

# “Governance restricts”: A contextual assessment of the wastewater treatment policy in the Guadalupe River Basin, Mexico



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## ABSTRACT

Lack of wastewater treatment is among the main water problems worldwide. The implementation of wastewater treatment policies faces varying challenges given the many different contexts. Therefore, context-sensitive approaches are required from a governance perspective. This paper aims to improve the understanding of the role of contextual factors in water and wastewater governance drawing on empirical evidence from Latin America, with a focus on the Guadalupe River Basin in Mexico. The findings indicate that the governance context restricts the implementation of wastewater treatment policy. Thus, future reforms should consider the top-down nature of the policy implementation process.

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## 1. Introduction

Despite significant improvements in drinking water supply, lack of wastewater treatment remains as one of the main water problems around the world (Ardakanian et al., 2015). In developing countries, approximately 90% of wastewater is discharged untreated into rivers, lakes and oceans (Corcoran et al., 2010). The average wastewater treatment level reaches 70% in high-income countries, but falls to 38% in upper-middle-income countries and declines further to 28% in lower-middle-income countries (Allaoui et al., 2015). These levels demonstrate that wastewater governance is failing worldwide. This state of affairs has negative consequences for human health and nature, and comes with high economic costs (UN WATER, 2014; WHO and UN Water, 2014).

The consensus among the international community is that water problems are, in many ways, best seen as governance issues; as the amount of water can be enough and solutions are well known, but inequality, lack of access and mismanagement are still present, implying that the real challenge is the implementation of the solutions (Gupta, 2011; Jacobson et al., 2013; Marques et al., 2016;

Miranda et al., 2011; OECD, 2011; Peniche Camps and Gúzman Arroyo, 2012; UN WATER, 2006). Despite this consensus, there is not much consistency in the understandings and meanings of the governance concept (Bressers and Kuks, 2003). Due to this reason and the importance of governance, many scholars have tried in the last decades to categorise those understandings and meanings (Bressers and Kuks, 2003; Klijn, 2008; Rhodes, 1996; Van Kersbergen and Van Waarden, 2004). Thus, governance has become an important and common concept in the water sector (Pahl-Wostl, 2015). The broadness of the term is reflected in its derivative concepts, such as “water governance”, “good water governance”, “water governance assessment” (Casiano and Boer de, 2015; Vinke-de Kruijf and Özerol, 2013) or “improved water governance” (Stockholm International Water Institute, 2015). Governance can be conceptualised as “a social function” or “a system” (Pahl-Wostl, 2015, p. 25). The first conceptualization relates to the normative perspective, which considers governance as a desired outcome, while the second one reflects a neutral perspective that considers governance as a combination of institutional arrangements. Water governance, as a normative concept, has been promoted by international organisations. Commonly, the analytical frameworks of these organisations are inspired by political practices, certain philosophical principles and objectives inherent to specific societies (Hufty, 2009, p. 3). International organisations such as the United Nations and the Organization for Economic

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Cooperation and Development (OECD) have established water governance principles. For example, the OECD principles on water governance focus on efficiency, effectiveness, trust and engagement (Akhmouch and Correia, 2016). Currently, most OECD member countries have decentralised their water policy-making, and river basin management has been encouraged in both federal and unitary countries (OECD, 2011).

Various scholars have criticised the normative perspective and called for contextual consideration; arguing that governance problems require context-specific answers, rather than “panaceas” or “universal remedies” (Gupta et al., 2013, p. 577; Ostrom et al., 2007, p. 15176; Pahl-Wostl, 2015, p. 11). This criticism also entails the development of several frameworks that consider contextual factors (Ansell and Gash, 2008; Bressers and Kuks, 2013; Ostrom et al., 2007; Pahl-Wostl, 2009, 2015; Pahl-Wostl et al., 2010; Thiel and Egerton, 2011; Van Rijswijk et al., 2014). One of them is the Governance Assessment Tool (GAT), applied in this article and explained in Section 2. Other is the Management Transition Framework, which is described as “an interdisciplinary conceptual and methodological framework supporting the analysis of water systems, management processes and multi-level governance regimes” (Pahl-Wostl et al., 2010, p. 571). Another framework is the Ten Building Blocks for Sustainable Water Governance, described as “an objective, impartial and undogmatic assessment of the applicability of integrated water resources management” (Van Rijswijk et al., 2014, p. 726). The frameworks mentioned are applied to assess water governance and, as the GAT, they also help to improve our understanding of contextual factors of the governance arrangement in the implementation of water policies. Actually, the understanding of both the impact that governance has on the performance and efficiency of the water utilities, and how the improvement in the governance can influence the outcomes in a consistent manner, contribute to redraft the water governance concept (Marques et al., 2016).

It is well known by public policy scholars and practitioners that issuing policies does not guarantee the expected results (Meier and McFarlane, 1995). Even governance systems that are well-designed, from a certain point of view, do not automatically deliver the expected outcomes (Birkland, 2011; Durlak and DuPre, 2008; McLaughlin, 1987; O’Toole, 2004; Pressman and Wildavsky, 1984). Wastewater treatment policy in Mexico provides an example of this lack of intended results. Since 2000, the federal government made significant investments to increase the number of wastewater treatment plants (WWTPs) (Peña de la et al., 2013). The number of WWTPs increased from 793 in 2000 (CONAGUA, 2014) to 2337 in 2014 (CONAGUA, 2015c). However, many of these WWTPs are not being operated, while others are abandoned or incomplete, and some do not work properly (Valle, 2014). None of the national water plans achieved their objectives on wastewater treatment levels (Casiano and Bressers, 2015). The current wastewater treatment level is around 55% for municipal discharges (CONAGUA, 2015b) and 19% for the industry (Green-Peace, 2014).

Water governance assessments have become important policy tools as they can help both the identification of policy implementation challenges and the recommendation of pragmatic reforms, as well as uncover the relationship between programmes, regulations and the achievement of goals (Jacobson et al., 2013). In recent years, various methodologies have been developed to assess water governance. The United Nations Development Programme (UNDP) has compiled 13 (Jacobson et al., 2013) and the OECD 25 (OECD, 2015). Besides these evaluation tools, only a few studies on wastewater governance assessment have been carried out in Mexico, including the studies on the Lerma-Chapala basin (Pacheco-Vega, 2009), the Aguascalientes case (Pacheco-Vega, 2015a), the Atoyac-Zahuapan sub-basin (Casiano Flores et al.,

2016; Rodríguez, 2010) and the Puebla Alto Atoyac sub-basin (Casiano and Boer de, 2015).

This paper aims to bridge three research gaps in the wastewater policy and governance literature, with a focus on Mexico, a part of the Latin American context. Firstly, water governance analysis usually concentrates on water supply, demand and distribution, while only a few studies examine sanitation and wastewater (Pacheco-Vega, 2015b). Secondly, most studies on wastewater emerge from the perspectives of engineering and natural sciences, whereas only a few are from a social science perspective (Pacheco-Vega, 2015b). Thirdly, in Latin America, there are no sub-national studies that provide an in-depth examination of wastewater policies (Pacheco-Vega, 2015b). In a broader sense, the paper also contributes to the governance-focused debate on policy implementation (Van Rijswijk et al., 2014).

Previous studies in the Mexican context show that wastewater treatment policy has been driven by the government through federal programmes, implying a “top-down” implementation approach (Casiano and Boer de, 2015; Casiano Flores et al., 2016). For a comprehensive analysis that allows both top-down and bottom-up implementation approaches, this paper focuses on the Guadalupe River Basin. This case is among the few in Mexico that involves the creation of a sub-basin commission in a bottom-up fashion (Franco-Garcia et al., 2013), alongside the influence of the National Water Commission’s (CONAGUA) top-down programmes. The traditional “top-down” implementation approach relies on clear directives and the assignment of ultimate responsibility to the agencies involved; whereas the “bottom-up” approach of collaborative implementation includes recommendations that establish clear criteria for resolving the conflicts among different stakeholders (Koontz and Newig, 2014). Both approaches create a context that influences the policy implementation by supporting the actions of the stakeholders and/or by creating restrictions for the implementation process. To assess the nature and degree of this influence, our research question is formulated as follows: How supportive or restrictive is the context created by the combination of bottom-up and top-down implementation approaches for the implementation of the wastewater treatment policy?

To answer this question, we start with an elaboration of the Governance Assessment Tool, which is followed by a description of the assessment methodology and the empirical case. Then the results from the governance assessment are presented, and finally concluding remarks are provided.

## 2. The governance assessment tool as a theoretical and methodological framework

The Governance Assessment Tool (GAT) is part of those frameworks that consider governance from an institutional arrangement perspective. It is related to the UN’s fifth methodology type, which is described as a tool with a highly academic character (Jacobson et al., 2013, p. 68) and it is also part of the 25 assessment tools compiled by OECD (OECD, 2015, p. 31). The GAT has been applied in the analysis of water projects implementation in the Netherlands (Boer de and Bressers, 2011), Canada (Boer de, 2012), north-west Europe (Germany, United Kingdom, France, Belgium and The Netherlands) (Bressers et al., 2016), Romania (Vinke-de Kruijff et al., 2015), Mexico (Casiano and Boer de, 2015; Casiano Flores et al., 2016) and Palestine (Al-Khatib et al., 2017; Judeh et al., 2017). Here, governance is regarded as “beyond the government” and defined as the underlying structural context that guides and organises the actions and interactions of the actors involved in water resources management (Bressers and Kuks, 2013).

The elements of the GAT are based on the Contextual Interaction Theory (CIT) (Boer de, 2012; Boer de and Bressers, 2011; Bressers

and Kuks, 2004). CIT was developed to organise the multiplicity of aspects in public policy and administration literature into a concise framework (Bressers and Kuks, 2013). It considers the multi-layered structural context and the role of multiple actors in negotiations for implementation (O’Toole, 2000). CIT is a third-generation implementation approach that combines top-down and bottom-up analysis. It conceptualises policy implementation as the set of activities connected to the employment of pre-set policy measures (Dinica and Bressers, 2003). Furthermore, CIT divides the descriptive-analytical elements and the semi-normative qualities of the governance context (Casiano and Boer de, 2015). The five descriptive-analytical elements are called the “dimensions of governance”, which are multi-level, multi-actor, multi-faceted, multi-instrument and multi-resourced based. These five dimensions describe the governance regime (Bressers and Kuks, 2013) and they are attributes upon which each criterion or quality is assessed. The “semi-normative” characteristic implies that the normative contents of the qualities are derived from and thus are dependent on the importance and urgency of the implementation of policies under assessment. The four semi-normative quality criteria are: extent, coherence, flexibility and intensity. Together, the dimensions and the qualities measure how supportive the context is for the implementation of the policies under study. The four criteria are defined by the questions that they pose (Bressers et al., 2016):

*Extent:* are all elements in the five dimensions, which are relevant for the sector or project being addressed, taken into account?

*Coherence:* are the elements in the dimensions of governance reinforcing, rather than contradicting, each other?

*Flexibility:* are multiple roads to the goals, depending on opportunities and threats as they arise, permitted and supported?

*Intensity:* how strongly do the elements in the dimensions of governance urge changes in the status quo or in current developments?

The five dimensions and the four quality criteria are used to analyse the governance interactions and to assess the top-down and bottom-up implementation manners from a contextual

perspective (Bressers and Kuks, 2013). As Table 1 illustrates, the GAT is a ‘matrix’ of questions with the five dimensions in its rows and the four qualities in its columns (Bressers et al., 2015).

Previous research has demonstrated that the GAT can be applied when there is a multi-level setting exhibiting interdependence amongst the actors. This means that different levels should act as semi-autonomous units and power must be diversified (Gage and Mandell, 1990). This interdependence must be classified at least as a “legislatively initiated coordination” (Gage and Mandell, 1990), even if it is not fully implemented. So far, as shown before, the GAT has been used to assess policy implementation mainly in developed countries, where significant stakeholder involvement and bottom-up implementation take place. However, few studies have applied the GAT in Latin American contexts, where the policies are implemented mainly in a “top-down” manner. One such study focused on the Puebla’s Alto Atoyac sub-basin in Mexico, where there is a symbolic implementation of the wastewater treatment policy (Casiano and Boer de, 2015). Another study examined the Tlaxcala’s Atoyac-Zahuapan case, where the decentralisation policy has not delivered the intended results for wastewater treatment (Casiano Flores et al., 2016). This paper presents an institutional variation when compared to these previous studies, since it includes the creation and operation of a basin commission.

### 3. Methodology

The GAT has been created by social and political scientists with the inputs of practitioners and stakeholders. It is still under development and requires refinement as other governance assessment methods does (Bressers et al., 2016). It is important to emphasize that the GAT has an institutional perspective, it includes contextual considerations and it is an integral but not an interdisciplinary approach (Bressers et al., 2016).

The GAT enables a systematic analysis of the governance context to diagnose critically whether and to what extent it restricts or supports policy implementation. It aims to be an “actual hands-on but science-based assessment method” (Bressers et al., 2016, p. 8)

**Table 1**  
Water governance assessment matrix.

Governance dimension	Qualities of the governance regime			
	Extent	Coherence	Flexibility	Intensity
Levels & Scales	How many levels are involved and dealing with an issue? Are there any important gaps or missing levels?	Do these levels work together and do they trust each other between levels? To what degree is the mutual dependence recognised?	Is it possible to move up and down levels (upscaling and downscaling) given the issue at stake?	Is there a strong impact from a certain level towards behavioural change or management reform?
Actors & Networks	Are all relevant stakeholders involved? Who are excluded?	What is the strength of interactions between stakeholders? In what way are these interactions institutionalised in stable structures? Do the stakeholders have experience in working together? Do they trust and respect each other?	Is it possible that new actors are included or even that lead shifts from one actor to another when there are pragmatic reasons for this? Do the actors share in social capital allowing them to support each other’s task?	Is there a strong impact from an actor or actor coalition towards behavioural change or management reform?
Problem Perspectives & Goal Ambitions	To what extent are the various problem perspectives taken into account?	To what extent do the various goals support each other, or are they in competition or conflict?	Are there opportunities to re-assess goals?	How different are the goal ambitions from the status quo?
Strategies & Instruments	What types of instruments are included in the policy strategy and are implemented and which are excluded?	To what extent is the resulting incentive system based on synergy? Are there any overlaps or conflicts of incentives created by the included policy instruments?	Are there opportunities to combine or make use of different types of instrument? Is there a choice?	What is the implied behavioural deviation from current practice and how strongly do the instruments require and enforce this?
Responsibilities & Resources	Are responsibilities clearly assigned and sufficiently facilitated with resources?	To what extent do the assigned responsibilities create competence struggles or cooperation within or across institutions?	To what extent is it possible to pool the assigned responsibilities and resources as long as accountability and transparency are not compromised?	Is the amount of allocated resources sufficient to implement the measures needed for the intended change?

for policy implementation. The implementation process regarding the wastewater treatment policy is examined under four stages, namely: planning, construction, operation and monitoring. To assess the governance context of this implementation process, the data was collected through individual interviews and document reviews.

A total of 22 respondents were interviewed in two rounds. The first round was in January 2015 and the second round took place between July 2015 and March 2016. There has been a follow up with some respondents to clarify the answers provided and to obtain more detailed information. Given that the case study was the Presa de Guadalupe sub-basin, the starting point was the Guadalupe Commission actors. However, the interviews were not limited to them since the CORESE Commission drives the wastewater treatment policy through a multi-level arrangement. Therefore, as a second step, and with the support of the commission staff in most of the cases, the first author contacted the governmental actors who introduced him to the civil servants in charge of the wastewater treatment policy implementation in the water utilities; the Water State Commission and the CONAGUA delegation. The interviewees included directors or department heads in charge of the planning, operation and/or monitoring of the wastewater treatment plants in the different governmental institutions. Table 2 shows the affiliation of the interviewees.

The interview questions were based on Table 1 and they were tailored according to the empirical case. The context is assessed as “supportive” for each criterion, when the majority of the dimensions favour the implementation at a moderate or high level. Otherwise, the context is assessed as “restrictive”. Table 3 presents the parameters that are operationalized for each cell of the matrix (Casiano Flores, 2017).

From the GAT perspective, the governance dimensions and qualities that compose the matrix are not assigned with different weights, as this is context dependent. GAT studies have found that under certain contextual circumstances some items from the matrix can be more or less important than others; and changes in one dimension can affect the others (Bressers and Kuks, 2013). Furthermore, favourable conditions in one item can compensate to some degree less favourable conditions in another item. Even during the implementation process, certain contextual circumstances can help to overcome quality issues. For example, fragmentation, i.e., low level of coherence, in instruments or resources for implementation can be repaired by good relations and strong bonds among the actors, provided that there is enough flexibility in the governance to be allowed to pool resources. Similarly, a context that is supportive in terms of flexibility and intensity can overcome incoherence, too (Boer de et al., 2016, p. 232). At the end, it is not only about scores, but an assessment of the combinations of circumstances and how they impact the implementation process.

#### 4. Case description

In 1992, the Mexican government started implementing substantial water reforms. The current National Water Law created a

wide variety of institutions: 13 river basin organisations, 26 river basin councils, 32 river basin commissions, 41 river basin committees, 82 technical groundwater committees, 38 local clean beach committees, 85 irrigation districts and 23 rainfed districts (OECD, 2013). One of the 32 river basin commissions was established for the Guadalupe River Basin, which consists of five municipalities: Atizapán de Zaragoza, Cuautitlán Izcalli, Isidro Fabela, Jilotzingo and Nicolás Romero (Franco-García et al., 2013). Fig. 1 shows the location of the basin.

The Presa Guadalupe River Basin Commission, hereafter called “the Guadalupe Commission”, was established in January 2006 after a massive fish death that had happened in May 2004 (Franco-García et al., 2013). In Mexico, commissions are commonly created in a top-down process directed by the CONAGUA. However, the Guadalupe Commission was initiated through a bottom-up process (Franco-García et al., 2013). By law, CONAGUA is obligated to promote the participation of water users and to consult with the river basin councils, to propose planning, to identify problems and to create strategies. The guidelines are stated in the Rules of Operation for the Management Basin Councils (Franco-García et al., 2013). The process of creating river basin organisations was considered as a mere decentralisation of offices, instead of a power decentralisation; since the regional and local offices and their directors were still subordinated to the CONAGUA’s director (Jardines Moreno, 2008; OECD, 2013).

River basin commissions, such as Guadalupe, are auxiliary bodies of CONAGUA. They are expected to facilitate the implementation of river basin councils’ strategy, inter-governmental coordination, and social participation at the sub-basin level (OECD, 2013). The Guadalupe Commission is composed of the actors shown in Fig. 2.

The stakeholders that form the Guadalupe Commission include the federal, state and municipal government, the urban and agricultural water users, as well as other sectors, such as forestry, aquaculture, non-governmental organisations (NGOs) and universities. The Commission has its own staff and is supported by a federal budget that comes mainly from CONAGUA.

The Guadalupe Commission is expected to coordinate actions among the stakeholders in the sub-basin and has the following objectives (CCPG, 2015):

- Promote water sanitation and monitor the water quality
- Improve the distribution and use of water
- Promote an efficient use of water
- Promote the environmental, social and economic value of water
- Promote conservation and improvement of ecosystems

Water pollution problems still persist ten years after the creation of the Guadalupe Commission. The reservoir contains high levels of nitrogen, phosphorus, carbon compounds and bacterial pathogens (Sepulveda-Jauregui et al., 2013). It is estimated that annually 15 million m<sup>3</sup> of untreated wastewater originating from the municipalities is discharged into the basin (Franco-García et al., 2013). Generally, stakeholders do not perceive any improvement in

**Table 2**  
Affiliation of the interviewees.

Water utility	State level	Federal level	Social actors
OPERAGUA Cuautitlan Izcalli	Ministry of Agriculture	Presa Guadalupe Basin Commission	Aquaculture Sector
OPERAGUA Atizapan	Water State Commission	CONAGUA Delegation in Estado de Mexico	Civil Society (Comite de Rescate del Lago de Presa Guadalupe)
Jilotzingo	Ministry of the Environment		

**Table 3**  
Water governance assessment rubric for assessing the WWTP policy.

Governance dimension	Qualities of the governance regime			
	Extent	Coherence	Flexibility	Intensity
Levels & Scales	<p><b>High:</b> All levels feel involved in the implementation</p> <p><b>Moderate:</b> Most of the levels feel involved</p> <p><b>Low:</b> The minority of levels feel involved</p>	<p><b>High:</b> The levels consider they all work together, trust each other and recognise its dependence</p> <p><b>Moderate:</b> The levels consider few multi-level issues exist, they report some trust issues and recognise their dependence</p> <p><b>Low:</b> The levels consider, most levels are missing, they report some trust issues but recognise their dependence</p>	<p><b>High:</b> It is possible to move up and down levels, depending on the issue in what they could consider a freely manner</p> <p><b>Moderate:</b> It is possible to move up and down levels, depending on the issue, only through the implementation of agreements</p> <p><b>Low:</b> It is not possible to move up and down levels even when there are agreements to do so</p>	<p><b>High:</b> All levels are working to bring behavioural change or management reform</p> <p><b>Moderate:</b> Most levels are working to bring behavioural change or management reform</p> <p><b>Low:</b> The minority of levels are working to bring behavioural change or management reform</p>
Actors & Networks	<p><b>High:</b> All the stakeholders feel involved</p> <p><b>Moderate:</b> Most of stakeholders feel involved</p> <p><b>Low:</b> Few stakeholders feel involved</p>	<p><b>High:</b> Actors report that their interactions are institutionalised, stable (time working together), and there is trust</p> <p><b>Moderate:</b> Most interactions among actors are institutionalised. Actors report stability and/or trust issues</p> <p><b>Low:</b> Institutions that promote interactions among actors are not operating. Actors report stability and/or trust issues</p>	<p><b>High:</b> The institutional arrangement facilitates the inclusion of new actors, shift leadership and social capital creation</p> <p><b>Moderate:</b> The institutional arrangement facilitates only some of the follows: inclusion of new actors, shift leadership and social capital creation</p> <p><b>Low:</b> The institutional arrangement restricts the inclusion of new actors, shift leadership and social capital creation</p>	<p><b>High:</b> There is a collision of different actors to create a strong impact in behavioural change or management reform</p> <p><b>Moderate:</b> There is a fragmentation of the intensity. There is a minor collision of actors trying to create an impact in behavioural change or management reform</p> <p><b>Low:</b> There is only one actor or none collision trying to create an impact in behavioural change or management reform</p>
Problem Perspectives & Goal Ambitions	<p><b>High:</b> The actors consider that all perspectives are involved</p> <p><b>Moderate:</b> The actors consider that most of the perspectives are involved</p> <p><b>Low:</b> The actors consider that a minority of the perspectives are involved</p>	<p><b>High:</b> All the different goals of the actors involved support each other</p> <p><b>Moderate:</b> Most goals of the actors involved support each other</p> <p><b>Low:</b> There is competition among the goals of the actors</p>	<p><b>High:</b> It is possible to reassess goals during the implementation process</p> <p><b>Moderate:</b> It is possible that some aspects of the goals can be reassessed during the implementation process</p> <p><b>Low:</b> It is possible to reassess the goals only, after the implementation process or there is not reassessment</p>	<p><b>High:</b> The actors consider that the established goals can be achieved with the current policy implementation</p> <p><b>Moderate:</b> The actors consider that the policy implementation requires some minor changes to achieve the intended goal</p> <p><b>Low:</b> The actors consider that major changes are required to achieve the intended goals</p>
Strategies & Instruments	<p><b>High:</b> According to the actors and the law no instruments or strategies are missing</p> <p><b>Moderate:</b> According to the actors and the law some instruments or strategies are missing</p> <p><b>Low:</b> According to the actors and the law an important number of instruments or strategies are missing</p>	<p><b>High:</b> The system allows the creation of synergy among the policy instruments and there are not overlaps or conflicts among the instruments</p> <p><b>Moderate:</b> The system allows the creation of synergy among the policy instruments but some overlaps or conflicts among the instruments are found</p> <p><b>Low:</b> The system does not allow the creation of synergy among the policy instruments and there are overlaps or conflicts among the instruments</p>	<p><b>High:</b> The institutional arrangement provides the opportunity to combine and use different instruments and actors can make choices in a pragmatic manner</p> <p><b>Moderate:</b> The institutional arrangement provides the opportunity to combine and use different instruments as long as it is stated in the law</p> <p><b>Low:</b> The institutional arrangement provides the opportunity to combine and use different instruments but the actors do not do it or they do not have those choices</p>	<p><b>High:</b> The actors report that there is no need of behavioural deviation from current practice and the instruments are being enforced properly</p> <p><b>Moderate:</b> The actors report that there is a minor need of behavioural deviation from current practice and the instruments are facing small issues during enforcement</p> <p><b>Low:</b> The actors report that there is a major need of behavioural deviation from current practice and the instruments are facing important challenges during their implementation</p>
Responsibilities & Resources	<p><b>High:</b> Responsibilities are clearly assigned with sufficient resources</p> <p><b>Moderate:</b> Responsibilities are clearly assigned but some have resources</p> <p><b>Low:</b> Responsibilities are clearly assigned but there are insufficient resources</p>	<p><b>High:</b> The institutional arrangement and the actors promote cooperation within and across institutions</p> <p><b>Moderate:</b> The institutional arrangement promotes cooperation within and across institutions. However, actors report some issues</p> <p><b>Low:</b> The institutional arrangements promote cooperation within and across institutions. However, actors report relevant issues</p>	<p><b>High:</b> It is possible to pool the assigned responsibilities with effective accountability mechanisms in a pragmatic manner</p> <p><b>Moderate:</b> It is possible to pool partially some of the assigned responsibilities with effective accountability mechanisms in a pragmatic manner</p> <p><b>Low:</b> It is not possible to pool the assigned responsibilities with effective accountability mechanisms in a pragmatic manner</p>	<p><b>High:</b> The actors consider there are the enough resources needed for the intended changes</p> <p><b>Moderate:</b> The actors consider there are resources to comply most of the responsibilities to achieve the intended changes</p> <p><b>Low:</b> The actors consider there is a lack of resources to comply the responsibilities to achieve the intended changes</p>

wastewater treatment or in the water quality of the lake in the last decade.

## 5. Results: governance assessment of wastewater treatment policy

This section presents the findings based on the four qualities and their assessment in each dimension of the governance context.

### 5.1. Extent

*Levels & Scales.* Three levels of the government are involved in the implementation of the wastewater treatment policy. The Commission of Regulation and Follow-up (CORESE) provides for the participation of the federal and state government. The state government is responsible to present for discussion the proposals to modify the water programmes in the CORESE (CONAGUA, 2011). However, actors at the municipal level stated that they are not well represented and they do not participate in the planning and



Fig. 1. Location of the Guadalupe River Basin.

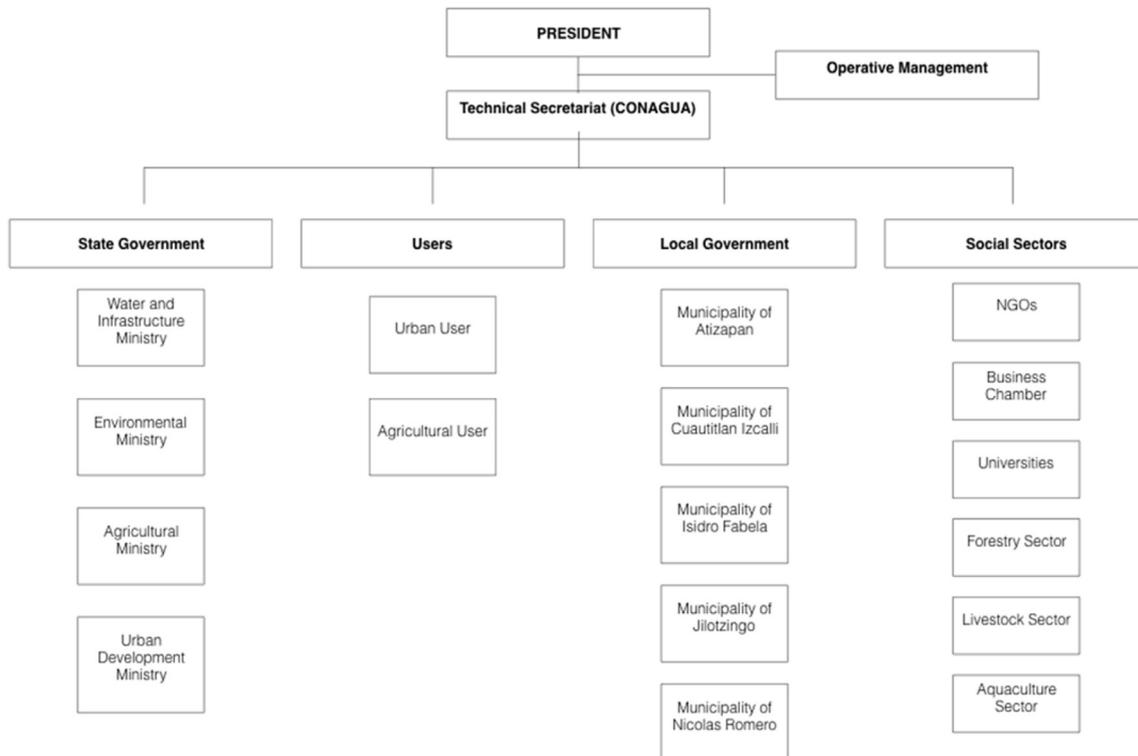


Fig. 2. Organogram of the Guadalupe Commission (CCPG, 2016).

construction of the WWTPs. The Guadalupe Commission is the other platform where different governmental actors participate. Wastewater treatment is among the axes of the Presa de Guadalupe Water Programme that was created by the Commission. However, the interviews confirmed that the wastewater treatment policy is exclusively implemented via the CONAGUA programmes.

*Actors & Networks.* The field research revealed that there are two main networks. The CORESE members formed one where the state and federal government together plan and follow up the wastewater treatment policy. The Guadalupe Commission formed the other where the different social and governmental actors participate; although it does not have any impact on the wastewater treatment programmes. Thus, the most powerful commission is incomplete. Meanwhile, the commission which is complete, in terms of actors, lacks power.

*Problem Perspectives & Goal Ambitions.* Governmental actors affirmed that not all the perspectives are considered in the CORESE. For example, during the WWTP construction, the water utilities were often unable to give their opinion and when they did, the constructors responded that they follow the requirements of the state government. The water utilities also argued that when they received economic support, they were often told how to spend the budget. Many respondents from the federal level also argued that they were not informed regarding the construction process. In the case of the Guadalupe Commission, the actors reported that all perspectives had been heard and they were incorporated in the Presa de Guadalupe Water Programme, but they did not influence the wastewater treatment policy.

*Strategies & Instruments.* The most important strategy comes from the CONAGUA's programmes, which require the creation of the CORESE. However, according to the interviewees, the Guadalupe Commission helped to improve communication among the stakeholders, increase coordination and create awareness about the sub-basin. These actions, however, did not impact the wastewater treatment policy. The Commission staff argued that they respected the work of each governmental body and saw the wastewater treatment policy as the responsibility of CONAGUA and CAEM (Water State Commission). The Commission was focused on delivering educational programmes and promoting public participation. Some interviewees expressed their concerns about the effectiveness of the commission: "They talk too much and nothing happens", "The Commission has not helped to improve water quality".

Some crucial legal instruments are not included within the policy. There is no secondary legislation for the National Water Law, which complicates its implementation (OECD, 2013). The existing legal provisions do not allow the water utilities to set prices realistically. They only propose the tariff and depend on the approval of the State Congress, making the water utilities sensitive to political factors. Politicians are not willing to increase water prices, given the political costs. Low financial costs and the political influence favour such shortcomings (Silva Pinto and Cunha Marques, 2015). The State Water Law enacts that the state government can charge the water utilities for the wastewater they treat from the municipalities. However, this was not applied in practice. As one interviewee explained: "If the state government wants to charge the municipalities for the plants we are operating, it is legally and politically complicated."

*Responsibilities & Resources.* According to the Guadalupe Commission staff, the commission's budget was used for daily operations and they were not in charge of any wastewater treatment programme from CONAGUA. The interviewees expressed that responsibilities regarding the implementation of the policy were clearly assigned; yet only a few were facilitated with resources. The interviews and CONAGUA's budget reveal that, of the four stages of

implementation, construction has the highest budget, while planning, operation and monitoring lack resources. Civil servants at the federal level commented that, due to the high amount of work, in some cases, they neither visited the construction site, nor knew the fate of the project. Water utilities at the municipal level had the least amount of resources to fulfil their daily tasks. Most of the water utilities in Mexico lack the economic resources (OECD, 2013) to build, rehabilitate and provide maintenance to the WWTPs. A respondent from a water utility stated that they sometimes face the dilemma of operating the WWTP or providing water services.

## 5.2. Coherence

*Levels & Scales.* According to the governmental actors, the main interactions occur between the state and the federal levels. These levels keep some communication through both commissions, whilst recognising their interdependence and clear assignment of roles. The federal and the state government plan the WWTPs. Resources come from the three governmental levels, while the state government builds the infrastructure, and the municipal or the state level operates the plants. Currently, the WWTPs operating in the sub-basin face challenges. Government actors from the three levels reported that many plants are not working properly or not working at all. CONAGUA is in charge of monitoring the municipal discharges and the industry as far as it discharges into federal water bodies. The state level can supervise the municipal level and water discharges in its jurisdiction, while water utilities at the municipal level must inspect the water discharges within their territory.

*Actors & Networks.* The CORESE and the Guadalupe Commission are institutionalised in stable structures. However, election cycles cause instability. The time in office is three years for the municipal level, and six years for the state and federal levels. The short terms at the municipal level reduce stability. The longer period of the two upper levels allows more stability. Several interviewees stated that they had already developed some experience working together. The interviews also revealed that the participants of the CORESE are often different than the participants of the Guadalupe Commission, and there is a lack of communication among them. This reduces coherence, since the two bodies are not supporting each other to implement wastewater treatment policy. Although communication might be maintained, the relationships among the actors is characterised by a low level of trust.

*Problem Perspectives & Goal Ambitions.* The interviews revealed two main challenges that the actors commonly perceive about the water pollution problem: uncontrolled urban growth and insufficient enforcement of wastewater treatment. When considering the Water Programme of the Guadalupe Commission, the goals should support each other. However, there are two different perspectives with regard to time and vision. While social actors saw the water quality improvement of the basin as a long-term project that was not limited to WWTP, governmental actors were restricted to their time in office and their actions were aligned only with the programmes they are responsible for. This situation brings fragmentation to the actions developed by the governmental actors.

*Strategies & Instruments.* The interviewees indicate that the Guadalupe Commission does not create any synergies with regard to wastewater treatment policy. The actors only exchange ideas and contacts, and each actor continues with "business as usual". Even though wastewater treatment is included in the Presa de Guadalupe Water Programme, the lack of legal and financial resources made its implementation fully dependent on others. The co-investment programmes of CONAGUA aim to create synergy among the governmental actors. However, poor results are achieved, partly due to the lack of an integrated approach from planning to operation. The societal support suffered from bias, due to

political interests and acts of corruption. The social actors who received benefits from governmental programmes reported both these factors.

*Responsibilities & Resources.* The National Water Law is clear about the responsibilities of each level and actor. It aims to establish inter-organisational cooperation for the wastewater treatment policy. However, the high degree of fragmentation creates communication problems among different organisations. State actors reported lack of communication between the Ministry of Environment and CONAGUA, and amongst the units inside CONAGUA. The problem was not about competences, but the resources available for those competences and the fragmentation of the competences. According to an interviewee, the main reason was that the lawmakers did not know or understand the water sector and they thought purely in political terms. Also, the actors at the federal level considered that, on some occasions, the state level did not fulfil its responsibilities. For example, a CONAGUA representative argued that, during some project visits, the federal level had found problems, but they were not presented in the CORESE by the state government. Water utilities complained that they followed the bureaucratic process to receive CONAGUA's support for certain projects, but CONAGUA depended on the Ministry of Finance and Public Credit. This bureaucratic and time-consuming process sometimes obstructed the delivery of economic resources, which diminished the credibility of CONAGUA. In the case of the Guadalupe Commission, the actors observed cooperation but they did not see concrete results after ten years. This might be related to the fact that the actions developed so far by this commission had a low or a long-term impact and they were not directly related to the wastewater treatment policy.

### 5.3. Flexibility

*Levels & Scales.* The governmental actors stated that it was not possible to move up and down governance levels. Also, although the three governmental levels respected the hierarchy, this was independent of the problem or the policy. By law, each governmental level has to align their development plan in accordance to the plan of the next superior level.

*Actors & Networks.* While the Presa Guadalupe Commission network includes social participation and, in principle, is open to new stakeholders, the CORESE is limited to the federal and state level actors. In the CORESE, the leadership comes from CONAGUA. The Guadalupe Commission also has its own rules of operation and these roles are clearly defined by the law. The stakeholders expect leadership to come from the president of the Commission and his team. However, the social capital initially created (Franco-Garcia et al., 2013) has been eroded since the commission creation. The support from CONAGUA's programmes is limited and each actor has a specific role according to the Rules of Operation.

*Problem Perspectives & Goal Ambitions.* The interviewees from the Guadalupe Commission argued that the goals of the commission had not been achieved and no opportunities existed for re-assessment. In the case of the CONAGUA's programmes, the goals were discussed and analysed during the meetings held by the state and federal governments. However, there was no re-assessment of those goals expected. The 2014–2018 National Water Plan is the first plan that stipulates assessments of the plan every two years.

*Strategies & Instruments.* The programmes from CONAGUA work independently from each other, as stated in their own rules of operation. The government actors argued that there was a lack of flexibility to combine resources or to use the economic resources from one WWTP to support another. The projects were planned independently. However, changes were made for 2016 to merge different programmes and to have more integrated planning. Lack

of flexibility also affected the planning and building since, according to the programmes, actions were expected annually. Sometimes this period was not enough and the projects were not finished. An interviewee from the federal level exemplified that if a WWTP was not finished within the planned period or the resources were insufficient, the state government had to finish it and the federal government can only intervene five years later. Since no legal obligation exists for the state government, such incomplete projects were often abandoned.

*Responsibilities & Resources.* Governmental actors noted that the only way to pool resources together was if the law specifically allowed it or created programmes with this objective. Co-investments have permitted the construction of sanitation infrastructure. Until 2015 all CONAGUA's programmes worked independently. The state government commented that they received economic support from CONAGUA's programmes for the WWTPs that were meeting discharge standards. However, those resources could not be used to improve other plants, they must be invested in the plant that is within the parameters. The state government would like changes in the legislation that might allow them to invest, rehabilitate or support the operation of other WWTPs. Different audits were established to avoid corruption in programme implementation. However, some federal and municipal actors mentioned cases of corruption, which took place mainly in the tender process. According to the interviewees, a main reason for corruption was the low monitoring capacity of the auditors, who paid attention to unimportant things and were not trained to see how overestimated the costs were. They could only act after the programme implementation, which limited the effectiveness of the audit.

### 5.4. Intensity

*Levels & Scales.* The governmental actors perceived that the main impacts on the policy came from the federal level (CONAGUA) and the state government, but social actors perceived this impact as symbolic and without real consequences. They witnessed that the WWTPs did not operate properly, projects were not concluded and there was a lack of law enforcement. Additionally, no sanctions were applied if one level did not support the planned projects or co-investments. One respondent from an NGO explained, "We make proposals to improve water quality and the governmental levels show interest. However, they do not implement them".

*Actors & Networks.* The federal government is the most dominant actor, since it has the main legal and economic resources (CONAGUA, 2015a). However, the policy needs to be supported by the other two governmental actors. According to the interviewees and the legal framework, each actor has a specific role to fulfil. Even when social actors, such as the aquaculture group, are very interested in wastewater treatment actions, their legal and economic limitations was likely to hinder the impact of their participation. Until now, social groups did not participate in the decision-making regarding wastewater treatment policy, since it is seen as a governmental task. The impact of NGOs is limited to encouraging the government to act.

*Problem Perspectives & Goal Ambitions.* According to the Guadalupe Commission actors, the goals set in the Water Programme for the Guadalupe Basin were far from being achieved. Most of the interviewees from the two commissions agreed that the situation with the WWTPs was still the same. Some actors considered that the pollution levels were almost the same as a decade ago. Others believed that it was worse, due to urban growth and a lack of law enforcement. While many societal actors viewed the situation critically from a problem-solving perspective, some governmental actors just considered whether the intended infrastructure had

been realised.

**Strategies & Instruments.** Government and non-government actors agreed that there was a lack of enforcement to require the municipalities to operate the WWTPs and monitor polluters. A federal civil servant explained the situation: “Municipalities do not have discharge permits, partially because it is a complicated administrative process. It should be less complex in order to motivate the municipalities to obtain them. Only between 10% and 20% of the municipalities have a discharge permit in the State of Mexico.”

According to the interviewees from water utilities, within the WWTP tenders, the main criteria to choose the constructor was the cost of the construction, which tends to affect the quality of the infrastructure. Therefore, some actors thought that technical and cost-efficient elements should play a primary role. Governmental and social actors witnessed how operators and technicians were replaced after every election, mainly at the municipal level. This brought much instability to the implementation process and contributed to unfinished projects.

**Responsibilities & Resources.** CONAGUA is the biggest spender in the water sector. In 2015, the federal government provided 60% of the economic resources, while the state accounted for 16.4% and the municipalities 9.5% (CONAGUA, 2015c). In this sense, resources from the federal and state levels prioritise the rehabilitation and construction of the infrastructure. However, the rest of the implementation process faces a lack of resources. Water utilities commented that they lack resources for all stages of implementation. For example, regarding monitoring, some water utilities did not even take samples because they did not have the equipment and they conducted physical analysis only when there was a social outcry. CONAGUA and CAEM also stated that they lacked personnel for inspections and planning. In many occasions, the employees were overloaded with work and the changes in projects required a significant amount of time, resulting in significant delays. In other occasions, they were asked to approve problematic projects due to political pressure.

## 6. Overall assessment

**Restrictive extent,** because three dimensions range from moderate towards low and two are low. Several stakeholders participate in the Guadalupe Commission. However, this participation is merely symbolic, since it does not impact the wastewater treatment policy. The policy was driven by the state and federal government via CONAGUA's programmes and perspectives. Social actors did not participate in any stage of the policy and the municipality is in charge of the operation of the WWTPs built by the state and the federal government. The secondary legislation of the National Water Law is missing, which complicates its implementation. Responsibilities were clearly assigned, but resources were lacking for most implementation stages.

**Restrictive coherence,** because only one dimension is moderate and four range from moderate towards low. All three governmental levels are involved for the implementation of the wastewater treatment policy. However, the two major institutional structures (CORESE and the Guadalupe Commission) do not support each other. The governmental levels that work together are the state and the federal levels, who struggle with a low level of trust. While governmental actors have a short-term perspective, social actors have a long-term and more integrated perspective. The system aims to create synergy and cooperation regarding the implementation of the policy, but it is observed as being fragmented.

**Highly restrictive flexibility,** because all five dimensions are low. Power is hardly distributed, since CONAGUA and the state government are the central actors within a hierarchical context. New

actors cannot be involved unless the law considers them. The Guadalupe Commission is open to accept new actors, but they cannot influence the policy implementation. Regarding CONAGUA's programmes, the participation is limited to the state and the federal government. There are no opportunities to reassess goals, and resources cannot be pooled unless the law considers them. Social capital is not shared, as the policy implementation is limited to the governmental actors.

**Highly restrictive intensity,** because one dimension ranges from moderate towards low and four are already low. Most resources are focused on the construction phase, leaving an important deficit for planning, monitoring and operation of the WWTPs. Municipalities show a low degree of involvement in the policy implementation and many of them do not have wastewater discharge permits. Policies that have short-term impacts are prioritised. Enforcement of the law is required to charge the municipalities for the WWTPs that the state operates on their behalf. However, charging the costs is obstructed due to legal and political constraints. Water tariffs depend on the Congress' approval; therefore, they are sensitive to political games, since deputies are worried about the support of their constituency and party interests.

The results of the assessment are summarised in Table 4. The table contains the general assessment derived from the interviews and secondary data analysis.

## 7. Conclusions

This paper examined the context that was created by the bottom-up and top-down approaches for the implementation of the wastewater treatment policy in the Guadalupe River Basin. The GAT allowed an assessment of the combination of “top-down” and “bottom-up” implementation approaches in a systematic manner. Using the qualities of extent, coherence, flexibility and intensity, the governance context is assessed to be restrictive for the implementation of wastewater treatment policy. From the interviews and the review of secondary documents, it can be concluded that some crucial actors and instruments have not been included and intensity is focused towards short-term actions, which leads to a symbolic implementation. The federal government should increase its monitoring capacity in order to be taken seriously by the lower governance levels. This symbolic implementation is similar to the case of Puebla's Alto-Atoyac, where no river basin commission exists (Casiano and Boer de, 2015). The findings indicate that, given the inflexibility of the context, there is no room for innovative solutions. Actors are willing to keep their behaviour, even when they realise that the policy is not having the expected outcome.

The paper assessed coherence as restrictive, as the findings confirmed that, even with the participation of different stakeholders, the Guadalupe Commission only encouraged others to take measures (Franco-García et al., 2013). The Guadalupe Commission is seen by the social actors as a waste of resources without any impact on the policy implementation. In this sense, the participation of the stakeholders remains symbolic as it does not affect the decision-making process (Özerol et al., 2013). At the end, collaborative institutions are expensive and time-consuming (Ingram, 2008, p. 3). Participation is not a panacea and, just like integration and good governance, it has the potential to bring important benefits, but those benefits are difficult to achieve (Vinke-de Kruijff and Özerol, 2013).

This paper also shows how the river basin institutions are unable to bring improvements to problems that for decades have been governed by forces outside those institutions' control (Ingram, 2008). The Guadalupe Commission participants perceived no improvement in the water quality of the basin. Based on the interviews it was possible to conclude that the Guadalupe

**Table 4**  
Summary of assessment results.

Governance dimension	Qualities of the governance regime			
	Extent	Coherence	Flexibility	Intensity
Levels & Scales	Moderate	Moderate to low	Low	Moderate to low
Actors & Networks	Moderate to low	Moderate to low	Low	Low
Problem Perspectives & Goal Ambitions	Low	Moderate to low	Low	Low
Strategies & Instruments	Moderate to Low	Moderate to low	Low	Low
Responsibilities & Resources	Low	Moderate	Low	Low
Overall Assessment	Restrictive	Restrictive	Highly Restrictive	Highly Restrictive

Commission represents the struggle for a “bottom-up” implementation approach in a hierarchical setting that leaves hardly any room for participation, since the dominant approach is still “top-down”. The Guadalupe Commission has tried to bring into the agenda the importance of WWTPs. However, many interviewees agreed that those infrastructure-building policies mainly responded to the plans of CONAGUA and CAEM. Under this context, participation through a River Basin Commission is not supported. Therefore, the participation of societal actors might be more effective by pressing directly the executive authorities to set the topic in their agenda and monitoring the implementation of CONAGUA programs. However, this path might keep hindering the creation of social capital.

It was also discovered that the Guadalupe Commission and the CORESE did not support each other, and their actions were highly fragmented. Even when the CONAGUA programmes helped to build WWTPs, the expected impact was not achieved, since the planning, operation and monitoring stages face significant challenges, such as lack of resources, bureaucratic infighting and inter-ministerial differences. These challenges are common and present in different countries (Biswas, 2008). Through the interviews and secondary data, it was possible to conclude that the institutional arrangements are unstable due to political changes, and politicians are concerned about their career and party interests. This situation affects negatively the WWTP policy implementation, including water pricing. In this regard, water pricing requires specific reforms adapted to the context, in order to support the water sector objectives (Silva Pinto and Cunha Marques, 2015). Planning has been re-fragmented by top-down implementation of different schemes and, thus, evolved into a symbolic exercise that eventually has eroded trust by the participants. Previous studies argued that effective and coordinated water governance systems were needed as, otherwise, purely technical solutions would fail (Grigg, 2011). However, this effective coordination and multi-sector collaboration is difficult to establish in practice.

The influence of the Guadalupe Commission was assessed to be very limited and no changes are expected in the near future. However, CONAGUA’s rules of operation were changed in December 2015. Among these changes is the creation of PROSAN. This new program merged two programs, one that supports the WWTPs construction and the program that supports the operation of the WWTPs. This kind of reforms can help to decrease fragmentation. The other, is a change towards a participative approach by the federal government. According to the new Rules of Operation, the CORESE involves the water utilities in its sanitation programme, which includes support for wastewater treatment infrastructure building and operation. However, based on the findings of this paper, important questions arise from these changes. An asymmetrical relation is still present, given that the municipal level is the one with the least resources and planning capacity: Will the participation of the municipal level in the CORESE impact the implementation of the wastewater treatment policy or will it be only symbolic? How capable are municipalities to make

appropriate proposals? Will the short-terms in office influence the time perspective of the policy implementation? Answering these questions is important in order to find whether this kind of reform can bring better results in a context that favours a “top-down” implementation process, and where symbolic participation and symbolic implementation are common to find.

It is crucial to reassess the participation of actors who are capable of implementing the policy. In this context, the municipalities do not have the resources or capacity; even when, as in other parts of the world diversified financing sources are adopted (Silva Pinto and Cunha Marques, 2015). The federal government does not perceive any improvement in the outcomes of the water utilities since the decentralisation process started in the 1980s (CONAGUA, 2015d). Therefore, this decentralisation process should be reconsidered. Political factors should also be reconsidered in dynamic election periods, as well as the possibility of strengthening top-down implementation when a bottom-up policy process faces contextual challenges. For example, considering that in Mexico there are informal rules which grant a higher authority to the upper levels (Pacheco-Vega, 2015a, p. 333), the participation of the state level should be promoted by the federal level in order to strength the WWTP policy implementation. Strengthening the role of the state government through reforms and the regionalisation of the wastewater treatment policy can be explored as a possibility to bring more stability in the policy implementation. The state government could promote reforms, to obtain the required economic resources for the operation of the WWTPs from the municipal level and the municipalities should evaluate the possibility to transfer the wastewater treatment plant policy implementation to upper levels. The first scenario is now occurring in the Atoyac-Zahuapan sub-basin and some actors have perceived an improvement in the wastewater treatment policy (Casiano Flores et al., 2016).

Some Mexican states have already decided to manage water at the state level, instead of strengthening the decentralisation process. The states of Aguascalientes and Nuevo León, are treating 100% of their municipal wastewater (Peña de la et al., 2013, pp. 23–24) and in both cases the state government is playing a primary role. Thus, future reforms should consider the role of the upper levels and the top-down nature of the policy implementation processes.

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