholder groups are heterogeneous and often the averages are not representative of the whole group and are shown only to identified the most mentioned and least mentioned codes, to have a more accurate idea of each interviewee response it is important to analyze the individual scores shown in Table 2. The averages are a simple form to aggregate the data, in order to draw conclusions on the most mentioned topics and issues. The interpretations of the results assumed by the author are:

- 0 – 1.5: importance was either high for one interviewee and not important/not mentioned by the rest of interviewees on the group or the average importance was relatively low for all the interviewees in the group.

- 1.6 – 2.0: This range is the most important to interpret along with the individual data since this averages can either represent very polarized results (some interviewees thought the topic was very important and others did not even mention it) or all the interviewees found the topic of medium importance.
- 2.1 - 2.5: The interviewees on average found the topic important.
- 2.6 - 3.0: The codes with these averages were the most mentioned/most important for interviewees.

As already mentioned, these interpretations are merely an aggregation method and should be interpreted along with the individual results.

Table 3 Code's weight averages by stakeholder group

		NGO	GOV	WUA	Average
Cooperation and coordination	Sharing of information	**3.0**	2.5	0.6	2.0
	Understanding different perspectives	1.5	1.8	2.2	1.8
	Events	1.7	1.5	1.4	1.5
	Training	2.3	1.8	1.8	2.0
	Interinstitutional coordination	2.5	**3.0**	1.0	2.2
	Mingas	0.8	1.3	2.4	1.5
	Trust	2.0	2.3	1.6	2.0
Conflicts	Environment	1.5	1.5	2.6	1.9
	Garbage disposal	1.2	1.5	2.2	1.6
	Pollution of water bodies	1.8	2.3	**3.0**	2.4
	Monopolization of water authorizations	1.7	1.8	1.8	1.7
	Inequality	2.0	2.0	1.6	1.9
	Tariffs	1.0	1.0	1.4	1.1
	Fines	0.7	1.0	1.6	1.1
Management	Lack of interest from users	1.8	1.5	2.6	2.0
	Lack of control/supervision	2.0	2.0	**2.8**	2.3
	Long-term planning	**3.0**	2.3	1.2	2.2
	Planning scale	2.2	2.3	1.0	1.8
	Collective memory	1.7	1.0	2.4	1.7
	Institutional memory	**3.0**	2.8	1.0	2.3
	Community	2.3	1.5	**3.0**	2.3
Institutions and politics	Legislation	2.0	1.8	0.8	1.5
	Financial resources	2.0	2.0	2.4	2.1
	Centralization of water management	2.2	2.3	1.4	1.9
	Representativeness	1.7	2.0	1.4	1.7
	Participation	2.3	2.5	2.2	2.3
	Continuity	2.7	2.8	1.4	2.3
	Public policy and the reality on the field	2.2	2.8	2.8	**2.6**
	Influence of politics	2.8	2.0	2.6	**2.5**

Table 4 Weight average of themes by stakeholder group

	Average	NGO	GOV	WUA
Cooperation and coordination	**1.85**	1.98	2.00	1.57
Conflicts	**1.67**	1.40	1.57	2.03
Management	**2.06**	2.29	1.89	2.00
Institutions and politics	**2.12**	2.23	2.25	1.88

In the following sections, each theme is explained and analyzed, and the overall results from the previous tables are mentioned.

5.2.1 Cooperation and coordination

This theme was most important for government stakeholders (2.00 weight average from a possible 0 to 3 scale, where 3 is most important) and least important to the WUAs (1.57 weight average).

Sharing information

One of the most cited points regarding cooperation and coordination was the sharing of information, especially within the NGOs interviewees, where they all gave it a top priority. Moreover, plenty of interviewees suggest a unified database regarding water and an inventory of projects and studies done previously on the basin would be extremely useful.

There is enough openness to share experiences between stakeholders. However, often this does not translate into action. A concrete plan to learn from others experiences is necessary. The WUA representatives did not mention the sharing of information often in their interviews.

Understanding different perspectives

Understanding different perspectives were mentioned by all interviewees at least once and deemed more important for the WUAs interviewees than other groups. Generally, interviewees from the WUAs group felt that the government is increasingly interested in making policies and improve water management in the country. However, they mostly felt that their perspective on water management issues was not understood by other stakeholders. As one interviewee from this group put it: “[The experts] think they know what we need, [they] get caught up teaching us and sharing their knowledge and forget to listen to us.”

Events and training

Both codes were mentioned slightly more by NGOs interviewees. For this research, events were considered participatory meetings, assemblies, and general gatherings while training was considered events with the purpose of teaching a technical skill, usually to WUAs, although twice training was mentioned in respect to government institutions.

The current number of events, and especially training were considered insufficient by most interviewees, not only technical trainings but also management and other issues. One interviewee suggested: “Population keeps increasing, but the community management mechanisms stay the same, there should be more training on how to scale management.”

Another important issue is the quality and clarity of the events organized, one of the user interviewees complained that the event organized by the WUA were mostly social and no real conversation or learning was encouraged. Another interviewee admitted that he was invited for the election of the basin council. However, he did not attend because it was not clear to him what the event objective was.

Interinstitutional coordination

This code was given top priority by all government interviewees, meaning that not only all of them mentioned it, but they all considered this a very important topic within water management. On average WUAs mentioned this topic briefly.

All the government interviewees admitted that coordination among government institutions could be improved. However, mostly they felt powerless and considered this to be a systemic problem in Ecuadorian government and did not felt hopeful this would change soon. Most gave a variation of one of the Senagua interviewees statement: “[...] we would like to collaborate with other government institutions, we know it is essential. But I honestly don’t know how.”

Additionally, cooperation between NGO and government was also mentioned as something that could improve policies and management.

Mingas

As already explained, *minga* is a fundamental component of Ecuadorian CBWM. *Mingas* and the community sense they entail were very important for most WUA interviewees; they mostly felt the need to go back to more traditional CBWM and recover *mingas*.

On the other hand, an interviewee from the government sector criticized *mingas* stating that sometimes they are used as a tool to collect money, arguing that sometimes community leaders use water as a negotiation tool.

Trust

Although trust between stakeholders was mainly mentioned as something necessary to a successful water management system, it was apparent from the interviews that both WUAs and NGOs lost some of their sense of trust on the government due to the way the water law was approved.

The government interviewees mentioned trust the most, mainly stating that it is essential for a functional management system and that they felt it should be a priority to work on building trust especially with users.

5.2.2 Conflicts

Conflicts were mentioned the most by WUAs and the least by NGOs. This theme was analyzed to determine if different stakeholders had the same visions as to what are the main issues in the basin.

Environment, garbage disposal and pollution of water bodies

These codes were mentioned the most by WUAs and were arguably the main issue in the basin for those interviewees. Garbage disposal and pollution of ditches were mentioned frequently as a concern for this group, “Often dead animals are found on the ditches, or you can see cattle drinking and at pasture near the ditches.” Moreover, WUAs felt alone in the fight to preserve water sources since they and the communities used to fight for preserving nature and the water sources; nowadays users seem to have forgotten the importance of nature. Pollution of water sources was given top priority by all WUAs interviewees.

NGOs mentioned these codes the least since they were mostly focused on the issues with water and basin management. It is worth mentioning that all stakeholders mentioned, at least briefly one or more of these codes.

Monopolization of water authorization

The average for monopolization of water authorizations was constant among the stakeholder groups. However, the importance of this code varied greatly depending on the interviewee. For people from Senagua, it was a top priority and mentioned time and time again, whereas other government interviewees did not even mention it. The same can be observed in NGOs and WUAs.

As a side note, it is important to mention that water authorizations are being revised. It is hoped that a clearer picture of the basin can come out of the updated authorizations. Senagua admits that the authorizations’ database is outdated and thus are currently revising all the granted authorizations, as well as the registry of WUAs.

WUAs authority and inequality

Inequality was equally important to NGOs and government and was not as mentioned by WUAs. It is interesting most of the interviewees from both NGOs and the government felt this would be one of the biggest issues for WUAs and users when WUAs did not give inequality priority. This code was often mentioned in regard to the water law as well, and most interviewees felt the law aimed to reduced inequality. However, it did not give practical provisions to reach this equality.

Unsurprisingly, WUA interviewees found WUA authority to be of medium importance. Interviewees felt the new law and water management system decreased the WUAs authority, and most of them agreed that there should be clearer and

applicable fines. Some of the interviewees also felt the local government should either be more involved in the enforcement of water policies and good practices or give more authority to WUAs. It is interesting to note how the WUAs feel Senagua has too much influence on community-based water management, while the field workers of Senagua feel they do not have enough authority.

5.2.3 Management

The second most mentioned theme. It was fairly important to all stakeholders' groups, but slightly more prioritized by NGOs. The overall feeling from the interviewees was: "In Ecuador, we have enough resources, but we are poorly managed."

Lack of interest from users and lack of control/supervision

The lack of interest from users was mentioned the most by WUAs, followed by NGOs. Most of the WUAs interviewees gave this code top priority and mentioned this as one of the main issues with water management in the basin. It is interesting to note how little government interviewees mentioned this as an issue; it shows the concerns of WUAs and what the government interviewees think are their concerns are different.

Lack of control and supervision was one of the most mentioned codes on average. From the interviews, a lack of clear allocation of responsibility for these tasks is apparent. Interviewees often mentioned there is a need for stricter control and supervision, but failed to mention who should be doing it. This code was given top priority by almost all of the WUAs interviewees.

Long-term planning and planning scales

Long-term planning was mentioned the most by NGOs. In fact, it was cited as one of the major issues for water and basin management by this group. Government interviewees also mentioned it fairly often, while WUAs mentioned it the least.

Planning scales was mentioned the most by the government interviewees and NGOs, while WUAs mentioned it very little. The main concern was the allocation of responsibilities at the different planning levels, most think that a revision of the responsibilities allocated on the law and the regulation should be revised. Another point mentioned regarding planning scales was the planning units. The legislation establishes the river basin as the planning unit in Ecuador regarding water management. However, other government institutions have different planning units. For example, the National Secretariat of Planning and Development uses districts as their planning unit; these are cantons or a union of cantons. This leads to a mismatch between policies and makes IWRM even harder.

Collective memory and institutional memory

Collective memory was mentioned the least by government interviewees and by far the most mentions came from the WUAs group. Most of the interviewees from said group felt collective memory was key to maintaining good water and basin management, especially regarding the control of authorities. As one interviewee put it: "if we forget what happened every time a new government or board steps in, we will be trapped in a loop of making the same mistakes again […]. I'm not saying that what we did in the past was perfect, but we should at least aim to make different mistakes."

The institutional memory, on the other hand, was mentioned the most by NGOs, in fact, all of the interviewees saw this code as a top priority and pointed the lack of institutional memory as one of the biggest issues governmental institutions face. Government interviewees also saw this as an extremely important topic, with most of the interviewees admitting that it is a widespread issue in Ecuadorian governmental institutions: "as soon as someone leaves [a certain position], whatever they were working on comes to a full stop and anytime [the institution] wants to continue with the project they have to start from almost zero."

Community

Although this code has a relatively high average between all interviewees, the group that was concerned the most was certainly the WUAs. As mentioned before, the sense of community is seen as a vital component to water management in Ecuador (mainly in rural areas). NGOs also gave the community code high importance in their interviews.

5.2.4 Institutions and politics

This theme had the highest average. It was cited the most by NGOs and government interviewees and WUAs to a lesser extent.

Legislation and financial resources

The legislation was mentioned the least by WUAs, and normally when the interviewee said something about the legislation was to say that the new legislation has not changed much in their day-to-day. NGOs talked more about legislation, mainly the process of approval of the new water law and constitution.

Although financial resources were not a top priority for any group, it was referenced by all interviewees. The main point of discussion was either the allocation of resources or how WUAs managed to gather the proper resources (tariffs and fines). One of the users said: “we need stricter fines and more conversation regarding the setting of tariffs. I personally think we do not value water in Ecuador, the amount of money we pay is very low, and maybe there would be less waste if the water was more expensive.”

Representativeness and participation

Participation and its importance were mentioned in almost every interview. All interviewees agreed that participation needs to be improved. Mostly the biggest concern was meaningful participation, implying that in various events participation is only a requirement that has to be fulfilled and does not make much difference, it only matters “on paper.” Moreover, most interviewees agreed there is a degree of participation on the local level. However, no one really knows how national policy and basin management plans are made. There is a need to simplify the processes of water management, the representativeness and participation should be there, but the whole bureaucracy is excessive.

Surprisingly, representation was mentioned the most by the government interviewees and the least by WUAs. Government interviewees seemed to think representativeness is a key issue when dealing with participatory management; it was brought up especially when talking about the basin councils. It is worth noting that, although not mentioned exhaustively, representativeness was usually mentioned at least once in almost every interview.

Continuity and the influence of politics

Continuity is one of the main issues in water management — both at the institutional level and local management organization. “There are no real long-term planning goals, which makes it harder for projects to really work, and when they exist, they are easily changed when the [people in] power change. There is no unifying vision.” The lack of continuity was viewed as a major issue by NGOs and government interviewees. The lack of continuity is often linked to institutional instability, to better illustrate this instability the current fate of Senagua is an interesting case to mention. Due to the austerity measures, Senagua was supposed to merge with the Environment Ministry according to the presidential decree number 533 issued on October 3rd, 2018. However, on January 2019 unofficial reports on that, the merger would not happen stated surfacing. As explained in Annex (B), the institutions responsible for water management have changed constantly through the decades, making long-term planning almost impossible.

Politics were also mentioned substantially by all interviewees; the overall feeling was that water and access to water is a highly political matter. One of the interviewees shared his frustrations: “Depending on how large the WUA is, authorities take forever to grant resources to build the necessary infrastructure.” Another interviewee stated: “It all comes down to

how many votes your WUA represents or how much money the members of the WUA have." NGOs also felt that politics and the interests of the people in power are hindering the improvement of water management in the basin.

Public policy and the reality on the field; centralization of water management

Public policy and the reality on the field was the most cited code overall. Every single interviewee mentioned this topic at least once, most agree that there still is a major gap between policy and the field reality. One example cited by an interviewee was the garbage disposal on canals and irrigation ditches, the law obviously prohibits it and says the municipality is in charge of garbage recollection (on that particular area), however, the garbage trucks do not even fit on most of the roads and some of the inhabitants of this areas have never seen a garbage truck.

Regarding the centralization of water management, it was most cited by government interviewees but it varied greatly within interviewees. Most interviewees that mentioned this code agreed that there is a need for a supervised decentralization of water management, although WUAs need guidance and a stricter control and supervision, there should be mechanisms in place that allow a more flexible approach. Even though the law seems to centralize all decision making and regulation into Senagua (through the Sole Water Authority), the government interviewees argued that with the resources they have it is impossible in practice.

5.3 Survey

Since the users and WUAs was the largest and most diverse group, a survey was conducted to see if the results obtained in the interviews hold true. The survey was structured in four parts; the first was yes or no questions to assess what type of user the respondent was (user, part of the water association board, type of water association, etc.). In the first surveys, there were questions such as age, to what water association the respondent belonged and how much water they usually use. However, none of the survey's participant answers these questions as they did not feel comfortable answering. To protect their privacy and to encourage participation, those questions were later eliminated. It is worth mentioning that most of the participants were part of a water association board, given that most of the users did not want to fill the survey. When asked most would refuse, saying they know nothing about water management and could not contribute to the research, even when it was explained that the survey was mainly opinions and did not require previous knowledge, most of the water users did not want to participate. As a result, only 73 surveys were carried out, and only 52 were computed into the results since some surveys had to be discarded due to clear lack of understanding of the procedure to answer the survey or incomplete responses. The respondents were addressed in different events and were not part of the same water associations. Table 5 shows the most relevant information from the first part of the survey.

*Table 5 Characterization of respondents (*percentage based on the respondents that depend on irrigation)*

	Yes	No
Part of a Water Association Board	71%	29%
Part of an Irrigation Water Association	28%	72%
Part of a Drinking Water Association	79%	21%
Depend on irrigation for their livelihood	43%	57%
Lack of water for human consumption is common	29%	71%
Lack of water for irrigation is common*	83%	17%
Have access to the internet at least once a week	93%	7%
Have heard of the Basin Councils	36%	64%

When considering water scarcity, 83% of the respondents that depend on irrigation for their livelihood said lack of water for this purpose is common, compared with only 29% for drinking water. Participants shared that scarcity in the basin is mostly due to the dry season. However, when referring to water for irrigation, respondents shared that the lack of water is often due to failures in the irrigation structures (mostly collapse of the channels due to landslide or litter accumulation) or unfair allocation of resources.

It is interesting to notice that 93% of the survey respondents have access to the internet at least once a week, sometimes online platforms are overlooked as possible solutions to encourage participation due to the notion that most people in the countryside lack access to the internet. Although the national percentage of people that used the internet in the year 2016 is 55.6% according to the Ecuadorian Institute of Statistics and Census, this number has a great variation when considering age group and location. In the Pichincha province, the number goes up to 67.1% and when considering the age group of 16 to 24 years old the percentage increases significantly to 83.8% (INEC, 2016). In fact, when asked if they would think that an online platform would encourage them to participate more than 78% of participants responded affirmatively. Of course, this information might be skewed due to the small population sample, people in more remote locations might not have the same response as the ones willing to answer the survey. However, especially when trying to reach a younger audience, online platforms might be an important tool for participation.

The second part of the survey aimed to assess how the respondents feel water management has changed over the years. The first set of questions compares the current situation with the situation five years ago, around the time the new water law passed. The second set of questions were exactly the same as the first set but compared with 10 years ago, when the new constitution was approved. The questions asked to compare difficulty in obtaining water permits, difficulty in resolving conflicts, water prices, quantity, the fairness of water distribution and the importance of the water associations, as shown in Table 6.

Table 6 Comparison of the situation now, 5 and 10 years ago

	5 years ago			10 years ago		
	harder	**same**	**easier**	**harder**	**same**	**easier**
obtain permits to use water was	50%	15%	35%	36%	21%	43%
	harder	**same**	**easier**	**harder**	**same**	**easier**
resolving conflicts regarding water was	43%	29%	29%	51%	20%	29%
	more expensive	**same**	**cheaper**	**more expensive**	**same**	**cheaper**
water prices were	6%	57%	37%	0%	36%	64%
	less	**same**	**more**	**less**	**same**	**more**
the quantity of water I used to get was	28%	36%	36%	14%	36%	50%
	less fair	**same**	**fairer**	**less fair**	**same**	**fairer**
the water distribution was	43%	43%	14%	37%	42%	21%
	less important	**same**	**more important**	**less important**	**same**	**more important**
the water associations were	44%	28%	28%	57%	30%	13%

The third part inquired about events (such as workshops, training, meetings, discussion spaces, etc.). Mainly if such events existed and if they impacted the respondent's ability to understand different points of view. All of the participants (100%) said there were events such as the ones described and that they helped them understand better a different point of view regarding water issues. However, most of the respondents (99%) also agreed there should be more events.

The last part of the survey consisted of 24 statements that participants had to rate according to five categories: do not know, nothing, a little, some, a lot. The statements were mainly opinions and perceptions. In the next few paragraphs, the

most interesting results are analyzed while the full results can be found in Table 7. From the initial 52 surveys, only 48 responded this last part due to its length.

Table 7 Statements assessment

	Statement	Don't know	Completely Disagree	Disagree to an extent	Agree to an extent	Completely Agree
1	I know what institutions are responsible for water management	18.8%	4.2%	2.1%	41.7%	33.3%
2	There are sufficient technical trainings	6.3%	8.3%	58.3%	4.2%	22.9%
3	The government should be responsible for water management	6.3%	29.2%	0.0%	0.0%	64.6%
4	The government considers my needs regarding water	4.2%	54.2%	8.3%	6.3%	27.1%
5	I feel that SENAGUA listens to my worries and needs	0.0%	6.3%	6.3%	22.9%	64.6%
6	I feel that the WUA BOARD listens to my worries and needs	4.2%	0.0%	12.5%	12.5%	70.8%
7	I trust in the people responsible for water management	0.0%	0.0%	12.5%	25.0%	62.5%
8	I think there is trust between the people responsible for water management	0.0%	0.0%	35.4%	6.3%	58.3%
9	I feel that my opinion is taking into account in the decisions made regarding water	0.0%	2.1%	22.9%	20.8%	54.2%
10	I feel freedom to express my points of view even if they are different from the authority and my colleagues.	0.0%	0.0%	0.0%	37.5%	62.5%
11	I feel I have something to contribute to water management.	0.0%	0.0%	8.3%	14.6%	77.1%
12	The government understands my water-related problems	6.3%	43.8%	18.8%	18.8%	12.5%
13	I think the biggest challenge in water management is the lack of financial resources	0.0%	8.3%	4.2%	27.1%	60.4%
14	I think the biggest challenge in water management is the lack of communication	12.5%	12.5%	8.3%	20.8%	45.8%
15	I know where to go when I have a problem/conflict/worry concerning water	4.2%	6.3%	0.0%	20.8%	68.8%
16	Water-related conflicts are EASILY solved in my community	10.4%	12.5%	20.8%	22.9%	33.3%
17	Water-related conflicts are solved FAST in my community	12.5%	12.5%	6.3%	47.9%	20.8%
18	I think the Board and Senagua have a good relationship	2.1%	0.0%	0.0%	0.0%	97.9%
19	I feel represented in the Basin Council	18.8%	39.6%	0.0%	20.8%	20.8%
20	Water distribution is fair	0.0%	4.2%	16.7%	27.1%	52.1%
21	Bureaucracy is a problem in water management	6.3%	12.5%	4.2%	31.3%	45.8%

It is interesting to note the polarization on the responses for statement number 3, most of the people surveyed agree that the government should be responsible for water management. However, a representative amount of respondents (almost 30%) completely disagreed with the statement. When asked why, most responded said that community management should be strengthened and that most communities do not need the “interference” of the government and it should only make overall guidelines, leaving the decision making power to the communities.

When comparing the responses to statement 5 with 4 and 12, it is interesting to note that although Senagua represents the Ecuadorian state, the respondents feel more comfortable with Senagua and feel heard by them, while most think the State does not understand their needs. This seemingly contradictory response was observed when talking to water users throughout the research, most see Senagua as a more approachable institution that cares to a certain extent for their needs, while the State is often seen as politicians that do not care about them. Moreover, when speaking about the water secretary and the higher ranked employees within Senagua the same response was observed, they feel those people are too far away to care. On the other hand, when talking about Senagua in general, people often associated the institution with the field employees they see on events, training and meetings and felt those employees actually cared about their needs. This can be linked to the code found on the interviews about the differences between policy and the reality on the field. Moreover, these statements show an expected result: the closer the institutions/organizations are to the users, the users trust them more. The comparison of statements 5, 4 and 6 show that more people feel heard by the WUAs, a little less by Senagua and even less by the State.

The results regarding trust (statement 7) seems to contradict the findings of the interviews in which stakeholders lost their trust in the water management system. However, it is important to note that this question referred to the day to day managers (WUAs) and not policymakers or higher level managers.

When averaging the results, and leaving out the "do not know" answers, there were only 3 statements the majority of interviewees disagreed with, as shown in Table 8. The statements show the main issues users have with water management in the basin: the lack of technical training and the feeling that the government does not consider nor understand the people's issues regarding water. These overall feelings were seen in the interviews as well.

Table 8 Average Results: statements assessment

	Statement	Disagree	Agree
1	I know what institutions are responsible for water management	8%	92%
2	There are sufficient technical trainings	71%	29%
3	The government should be responsible for water management	31%	69%
4	The government considers my needs regarding water	65%	35%
5	I feel that SENAGUA listens to my worries and needs	13%	88%
6	I feel that the WUA BOARD listens to my worries and needs	13%	87%
7	I trust the people responsible for water management	13%	88%
8	I think there is trust between the people responsible for water management	35%	65%
9	I feel that my opinion is taking into account in the decisions made regarding water	25%	75%
10	I feel freedom to express my points of view even if they are different from the authority and my colleagues.	0%	100%
11	I feel I have something to contribute to water management.	8%	92%
12	The government understands my water-related problems	67%	33%
13	I think the biggest challenge in water management is the lack of financial resources	13%	88%
14	I think the biggest challenge in water management is the lack of communication	24%	76%
15	I know where to go when I have a problem/conflict/worry concerning water	7%	93%
16	Water-related conflicts are EASILY solved in my community	37%	63%
17	Water-related conflicts are solved FAST in my community	21%	79%
18	I think the Board and Senagua have a good relationship	0%	100%
19	I feel represented in the Basin Council	49%	51%
20	Water distribution is fair	21%	79%
21	Bureaucracy is a problem in water management	18%	82%

Another interesting observation is the fact that most respondents for the surveys were found on WUAs that were facing some sort of issue or conflict, more often the setting of tariffs or monopolization of water right by big industries. When people were approached in relatively successful WUAs with no apparent issues, people did not want to answer the survey and the WUAs representatives often complained that users did not attend the meetings and there was not much interest on participation from the users. It could be concluded that a common issue or problem often encourages participation, especially from the public. One of the interviewees from this WUAs stated that he has been trying to retire for years but no one wants to be in charge because they are receiving their water just fine and do not need the "hassle" of participating. This observation supports a common complain among WUAs representatives that the law establishing a certain minimum amount of meetings and attendees is not viable for all.

5.4 EVENTS ATTENDED

As part of the present research, various WUAs were visited, and some events attended. The following paragraphs show a brief overview of the most relevant events and the observations made.

Workshop for WUAs

One of the first events attended were a series of workshops made by a Parrish GAD with support from Senagua. The aim of these workshops was to train WUAs' leaders on different subjects, such as establishing tariffs, the obligations of the WUAs regarding taxes, modernization of WUAs management through software, etc.

Although the workshop was structured more as a seminar, where an expert would present a topic and explained it without much interaction from the public, there were several occasions in which the participation of the attendees was encouraged. Moreover, the informal exchanges of views and information among different WUAs were very interesting to observe. Discussions about the best practices and the general concerns of the boards were often sparked amid the participants of the workshop. All seemed to value the diverse points of view and saw the event as an opportunity to learn from their colleagues, as well as the specialists.

Furthermore, due to the presence of representatives of Senagua, a discussion regarding the need for a regulation stating how the tariffs should be established started, and since the event gathered representatives of WUAs from different sizes (from 20 users to 1500), the debate exposing each WUAs need was constructive and all participant listen to the different opinions. However, the main complaint heard was that, although these events are interesting and useful, what the attendees bring to the table (for example the issues with a tariff regulation) is often forgotten by the government institutions. One participant stated: "the discussion is fun and all but let's see if they indeed do something about the tariffs".

The workshops attended were held in the Parrish of Aloasi, on April 21^{st,} 2018 and May 05^{th,} 2018.

Scientific station Water and Paramos workshop

The EPMAPS and the Fonag created the Scientific Station Water and Paramos (Estación Científica Agua y Páramos) in 2017. It is an attempt to bring the scientific research done by universities into practice in the protected areas own by Fonag and EPMAPS, mostly located on the Guayllabamba basin. The Scientific Station provides researchers with access to the three protected zones, lodging and some assistance. The protected zones amount to a total area of around 18 800 ha and are located in altitudes varying from 3680 and 4640 m.a.s.l.

There are 11 investigation lines, all related to the conservation and restoration of the paramos and the watersheds, including hydrology, climate change, socioeconomic and environmental analyzes, restoration of the vegetation cover, etc. There are also different programs to foster collaboration such as a scholarship program for students doing their thesis research on specific topics.

The workshop attended gathered participants from the governmental sector (Senagua, Environmental Ministry, EPMAPS, etc.) and various universities, in this particular event WUAs and community managers were not present since it was geared towards scientific development and research. The main objective of this particular event held on June 29th, 2018, was to listen to the expectations of the different attendees and align the objectives of all the participants. The workshop was planned to create collaboration between the different participants, and group activities were carried out. The groups for the activities were formed by the organizers of the event to ensure diversity and to foster new relationships. The overall feeling was of cooperation, and many participants exchanged information among their groups to work on future projects together. The creation of a general database that gathers, not only raw data but also the ongoing projects different researchers are working on was proposed by all participants as a way to strengthen and improve research on the basin. The most mentioned concerns among participants were the need for open access to data and participation between all the stakeholders in the basin.

When asked about the usefulness of the event, participants agreed that this sort of events were extremely useful, especially for interdisciplinary research. Nevertheless, all agreed that often the events need more follow-ups to have a more palpable impact and collaboration between institutions entail more effort than just attending these events.

Water Resources Forum

The Water Resources Forum (Foro de los Recursos Hídricos) is an initiative organized by the Consorcio Camaren NGO. The main objective of the forum is to promote and encourage the conversation between different stakeholders regarding water resources, with a keen interest in strengthening community water management. The forum consists of a National Working Session held every two years and regional and provincial Water Forums, the national event is generally known as the Water Resources Forum and is held every two years. The main subjects of interest are (Consorcio Camaren, 2001):

- The legal and institutional framework for the integral and democratic management of water resources
- Policies on water resources in Ecuador
- Policies and irrigation management
- Agricultural production under irrigation
- The watersheds and their management
- Water for domestic consumption
- The pollution of water resources
- Climate change and water
- Strengthening of social organizations, of small and medium farmers to optimize and expand irrigation
- Support to organizations and institutions to improve the management and provision of public and community water services for human consumption

In the forum different stakeholders get together and attend seminars and workshops where different water issues are discussed, and solutions are proposed. Researchers, policymakers (Senagua), NGOs, the government sector, representatives of water users and other groups of interest are invited to the discussion. The event consists mainly of seminars about the overall theme of the forum and workshops were practical questions raised by different stakeholders are presented and solutions proposed by the heterogeneous groups of discussion. These groups are formed as diverse as possible to encourage the sharing of different points of view. After the event is over, Consorcio Camaren publishes the conclusions, suggestions, and recommendations reached in the forum.

The first event was held in 2001, and since then it has contributed greatly to the discussion of water resource management in Ecuador. When the Water law was being discussed, concerns of different groups were pointed out and different recommendations made, especially regarding community management. How much of the recommendations were included in the final law is controversial as discussed in the previous sections.

The event attended was the 10th National Meeting of the Water Resources Forum held on July 5th and 6th of 2018 at the Central University of Ecuador. This event was attended only as an observer without active participation. However, the conversations held with various participant supported the results obtained from the interviews, with the major concerns were: the lack of continuity both in institutions and in policy, the need for active and meaningful participation of all stakeholders, the staggering differences between policy and the realities on the field and the influence of politics in water policy and management.

6 Conclusions and Discussion

In this section, the research questions proposed in the introduction chapter are answered. The aim of this project was to understand the relations between policy makers, NGOs and water users in the Guayllabamba basin. Different approaches were taken to first assess the water management structures and institutions present on the basin. The document analysis aid to establish how should the management structure work according to the current legislation, it also helped to understand the realities of the basin shown in chapter 3. The interviews and surveys helped establish the perceptions of stakeholders, both about each other and about the issues on the basin. Finally, the direct observations provided a direct look at how the stakeholders behave in different settings.

Although the law established the National Water Strategic System, the formal institutions that are currently working on the basin consist of Senagua, the different levels of GADs and the WUAs. However, there are some supporting NGOs working alongside the community management institutions and government. The legal framework (mainly of the 2014 Water Law) produces a centric management model, almost all legal attributions are concentrated in the Sole Water Authority. However, in practice and due to limited human and financial resources, Senagua decentralizes the power and gives more autonomy to GADs and WUAs. Senagua does the basic planning, but the practical aspects are granted mostly to the municipalities and WUAs.

The perceptions of the different stakeholders' groups were, as expected, varied and depended greatly on the personal experiences of the representatives of each group. The government institutions (Senagua) was widely viewed as necessary and a step up from the previous institutions in charge of water management in the country. However, the trust in the government was particularly affected by the process of approval of the new water law. Both NGOs and WUAs felt that participation was merely a figure and not actually important. The idea that the government only wants to create the illusion of representation and participation instead of actively listening was alluded by various stakeholders, especially when referring to the previous government. However, and although the trust on public institutions seemed shaken, most of them seemed hopeful that participation could matter again if the right people lead strategic institutions. The overall perceptions are summarized below:

	Government	WUAs and users	NGO
Government	The government interviewees recognized the lack of cooperation within the government institutions. Moreover, they agreed some of the policies and stipulations of the law were not very practical.	The government sees WUAs and community management as the solution to dealing with different realities, especially in remote locations. However, the idea that the government institutions should "teach" the public instead of listening to their experiences and suggestions is still ingrained on many government officials.	There is a need for approximation between government and NGOs, there are various NGOs in the basin that could aid the government institutions with data and manpower. Especially regarding training and recovering the trust of the public on participation and its importance. However, the bureaucracy of the governmental institutions can hinder the collaboration between NGOs and the government. Moreover, due to the last government's policies regarding NGOs, there is a breach of trust that has to heal as well.

WUAs and users	Although in general, the people from this group seemed hopeful that the government is indeed trying to do its best, there is still some doubt regarding participation and whether or not it is merely a requirement. Moreover, people often feel skeptical of the permanence of current regulations, meaning that often people feel that they have to comply with what the current institutions and legislation demand until it changes again. There is more trust in local institutions than national ones.	WUAs saw themselves as the more perennial institutions. Users tend to trust WUAs but there is a generalized feeling that people care less and less about participation and community management. Moreover, several users complained about the lack of interest from other users on the environment.	The NGOs interviewed often looked at the big picture and tried to work with the people living at the basin, providing not only technical support but also training so the communities can be self-sufficient in the long run. The NGOs interviewees generally thought that more conversation is still needed.
NGO	The overall feeling of the NGOs regarding government institutions was a will to help, but some trust issues lingered from the dubious process of the 2014 water law approval. Moreover, NGOs often feel that the data and reports they create and hand over to the government institutions are either misused or ignored. There is a need for a clearer path of the information shared by NGOs within government institutions. However, disregard of the information offered might be due to the fact that the NGOs offering the data do not work on all the basins. Senagua, being a national institution often has to standardize its processes and it makes the use of specific information of a specific basin harder.	NGOs work mostly with WUAs and users, this relation is arguably the longest. NGOs state that they intend to educate WUAs and users so they can become self-sufficient. However, in some events the teacher-student dynamic could still be observed. In general NGOs are seen as helpful and on their side by users and WUAs that have worked with them. Albeit there are punctual issues (mainly when NGOs impose practices WUAs are not used to follow).	NGOs have worked together on the Guayllabamba basin for a long time. Mostly each NGO specializes in an aspect of water management (technical aspect, training to locals, governance, etc.) and then work together contributing with their respective expertise. Nonetheless, they also felt there was a need for a more effective sharing of information. If they were not working together on some project they would hardly have access to what the other NGO was working on or the data they had available.

Since WUAs have been a reality in Ecuador for decades, the overall feeling is that no matter what institutions are created they will most likely disappear. WUAs try to comply with the current demands from the government, but most of the interviewees felt it was only until the legislation or institutions change again. This perception is rooted in the instability of water management institutions. Besides, it is not only institutional continuity a problem but also the dependency on individuals to carry out projects within the institutions that prevent projects from being concluded once the individual is not available anymore. Some of the interviewees from the government had been working in their field for decades, and they passed through numerous institutions that came before Senagua, a tangible concern was that the moment they

retire, their life's work would be wasted since no one will remember or use their experiences. NGOs also suffered from this issue, although on a lesser scale.

NGOs are not often mentioned by other stakeholders unless they are brought up. The government recognizes that they have important information and could be an ally, but there are still some difficulties for them to work together especially bureaucracy. Sharing of information is stiff and often lost within the institutions. The creation of a centralized database for both data, projects, and studies carried out in the basin could help with the cooperation of the different stakeholders. Not all WUAs and users inquired in this research had direct contact with NGOs, however, the ones that had seen them as useful mediators with the government institutions and often more "permanent" than the government. NGOs and WUAs worked together especially regarding training and the construction of water infrastructure for communities.

When commenting on the main issues in the basin, stakeholders seem to agree overall with each other, there were not radically different statements. The major issues identified in this research that harm the relations of stakeholders were:

- *The divergence between policies and the reality on the field:* The most cited issue, which can stem from the lack of communication or efficient communication between stakeholders. More contact with the field and its reality was the most cited issue in the basin, increasing the contact of decision-makers with the people in the field could help increase the trust towards the government institutions. The survey's results especially, show how people trust the local level (more contact) a lot more than the national policymakers and national water managers (less contact).
- *Trust:* Bothe WAUs and NGOs still have some trust issues with government institutions, especially since the controversial process of approval of the water law approval.
- *Continuity:* The overall observed feeling was that the laws and institutions change so much that it is not worth it to get involved.
- *Sharing information:* Lack of clear and accessible information was apparent in the course of this research. Moreover, confusing and contradicting information was often found and very hard to distinguish which information was correct and updated. The creation of a unified database and somewhere to share what projects and studies have been conducted on the basin could help the flow of information and make sure that decision-makers, and any of the stakeholders, have comprehensive information at their disposal.
- *Community:* One of the main concerns of the interviewees was the loosing of the sense of community, they feel the ancestral management models are losing ground due to a lack of interest from users, in particular, the new generations. Different methods to engage users should be studied. However, it should also be studied whether the ancestral methods are still viable in the present or new methods should be considered.
- *Participation:* It is affected by the generalized feeling that participation is often a mere requirement and does not actually reach the levels of decision makers that can, in fact, take the suggestions and concerns into actions. Moreover, the need for effective participation, meaning that the people participating are aware of the problem discussed and have an instructed opinion and are not only there "to sign and raise hands".
- *Pollution:* The issue of garbage disposal on the canals and the discharge of untreated effluents on the rivers was the main concern between stakeholders. This is the most significant and pressing issue according to the interviewees.

Obviously, each interviewee tended to point out the issues that related to them the most, for instance: a WUA that has a huge problem with pollution is more likely to think pollution is the biggest issue in the basin, whereas a WUA located near big industries tend to complain more about the fairness on distribution. However, stakeholders recognized that there are some issues that they, in particular, do not face (such as pollution) but other WUAs in the basin face and therefore should be addressed by the policymakers, showing awareness of the other WUAs realities.

There seems to be a general hopefulness that cooperation and communications between stakeholders can improve in the near future. The stakeholders themselves think that improved relations and more effective communication and

cooperation can lead to better management, reduction of resources used (both monetary and manpower), and overall more informed decisions.

It is important to notice that the number of interviewees was limited, and although they were chosen due to their representativeness the results obtained may not represent every single stakeholder on their group. However, with the events attended, the survey, the news reports, and the overall contact and conversations carried out through the research, the overall perceptions are reflected in the results presented here.to them but when asked if the State takes their views into account the response was more negative. This result corroborates the idea that people tend to trust more the institutions with whom they have more contact. Moreover, the words “State” and “government” tend to evoke more critique and less trust than the specific government institutions (Senagua, specific GAD, etc.).

Although the research consisted of a case study, the findings presented are expected to hold true in other Ecuadorians basins since the major issues and conclusions (such as the continuity issue of institutions, the lack of trust and the idea that participation is just a requirement that needs to be fulfilled) can be extrapolated to a national reality. However, it is needed to replicate this study in other basins of the country to be able to draw conclusions on the national level. It would also be interesting to compare this research with basins in other countries with similar realities, such as Bolivia, to be able to extract the common results and reach broader conclusions.

7 FURTHER REFLECTIONS

The present research consists of a first step towards understanding the dynamics of stakeholders relations and interactions, with the future objective of improving the overall cooperation and communication between all stakeholders in the basin (and other Ecuadorian basins). The importance of the present research lays on the difficulty to assess and understand how different groups of people react and interact with each other in water management, case studies like this can help understand and uncover factors that would not be noticed in a model or a more quantitative research.

Regarding the institutions created by the legislation, the whole National Water Strategic System established in the water law is not actually functioning in practice. the Intercultural and Plurinational Water Council has not been formed. This could be interpreted as disinterest from the government bodies to public participation, which leads to public apathy as verified with the interviews and surveys. Several indigenous groups fought for the creation and inclusion of this Council in the Water Law. However, it is evident that in practice they do not have the attributions they should. Otherwise, the Water Resources National Plan could not be made. The feeling among representatives of these groups is that the Council was only formed to appease protest and has no real voice (Acción Ecológica, 2015). The basin councils are still being formed as well.

The analysis of the historical development of institutions and laws regarding water management shows how they change regularly. The 2008 Constitution was reformed in 2010 with a referendum ordered by the same government that wrote it two years before. In this constant discontinuity, the few stakeholders hat remain unchanged are often NGOs, in the Guayllabamba, Fonag has more than 20 years of experience and is often forgotten by the policymakers. For instance, Fonag in conjunction with FFLA created a management plan for the basin that took more than 5 years of studies and constant participation and consultation of different stakeholders, when the interviewee from the government (including ones working at the Guayllabamba basin/Esmeraldas HD) did not know about this study. Various examples like this were shared by interviewees, and when the government interviewees were questioned about why the studies were not used, the interviewees stated to have no knowledge of said studies and were interested to get access to this reports/studies.

Likewise, the Constitution's view of nature is very idealized, and the country's ability to put all this legislation into practice has been questioned. Especially considering that almost one-third of Ecuador's GDP depends on the oil and mining industry (Whittemore, 2011). The reality is that a country facing an economic crisis, and having to endure austerity measures due to debt is not going to put nature's right above economic gain. Often natural resources legislation seems to be taken from different realities and propose measures that are great on paper but have a slim chance of being applied.

It is interesting to notice that the use of different terms that mean the same organization affects the response or perception from users. For example, when asking if water managers know what they are doing or if they trust water managers the response was average, but when asking about the WUAs (the organizations responsible for local water management) the response tended to be more positive. The same happened when talking about the State or Senagua. Since Senagua is the representative of the State according to the water law, it could be argued that both terms could be used interchangeably. However, most people agreed that Senagua was interested in listening. It is interesting to see how perceptions change when dealing with a specific individual and an entire organization. People who were surveyed after an event in which certain institution participated were more likely to perceive the institution more positively than people randomly surveyed. This strengthens the idea of the need for real face to face interactions.

One conclusion derived from the present research that would need further study is the fact that participation happens mostly where there is some sort of conflict or issue. In places were no major issues are present, it is hard to make people participate if there is no interest behind it. This observation questions the need for participatory management everywhere and at all levels. Meaning, if some WUAs do not have major conflicts perhaps they should not be obligated by law to have a certain number of meeting with a specific number of participants because it would be virtually impossible to force

participation. Moreover, it could be argued that forced participation does not have the same benefits as organic or spontaneous participation.

Every single interviewee and person surveyed agreed that there should be more participation. However, it is important to note that participation happens in various instances and levels, so considering it a single hermetic concept might be the reason for many contradictions with discourse and practice. For example, one of the interviewees from the WUAs that emphasized the need for participation of the community the most, later admitted he did not attend various events organized by lawmakers and Senagua because he did not see the point. This dichotomy was noted on other stakeholders as well.

Moreover, one of the main points raised by WUAs was the need to regain the sense of community. However, imposing a management model does not work. There should be either more studies on how to engage the new generations on the community or how to adapt community management to the new generations. Perhaps technology could be an allied. Otherwise the increasing apathy the WUAs are reporting is only expected to grow. This apathy can also be caused by the lack of tangible problems in the WUAs, if everybody is getting their water at a reasonable price is unlikely people will interrupt their day to participate in meetings and other events, which would lead to question if participation is needed in the amount and the levels the law asks for. This perceived unnecessary participation also gives way for managers to "only ask for signatures and raised hand" which in turn can hinder meaningful participation, in this research meaningful participation is defined as participation from people who are actually affected or have an effect on issues discussed, besides having some background knowledge on the issue.

In conclusion, there is still a long way to go regarding trust and to improve the relations between NGOs, policymakers, and WUAs. Sharing of information is confusing and unclear; there is still a need for more open conversations among stakeholders and participation needs to be seen as a fundamental step on decision-making again. However, stakeholders are more aligned in their concerns than they seem to think and, even though there are still the issues of political and institutional instability, the government institutions are more aware of the needs of water users and WUAs than before.

Further research is still needed to determine feasible ways to improve and strengthen the relations between stakeholders on this basin. Furthermore, the dynamics of the cooperation between the different stakeholders and what factors affect it is still underdeveloped in the basin, and there is a need to study how could information be shared more effectively.

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ANNEXES:

A) SURVEY

ENGLISH VERSION

Mark with an X your answer: ☐ **User** ☐ **WUA board member**

Part of an Irrigation Water Association	☐Yes	☐ No
Part of a Drinking Water Association	☐ Yes	☐ No
Depend on irrigation for their livelihood	☐Yes	☐ ☐
Lack of water for human consumption is common	☐ Yes	☐ No
Lack of water for irrigation is common	☐Yes	☐ ☐
Have access to the internet at least once a week	☐ Yes	☐ No
I've heard of the Basin Councils	☐Yes	☐ ☐
I know how to ask for a water authorization	☐ Yes	☐ No
There are events (such as discussion tables, trainings, mettings) that help the discussion and solving of water-related problems?	☐Yes	☐ ☐
Do you believe there should be more events like the ones mentioned above?	☐ Yes	☐ No
Do you think an online platform (Facebook, Whatsapp, email…) would help you to participate more in water-related discussions?	☐Yes	☐ No
The events help you understand other points of view?	☐ Yes	☐ No

Who organized the events? ☐ Senagua ☐ Fonag ☐ Municipio ☐ Junta ☐ Otros

How many events have you atended? ☐ None ☐ 1-5 ☐ 6-10 ☐ 11-20 ☐ + 20

Choose the best word for each sentence:

5 YEARS AGO			
ask for and obtain permits to use water was	harder	same	easier
resolve conflicts regarding water was	harder	same	easier
water prices were	more expensive	same	cheaper
the quantity of water I used to get was	less	same	more
the water distribution was	less fair	same	fairer
the water associations were	less important	same	more important

10 YEARS AGO			
ask for and obtain permits to use water was	harder	same	easier
resolve conflicts regarding water was	harder	same	easier
water prices were	more expensive	same	cheaper
the quantity of water I used to get was	less	same	more
the water distribution was	less fair	same	fairer

		Don't know	Completly Disagree	Disagree to an extent	Agree to an extent	Completly Agree
1	I know what institutions are responsible for water management					
2	There are sufficient technical trainings					
3	The government should be responsible for water management					
4	The government considers my needs regarding water					
5	I feel that SENAGUA listens to my worries and needs					
6	I feel that the WUA BOARD listens to my worries and needs					
7	I trust in the people responsible for water management					
8	I think there is trust between the people responsible for water management					
9	I feel that my opinion is taking into account in the decisions made regarding water					
10	I feel freedom to express my points of view even if they are different from the authority and my colleagues.					
11	I feel I have something to contribute to water management.					
12	The government understands my water-related problems					
13	I think the biggest challenge in water management is the lack of financial resources					
14	I think the biggest challenge in water management is the lack of communication					
15	I know where to go when I have a problem/conflict/worry concerning water					
16	Water-realted conflicts are EASILY solved in my community					
17	Water-realted conflicts are solved FAST in my community					
18	I think the Board and Senagua have a good relationship					
19	I feel represented in the Basin Council					
20	Water distribution is fair					
21	Bureaucracy is a problem in water management					

ORIGINAL (SPANISH) VERSION

Señale con una X la opción que corresponda: ☐ **Usuario** ☐ **Directivo de Junta**

Soy parte de una Junta de Agua Potable	☐ Sí	☐ No
Soy parte de una Junta de Riego	☐ Sí	☐ No
Dependo del riego para vivir	☐ Sí	☐ No
Es común que me falte agua para consumo	☐ Sí	☐ No
Es común que me falte agua para el riego	☐ Sí	☐ No
Tengo acceso al internet al menos una vez a la semana	☐ Sí	☐ No
He oído hablar de los Consejos de Cuenca	☐ Sí	☐ No
Sé cómo se piden las autorizaciones para usar el agua	☐ Sí	☐ No
Existen eventos (como mesas de discusión, capacitaciones, reuniones, socializaciones) que ayudan a la discusión y solución de problemas relacionados al agua	☐ Sí	☐ No
¿Cree que debería haber más eventos?	☐ Sí	☐ No
¿Cree que una plataforma online (Facebook, WhatsApp, Correo electrónico…) le ayudaría a participar más activamente?	☐ Sí	☐ No
¿El evento le sirvió para entender mejor otro punto de vista?	☐ Sí	☐ No

¿Quién organizó los eventos?	☐ Senagua	☐ Fonag	☐ Municipio	☐ Junta	☐ Otros
¿A cuántos eventos ha asistido?	☐ Ninguno	☐ 1-5	☐ 6-10	☐ 11-20	☐ + 20

Subraye la palabra que corresponda en cada frase:

HACE 5 AÑOS			
pedir y tener permisos para usar el agua era	más difícil	igual	más fácil
resolver conflictos era	más difícil	igual	más fácil
el precio del agua era	más cara	igual	más barata
la cantidad de agua que recibía era	menos	igual	más
la distribución del agua era	más injusta	igual	más justa
las juntas eran	menos importantes	igual	más importantes
HACE 10 AÑOS			
pedir y tener permisos para usar el agua era	más difícil	igual	más fácil
resolver conflictos era	más difícil	igual	más fácil
el precio del agua era	más cara	igual	más barata
la cantidad de agua que recibía era	menos	igual	más
la distribución del agua era	más injusta	igual	más justa
las juntas eran	menos importantes	igual	más importantes

		No sé	Nada	Poco	Algo	Mucho
1	Sé quiénes son responsables por el manejo del agua					
2	El municipio es importante en el manejo del agua					
3	Hay suficientes capacitaciones técnicas					
4	Sé cuál es la función de la Senagua					
5	Sé cuál es la función del Fonag					
6	El gobierno debe ser el responsable del manejo del agua					
7	El gobierno tiene en cuenta mis necesidades respecto al agua					
8	Siento que la **SENAGUA** escucha mis preocupaciones y necesidades					
9	Siento que la **JUNTA** escucha mis preocupaciones y necesidades					
10	Confío en los responsables del manejo del agua					
11	Creo que hay confianza entre los que manejan el agua					
12	Siento que se considera mi opinión en la toma de decisiones respecto al agua					
13	Siento libertad para expresar puntos de vista diferentes al de las autoridades y mis compañeros.					
14	Siento que puedo aportar en el manejo del agua					
15	El gobierno entiende mis problemas respecto al agua					
16	Creo que el mayor problema en el manejo del agua es la falta de dinero					
17	Creo que el mayor problema en el manejo del agua es la falta de comunicación					
18	Sé a dónde acudir cuando tengo algún problema/conflicto/preocupación respecto al agua					
19	Los conflictos que hay en mi comunidad sobre el agua se resuelven **rápidamente**					
20	Los conflictos que hay en mi comunidad sobre el agua se resuelven **fácilmente**					
21	Creo que la junta tiene una buena relación con la Senagua					
22	Me siento representado en el Consejo de Cuenca					
23	La distribución del agua es justa					
24	La burocracia es un problema en la gestión del agua					

¡Gracias por su ayuda!

B) LEGISLATION AND INSTITUTION CHANGES OVER TIME

A timeline of significant changes in the legislation and institutions in Ecuador's history.

Year	Event	Observations
1830	First Ecuadorian Constitution	Did not mention water or natural resources.
1832	1st Water Law	Regulated the extraction of water from rivers, lakes and other public or communal sources. It protected private property and did not define what common or public sources meant.
1855	Reform of the Water Law	Manufacturing companies were now included in the law provisions.
1860	Ecuadorian Civil Code	Ended up replacing the Water Law in practice, it provided more explicit definitions regarding ownership and defined what the public use and national goods was.
1936	2nd Water Law	This law was decreed during the military dictatorship, it incorporated more functional and more unambiguous provisions, especially regarding access and uses.
1939	Complementary regulation	Provisions for the use of ditches and irrigation water for the benefit of agriculture.
1944	Law of Irrigation and Soil Sanitation and the creation of the *Caja Nacional de Riego*	It was directed at the promotion of agricultural production and established an order of priority for water supply. The National Irrigation Fund was in charge of the execution of irrigation projects and was part of the Public Works Ministry.
1960	Water Condominium Law	Regulated the existing communal property over irrigation channels.
1960	3rd Water Law	Lesser norms and regulations were transformed into law, as well as some provisions that were established in other laws. It had a private and state approach to water management
1965	IEOS	Ecuadorian Institute of Sanitary Works, was created as part of the Public Health Ministry. The main priority was to establish regulations and the construction of infrastructure.
1966	INHERI	The Ecuadorian Institute of Hydraulic Resources was created to try to solve the institutional dispersion present in water management.
1972	4th Water Law	It eliminated any possibility of exercising private property over natural water sources and channels. It established that all privately owned waters, existing until then, should revert to the public domain. Most importantly, it embraced a single and unique form of administration to try to eliminate the ambiguity of previous laws in this matter.

1979	Law of Drinking Water and Sewerage Boards	The regulation governing the Drinking Water Administration Boards, this recognized the validity of community water management.
1992	MIDUVI	Creation of the Under-secretariat of Water and Sanitation at the Ministry of Urban Development and Housing (MIDUVI), responsible for technical support to municipalities and provinces in water-related issues
1994	CNRH	Creation of the National Council of Water Resources that would assume all the functions of INHERI. It was an attempt to unify and centralize water management.
1998	New Constitution	Gave the use and exploitation of water rights to the State and the ability to issue exploitation rights to those whom the State saw fit. It went directly against the Civil Code and the 1972 Water Law that granted the right to use water resources to the whole nation and not only the state.
2004	Water Law Reform	Mostly a reproduction of the 1972 law, adding some articles from the Agrarian Development Law. This reform is often forgotten. In fact, one of the reasons to update the Water Law in 2014 was the claim that the Water Law had not been updated since 1972.
2008	Montecristi Constitution	The first constitution to recognize nature's rights, it is further explained later in this chapter.
2008	Senagua	The National Water Secretariat is created to replace the CNRH and assume all its functions. It is another attempt to eliminate redundancy in water management institutions, unify and centralize all water-related decision making and planning.
2014	5th Water Law	Organic Law of Water Resources Uses and Water Exploitation, this law is analyzed in depth in the following section.

C) CONSTITUTION ARTICLES

The following articles of the 2008 Ecuadorian Constitutions were translated by the author and summarized according to the research topic for better understanding, parts of the article not pertinent to the subject of study were left out.

Art.	Summary
3	Guaranteeing access to water is a primary duty of the State
12	The human right to water is fundamental and inalienable. Water is strategic national patrimony
15	Energy sovereignty will not be achieved to the detriment of food sovereignty, nor will it affect the right to water.
66	People have the right to drinking water and sanitation.
261	The **central State** will have exclusive powers over natural protected areas and natural resources. As well as energy resources, minerals, hydrocarbons, water, biodiversity and forest resources.
262	The **autonomous regional** governments will have exclusive competences to manage watersheds and promote the creation of basin councils.
263	The **provincial governments** have the exclusive competence of the provincial environmental management and to plan, build, operate and maintain irrigation systems.
264	The **municipal governments** have the exclusive power to provide the public services of drinking water, sewage, wastewater treatment, solid waste management, environmental sanitation
281	Food sovereignty is a strategic objective and an obligation of the State. Thus, it is the State's responsibility to promote small and medium production units. Also to promote redistributive policies that allow the access to land, water and other productive resources.
282	Concentration of land, hoarding or privatization of water and its sources is forbidden
313	The State reserves the right to administer, regulate, control and manage the strategic sectors, in accordance with the principles of environmental sustainability, precaution, prevention and efficiency. (Water, non-renewable natural resources and energy are considered strategic sectors among others)
314	The State is responsible for the provision of public services of drinking water, irrigation and sanitation. The State is also responsible for controlling and regulating the price and rates of public services.
318	Water is a strategic national patrimony for public use, inalienable and imprescriptible domain of the State, and constitutes a vital element for the nature and for the existence of human beings. The privatization of water is completely prohibited. Public or community water management will exist exclusively. The public sanitation service, drinking water supply and irrigation will be provided only by state or community legal entities. The State will strengthen the management and operation of community initiatives around water management and the provision of public services, by encouraging partnerships between public and community for the provision of services. The State, through the Sole Water Authority, will be directly responsible for the planning and management of water resources that will be used for human consumption, irrigation that guarantees food

	sovereignty, ecological flow and productive activities, in this order of priority. State authorization will be required for the use of water for productive purposes by the public and private sectors.
411	The State shall guarantee the conservation, recovery and integral management of the water resources, watersheds and ecological flows associated with the hydrological cycle. Any activity that may affect the quality and quantity of water, and the balance of the ecosystems, especially in the sources and water recharge zones, will be regulated. The sustainability of ecosystems and human consumption will be a priority in the use and exploitation of water.
412	The authority in charge of water management will be responsible for its planning, regulation and control. This authority will cooperate and coordinate with the one in charge of environmental management to guarantee water management with an ecosystem approach.
423	It is a strategic objective of the State the integration with Latin America and the Caribbean. The Ecuadorean State commits to promote joint strategies for the sustainable management of the natural heritage, conservation of biodiversity, ecosystems and water, research, scientific development and exchange of information.

D) FURTHER EXPLANATION ON THE LEGISLATION

This annex has appeared before as part of the Water law and organization course (CIE5500) paper

COMMUNITY BASED WATER MANAGEMENT IN THE ECUADORIAN LEGISLATION

ABSTRACT

Community management has been a vital part of water management in Ecuador since pre-Columbian times. The indigenous inhabitants of the region have always had a community approach to resource management in general, which has influenced the costumes and views on management to this day. With the 2008 constitution, water was declared a right and its management exclusively public or community-based. The subsequent water law was expected to reaffirm and reinforce this community style of resource management. However, some groups felt the water law relied too heavily on a state-centric management style. In this paper, an analysis of the role of community-based water management in the current legislation is carried out. In the end, although this type of water management is indeed covered in the legislation, the practical aspects are far from finished.

INTRODUCTION

Community-based management has two main advantages: it is easier and less resource intensive to implement in regions where the population is scattered, and small settlement are far apart, and it has greater potential for public participation than private or public management (Global Water Partnership, 2017). In Ecuador, this management model has been used for centuries. It predates the Spanish conquest, and it originates from the shared vision and strong sense of community most indigenous systems had. The Andean region, in general, has historically managed water locally, opposed to the centralized model imposed after the Spanish arrival.(Foro de los Recursos Hídricos, 2013)(Boelens, 2015).

When the current Ecuadorian legislation was being approved, some indigenous groups contested it based on the state-centric approach and complaint that the law did not empowered community based water management (CBWM). This paper aims to understand if/how does the water law foster community management by analyzing the current constitution, water law and the regulation of the water law. The scope of this research is the Ecuadorian legislation from 2008 onwards.

In the next section, a brief overview of community-based management in literature is given, mainly the overall recommendations to encourage it according to the Global Water Partnership. Then a detailed analysis of the community approach in the current Ecuadorian constitution and water law is presented. The last section consists of the conclusions and final comments.

COMMUNITY-BASED WATER MANAGEMENT

Community-based water management (CBWM) has been adopted by several cultures around the world. This method is usually applied in small and scattered communities. However, community-based organizations (CBOs) can seldom work alone, and it usually has to integrate to national water management plans and even international water management plans in transboundary basins. Moreover, due to the limited financial capacity of the CBOs, partnerships with government and NGOs are valuable to these organizations (Global Water Partnership, 2017).

The cultural aspect is also very important in CBWM. In the case of Ecuador, indigenous groups have demanded their right to manage their own water for decades. In fact, CBWM has been a part of Ecuadorian water policy for at least 40 years, in the form of Water Users Associations (WUAs). These associations, known locally as juntas de agua, are directed by a board elected from members of the community the WUA serves (Martines, 2010).

In the following section, the current legislation is discussed, however, legislation alone is not enough to foster and encourage CBWM. The Global Water Partnership in the toolbox B2.03 gives a few suggestions to implement community-based management successfully (Global Water Partnership, 2017):

- Adequate legal framework
- Increase the sense of ownership
- Training for the community managers
- Close interaction between local government and the community managers
- Network expansions limited to the community's ability to manage

To be able to apply these recommendations, a clear division of responsibilities is needed. The legislation or the policy makers have to make clear what is expected from the WUAs and put mechanisms and programs in place that provides a constant feedback between WUAs and government.

LEGAL FRAMEWORK

The importance of community-based water management has been established, and the ancestral roots of this type of management in the Andes region have also been recognized. Now, the question is whether or not this management model is not only supported but encouraged in the current legislation. The main bodies of law relevant to water management are the 2008 Constitution, 2014 Water Law, and its regulation.

Constitution (2008)

The 2008 Montecristi Constitution was generally well received among indigenous groups and water activists. It was the first constitution to give nature rights, mainly the right to exist, persist and to be restored and respected. The constitution also defined water and sanitation as a fundamental human right.

Article 318 gives most of the provisions related to water. It defines water as a strategic national patrimony for public use. This definition as strategic national patrimony is important since it changes the previous conceptions of water as a good or resource. It is important to understand that the 2008 Constitution established a shift in the vision of development and introduced the concept of Sumak Kawsay in the Ecuadorian legislation. This expression from the indigenous language kichwa was translated to Buen Vivir (Good Living) in Ecuador, although not all experts agree on the translation (Acosta and Martinez, 2010). In summary, this Andean ancestral form of living focuses on an equilibrated and harmonious relationship with nature, uses the community as the unit of life and puts the quality of life above unlimited development (Villalba, 2013).

Also, giving water the status of national strategic patrimony means that the state has total control over the planning and management of water resources. The constitution centralizes these attributions in the figure of a Sole Water Authority. The constitution does not define how the Sole Water Authority is composed, the intent is to centralized all policy and decision making relating to water and eliminate the institutional redundancies and confusions that have historically been present in Ecuadorian water management.

The constitution also establishes water management as strictly public or community-based. This distinction was made to avoid the privatization of water management and water supply. It also recognizes CBWM as a valid form of

management. Moreover, the constitution specifies that the government has an obligation to encourage and strengthen CBWM initiatives. It also gives local government the responsibility to consolidate and incentivize the creation of public and community alliances.

Article 318 also defines the priority of water uses — first human consumption, followed by irrigation that guarantees food sovereignty, ecological flow, and productive activities, in this order. The State has to authorize any productive water uses by the public and private sector. The inclusion of irrigation water for small-scale agriculture should mean a redistribution of water rights, given that water resources have historically been concentrated in the hands of large-scale farms and agro-export business (Martines, 2010). Given the importance of irrigation water for internal food production and as a way to decrease poverty in the rural sector, the monopolization of water rights (authorizations) is prohibited.

Lastly, the constitution establishes the right of all Ecuadorian citizens to participate in the formulation, execution, evaluation, and control of public policies and public services. Translating these provisions into water management, it is clear that the constitution requires a participatory management model. However, it is important to notice that even though CMWM incentivizes the participation of the local communities in its own resources management, it does not automatically mean that a participatory approach is guaranteed. First, CBOs can suffer from the same issues of representation as other institutions, especially in larger communities where the board members do not necessarily represent all members of the community being served. Secondly, the participation is very localized, people might have a say on what happens in their community, but participation in the national policy-making level is also important and is not covered by CBWM.

The constitution set up provisions regarding water management. Most notably, it gave a year for the formulation of the new water law and mandated the revision of irrigation water authorizations.

Water law (2014) and Regulation (2015)

Following the stipulations of the constitution, the National Assembly passed the Organic Law of Water Resources Uses and Water Exploitation in 2014. The approval of this law was highly debated and generated discussions on several points, especially with the indigenous communities and their representatives. One of the concerns was the creation of the Sole Water Authority, which concentrates all the decision and policy-making power. Although the Sole Water Authority was already stipulated in the 2008 constitution, the main point of debate was the composition of said institution, in the Regulation of the Water Law, the Sole Water Authority is defined as the Senagua (National Water Secretariat) a government institution with the rank of a ministry.

In the end a national strategic water system was created, which consists of the Sole Water Authority at the top, the Intercultural and Plurinational Water Council, every relevant ministry, ARCA (Water Regulation, and Control Agency), Decentralized Autonomous Governments (GADs) and the Basin Councils of the nine major basins in the country.

The Sole Water Authority is responsible for the direction, planning, and management of water resources. In other words, it is the maximum authority regarding water. Among their attributions it is worth highlighting the following responsibilities: to elaborate the National Water Resources Plan and the management plans for each basin, to establish the water protection areas, to grant authorizations for all water uses, to grant legal status to WUAs and to delineate the river basin areas and establish the possible grouping of different river basins.

ARCA is the technical-administrative body associated with the Sole Water Authority that has administrative and financial autonomy. It develops technical standards and supervises its application, including water quantity and quality standards that WUAs have to follow. It is also responsible for controlling and regulating the application of the policies and management plans formulated by the Sole Water Authority. In case a WUA does not comply with the standards set by ARCA, a period of time is given to provide an action plan that would bring the water up to standard. GADs are supposed to help both financially and technically in the creation and execution of these action plans.

The creation of the Intercultural and Plurinational Council was proposed as a form to appease the indigenous leaders; the law stipulates the Council would be the social control that guarantees the human right to water and would participate in the formulation of water-related policies. However, the Council did not meet the indigenous group's expectations, given the advisory only nature and the fact that, more than 4 years later, the council has not been elected. Likewise, the only other citizen organization included in the national water strategic system would be the Basin Councils, that have not been well established as well.

The other participatory body is the basin councils. In the regulations of the water law, Ecuador is divided into 9 hydrographic demarcations, namely the most important river basins. These demarcations are then divided into smaller basins. The basin councils should be formed for both planning units (demarcation and basins). However, the basil councils addressed in the national strategic water system are the ones from the nine demarcations. These councils are purely advisory, and their main function is to represent the public in the formulation of the basin management plans and the national water management plan. Although the creation of these councils was seen as a step towards public participation, the advisory nature was another point of content for the critics of the water law. In practice, these councils do not have actual decision-making power and are often overlooked by the authorities.

GADs are the forming blocks of Ecuadorian territorial organization. The different levels are regions, provinces, cantons, and parishes. Given the local nature of GADs, these are often the most important connection between citizens and the government. Cantons and parishes GADs are particularly important in CBWM since they are the ones that should provide technical and financial support to communities and CBOs. Moreover, they are often the intermediaries between the Sole Water Authority and the WUAs. The law states that GADs are responsible for coordinating the collaboration between different government levels and CBOs.

The law, following the constitution, recognizes community management as a valid form of water management. It establishes public and community-based as the only forms of water management in the country, forbidding the privatization of water and water services. Unless, the competent authority is not able, technically or financially, to develop the service. This exception also worried many indigenous leaders, as it seems to give an exception to the water privatization prohibition set in the constitution. What also generates concern is who determines if the competent authority is not able. There should be better parameters in place to judge the ability of the government to provide said services.

Water User Associations (WUAs), are the main organizations regarding CBWM and are defined as non-profit community organizations. A WUA can be created anywhere in the national territory that the government does not provide water services. WUAs should observe economic efficiency, sustainability of water resources, quality in the provision of services and equity in the distribution of water. Additionally, WUAs are required to keep a record of their functions and are subject to evaluation and control by the Sole Water Authority and ARCA. WUAs can also manage, operate and maintain infrastructure relating to their functions. It is interesting to notice that there is no minimum or maximum size established neither on the law nor on the regulation for WUAs, these can lead to a very heterogeneous group of WUAs. This makes it difficult for the authority to legislate and establish norms for all WUAs, since, just by the widely diverse composition different challenges will be faced by different WUAs.

The law describes two types of WUAs: drinking water and irrigation. Drinking water WUAs are responsible for providing drinking water and sometimes sanitation services, while Irrigation WUAs are responsible for irrigation water and sometimes drainage. Neither the law nor the regulation specified when the sanitation and drainage services should be part of the WUA and said services are not further explained in the articles detailing the attributions and obligations of WUAs.

Regarding participation on the bigger picture decisions, WUAs representatives should theoretically be elected to participate both in the Intercultural and Plurinational Council and the Basin Councils. However, as stated before, not all of these institutions have been formed. Thus, the participation of WUAs in the creation of management plans and

overall water policy is limited to public complaints and depends greatly on the inclination to listen of the government official responsible for their hydrographic demarcation.

The financial aspect of community management is largely based on the service tariffs paid by the water users to the WUAs. These tariffs are set by the WUAs but should follow the guidelines set by ARCA. It is important to differentiate the service tariffs the WUAs (service providers) set and the tariffs for the untreated water authorizations (set by the Sole Water Authority). Usually, WUAs do not have to pay for the untreated water since it is established that water for human consumption and food sovereignty (certain quantities) are exempt from paying recurrent water use authorization tariffs. For maintenance works, the members of the WUAs have to either provide manpower or the monetary equivalent. How much each member has to contribute is usually based on how much water they receive. When dealing with infrastructure that requires a heavier investment, WUAs are responsible to arrange the money with the relevant government level.

WUAs are also responsible, in conjunction with the Sole Water Authority, to preserve the water sources and use the resource sustainably. As mentioned before, the buen vivir changes the view of the relationship between people and nature. WUAs are in charge of preserving both the water resource as well as the nature that makes the resource possible (reforestation of water springs, protection of vegetation in the riverside, etc.).

Besides WUAs, there is another form of CBWM addressed in the law: customary law. In the constitution, the rights of some groups (nationalities, indigenous communities, collectives, etc.) to practice their customary law and keep their traditions is guaranteed. Thus, the water law recognizes their right to keep their current systems for water access, use, and distribution. However, customary law cannot go against the other provisions of the law, especially the free access to water. Also, the Sole Water Authority should keep a record of said practices.

Conflict resolution is also addressed in the law, when the WUAs or the communities have an internal conflict or with an external party they should try to reach a solution and solve the issue through agreement of those involved. Nonetheless, if a solution cannot be internally found, the Sole Water Authority can get involve and settle the dispute as it sees fit. These intervention of the authority should be treated carefully, since there is no guarantee that the Sole Water Authority knows the customs and can reach decisions that are completely foreign to the communities, worsening the problem (Acción Ecológica, 2015).

However, sometimes the conflicts are directed to the Sole Water Authority. In 2015 CONAIE (Confederation of Indigenous Nationalities of Ecuador) filled an unconstitutionality lawsuit against the water law. They claimed the law weakens CBWM, reducing the function and capacities of the WUAs. Moreover, they argue that forcing the creation of WUAs goes against their customs. They also argue that both the law and its regulation failed to create mechanisms to redistribute water rights and end privatization (Política, 2017)(Gordón, 2015)(Redacción, 2015).

CONCLUSION

It is clear that the main targeted management model in the Ecuadorian law is neither public nor community based only, but rather a combination of both. Moreover, the management model greatly depends on the synergy of both models. The miscommunication and lack of alignment between CBWM and the State institutions can lead to a slow and ineffective system. The legal framework in place is a start to validate the community based management model and its integration in the State's management model. However, there are still concepts that are left undefined and the mechanisms to apply the changes the law demands are unclear.

Another important aspect of the water law in particular, is how much is left to the regulation. In Ecuador, organic laws have to pass the assembly (Congress) and to be modified it also needs to pass with an absolute majority in the assembly. On the other hand, regulations of the laws are signed only by the president. Thus they only need the president's signature to be modified. Due to this, representatives of the indigenous groups, NGOs and water user associations were

concerned with how much changes the president can introduce without even passing the modification through the assembly.

A main point of content in the debate surrounding the water law was the participation of users and the citizens in water management both at the national and local level. The law establishes the citizens' organizations, such as the councils, as purely advisory. The Sole Water Authority is not obligated to take into account the points of view of the public. The true decision-making happens at the government institutions, and the inclusion of the public perspective depends on the goodwill of the government officials in charge. Granted, there are other mechanisms which citizens can use to exert control and report authorities if they do not comply with the law or constitution. But denouncing something should not be the only way the citizens' voices are heard. On the other hand, the foundation for participatory management has indeed been laid out with the creation of the basin councils and the Intercultural and Plurinational council. Now, making sure they are heard and complying with their regulating function should be the next step.

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E) ESMERALDA'S HD

The Guayllabamba is part of the Esmeraldas HD, which extends over six provinces: Pichincha, Cotopaxi, Santo Domingo de los Tsachilas, Imbabura, Manabi and Esmeraldas. All the numerical data presented in this annex was retrieved from the report Regional Hydrographic Plan of the Esmeraldas' Hydrographic Demarcation (CISPDR, 2016).

Sub-basins forming the Esmeraldas' HD:

Basin Name	Cantons	Area (km^2)
Muisne	Esmeraldas, Muisne, Atacames, Quinindé	1622,78
Esmeraldas	Esmeraldas, Latacunga, Pujilí, Sigchos, Quininde, La Concordia, San Miguel de Los Bancos, Pedro Vicente Maldonado, Puerto Quito, Santo Domingo	12 450,72
Guayllabamba	Latacunga, Eloy Alfaro, Quinindé, Cotacachi, Otavalo, Quito, Cayambe, Mejía, Pedro Moncayo, Rumiñahui, San Miguel de Los Bancos, Pedro Vicente Maldonado, Puerto Quito	9181,86
Verde	Esmeraldas, Eloy Alfaro, Quinindé, Rioverde	2016,28
Cayapas	Eloy Alfaro, San Lorenzo	6770,9

Rivers forming the Guayllabamba basin:

Name	Lenght (km)	Area (km^2)	Average anual run-off (hm^3)
Guayllabamba	268,4	8242,2	6984
Pisque	33,5	1133,4	576
Apuela	62,1	1043,9	823
Pita	46,8	602,7	341
Alambi	47,1	547,8	599
Chiche	9,5	394,1	166
Mashpi	42,8	368,5	655
Machangara	20,9	226,6	201
Naranjal o Llurimaguas	35,7	223,4	350
Chirapi	21,8	141,4	198
Capulís	11,8	134	102
Guambi	25,9	128,4	52
Manduriacu Grande	25	109,1	160
Pitzara	53,9	81,8	184
Chontal	17,9	48	50
Grande	71	883,2	1434

Economic indicators on the Guayllabamba basin

Main agricultural indices in 2010

Agriculture, forestry and livestock (thousands of USD)	634,117
Permanent crops (ha)	47,892
Transitory Crops (ha)	55,390
Total crops (ha)	**103,282**
Grassland area	168,365
Total agricultural (ha)	**271,647**
Quantity of older cattle	441,934
Quantity of smaller livestock	109,058
Quantity of poultry	20,883,835

F) GUAYLLABAMBA BASIN MAP