
# Institutional Analysis of Water Utilities Performance in Southern Mexico

## Comparative Case of Oaxaca and Tabasco

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This document represents part of the author's study programme while at the Institute of Social Studies. The views stated therein are those of the author and not necessarily those of the Institute.

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# List of Acronyms

| | |
|---|---|
| IAD | Institutional Analysis and Development Framework |
| CONAGUA | Comision Nacional del Agua |
| PCM | Political Constitution of Mexico |

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## Abstract

It is argued that decentralization increase efficiency in public service delivery by transferring the authority and responsibility to manage service delivery to local level of government. Nevertheless, the experience of decentralization in the world has had diverse results, including Mexico. This paper tries to argue, the role of local institutional frameworks in determining how decentralisation of water utilities can lead to different water utilities performance outcomes based on the local institutional frameworks in Oaxaca and Tabasco in Mexico. For this purpose, the paper uses the Institutional Analysis and Development (IAD) Framework to analyse and compare local institutions in which decentralized water utilities in Oaxaca and Tabasco operates to explain why they have different water utilities performance outcomes from decentralisation despite having similar characteristics such as water quality and water availability per capita among others. The results find that difference in decentralized water utilities performance outcomes in Oaxaca and Tabasco arise due to different local institutional frameworks in these two states. In particular, decentralisation has led to less efficient water utility performance outcomes in Oaxaca relative to Tabasco primarily because of the abundance of incentives to not comply with the cost recovery policy. Therefore, it is argued that decentralization is a blanket statement and only along with local institutions it determines the results of public service delivery.


## Relevance to Development Studies

Decentralization has been carried out in developing countries as a promise of good governance and greater social welfare. It has been argued that it makes public administration and service delivery more efficient. Nevertheless, many of these countries have had disappointing results. By exploring the local institutional frameworks under which decentralization is implemented, a more nuanced evidence of its benefits on public service delivery such as water supply -a fundamental element for human development- can be obtained.


### Keywords

Water utilities, decentralization, institutions, IAD Framework, Mexico.

# Chapter 1 Introduction

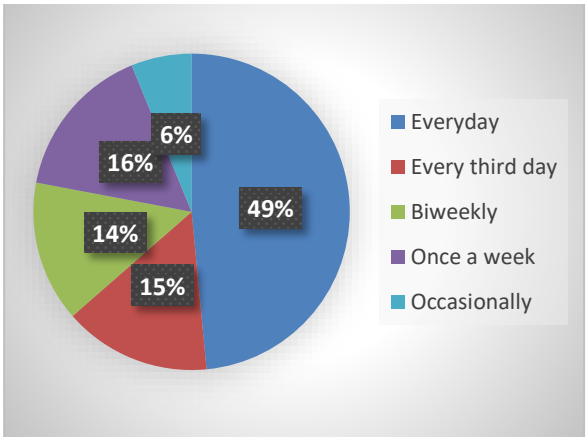
## Problem Statement

It is argued that decentralization increase efficiency in public service delivery by transferring the authority and responsibility to manage service delivery to local level of government. The decentralization of water utilities in Mexico started in 1982 with the aim to achieve the efficiency in service delivery. It was stated that the introduction of a market oriented and cost recovery policies, and the transfer of responsibility for providing water service to local governments would establish financial, technical and administrative competent units capable to provide an efficient service delivery. Nevertheless, decentralization has had very varied results in this country. A paradoxical situation is the difference in water utilities performance outcomes in two southern states of Mexico: Oaxaca and Tabasco.

Oaxaca and Tabasco have comparable economic growth and population characteristics along with similar availability of water per capita well above of the national average that is 3 692.20 m3 with 13 798 m3 and 13 021 m3 for Oaxaca and Tabasco respectively (CONAGUA 2016: 21, CONAGUA a 2016: 32).The quality of water in both states is also good and available in excellent condition according to the quality indicators used for the National Water Commission (CONAGUA, 2016:21). Their second water use priority in both states is also identical that is public supply, after the agricultural use.

Even more puzzling is the fact that despite these similarities, each state have had a different performance outcome from the decentralization of water utilities so far. In terms of households connected to the public network, and daily constant supply; Oaxaca holds 85% of the total household water pipe network (INEGI 2015). However, as shown in Figure 1, only 49% of connected households receive water supply every day at least one hour per day (INEGI a 2017). Moreover, of that percentage, only 35% of households receive a constant supply or twenty-four hours a day (INEGI b 2017).

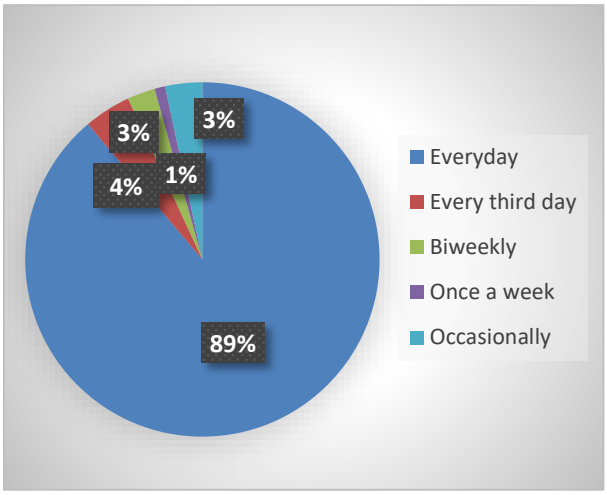
**Figure 1 Percentage of Water Supply Distribution of Households connected to the Water Pipe Network in Oaxaca, 2017**




**Source: own elaboration based on (INEGI a 2017)**

On the other hand, in Tabasco, 90% of the total houses are connected to the water pipe network (INEGI 2015) which is similar to Oaxaca (as shown in Figure 2). But unlike Oaxaca, Tabasco has shown improved water utility performance outcomes. For example, 89% of connected households receive proper water supply every day at least one hour per day (INEGI a 2017), and 47% of these households receives a constant water supply for twenty-four hours a day. (INEGI b 2017) unlike Oaxaca.

**Figure 2 Percentage of Water Supply Distribution of Households connected to the Water Pipe Network in Tabasco, 2017**




**Source: own elaboration based on (INEGI a 2017)**

## Research Objective

- To analyse and compare local institutional frameworks in which decentralized water utilities in Oaxaca and Tabasco operates in order to understand why they have different performance outcomes despite having similar water quality and water availability per capita.
- The paper tries to argue, the role of institutional framework in determining how decentralisation of water utilities can lead to different public water utility performance outcomes based on the local institutional framework in each state.

## Main Research Question and Sub-questions

- How do the differences in the institutional analysis in Oaxaca and Tabasco explain the differences in decentralized water utilities performance?

    - Who are the actors that participate in water utilities in Oaxaca and Tabasco? What are their roles?
    - What are the rules used in water utilities action arena?
    - What are the incentives that actors face within the water service delivery action arena?

## Justification

The decentralization of water utilities in Mexico started in 1982 with the aim to achieve the efficiency in service delivery. However, it has had very varied results in this country. So far, the existing literature that analyses the performance outcomes of the decentralized water utilities in Mexico point out the importance of the institutional conditions from the actors within the water utilities. Nevertheless, this ignores the consideration of other factors such as informal institutions from the point of view of the consumer's side, and physical conditions which also determines the performance outcomes of water utilities. By using the IAD framework this study explores the local institutional frameworks in a comprehensive way to provide a more nuanced explanation of the factors that influence the differences in decentralized water utilities performance outcomes.

## Challenges

Due to the key actors in the water utilities provision in Mexico are local governments, one of the difficulties in collecting data was the lack of access to information, transparency and accountability of the government about the provision of this good. Some of the information was not available to the public, the content and methodology for censuses and government agency reports changed over time and some databases are under construction as local governments are just beginning to set sites to make information public. Another difficulty was to find current information, since most of the censuses and government surveys are conducted in very long periods of time ranging from five to ten years. Finally, the information that was requested from the government authorities was never obtained.

## Limitations

Firstly, given the fact that the method used for collecting data was secondary data analysis, and the information that the government publishes about water utilities is not broad, the main limitation is that this work lay in the trust of the information that was accessed. Secondly, the use of secondary data analysis method and the theoretical approach only allows to make generalizations about the water utilities performance outcomes taking the states as a unit, at the risk

of disregard cases of exceptional municipal water management performance in both states. Moreover, the macro focus of the study does not allow to do a deep analysis on the communitarian ways of water management in Mexico that have been recognized in the literature as highly effective on this task.

## Structure of the Research Paper

Chapter 1 presents the introduction to the Research Paper, the research objectives, main question and subquestions, challenges and limitations.

Chapter 2 contains the literature review about decentralization and the experience of decentralization in the world. It also presents the experience of decentralization in water utilities in Mexico and the definition of institutions that is used in this research paper.

Chapter 3 explains the methodology and the analytical framework that was used.

Chapter 4 presents the institutional analysis of water utilities in Oaxaca and Tabasco. It notes that results of the decentralization in water utilities depends on the local institutional frameworks.

Chapter 5 presents the conclusions.

# Chapter 2 Literature Review

Since decentralization is an institutional reorganization, this chapter will first introduce the definition of the term institution used in this research paper to understand the underground implications of the decentralization of water utilities in Mexico. Then, it presents the academic debate about the advantages and disadvantages of decentralization for public service delivery. The third section gives a brief review of the existing literature on the experience of the implementation of decentralization in the world to show that the results of it have been mixed. The last section focuses on the experience of decentralization of water utilities in Mexico, and the problems that have arisen in its application so far.

## Institutions

There are some problems with regard to the term institutions that need to be clarified for use in this research paper. A first problem is that there is no consensus on the literature about the definition of institutions. Some authors have refer to institutions as 'rules of behavior about making decisions', 'the rules for social choice', 'standards of behavior', or as 'political structure' (Ostrom 1986). On the other hand, other authors have defined institutions in a more specific sense as "the human devised constraints that structure human interaction" (North 1993:15) within the political, economic and social sphere. Still a more exhaustive and specific definition of institutions and the one used in this research paper is provided by Crawford and Ostrom (1995) as "enduring regularities of human action in situation structured by rules[1], norms[2], and shared strategies[3] (…) which are constituted and reconstituted by human interaction in (…) repetitive situations" (Crawford and Ostrom 1995: 582). It is important to notice that institutions create incentives for human behavior as they "describe opportunities and constraints that prescribe, permit, or advise actions or outcomes for participants in certain situations (…) but they also creates expectations about other actor´s behavior" (Ostrom and Crawford 2005: 137-138).

A second problem about institutions is that this term is often used as a synonym of organization. However, both terms are very different. While institutions-as defined above- are the "rules, norms, and strategies adopted by individuals operating within or across organizations" (Ostrom 2007: 23) an organization "can be thought of as a set of institutional arrangements and participants who have a common set of goals and purposes" (Polski and Ostrom 1999:4). That is to say, organizations works with institutional frameworks as they are composed of institutions. Examples of organizations are government agencies, multi-lateral organizations, non-governmental organizations, cooperatives, clubs, families, etc. As North points out "institutions are the rules of the game and organizations are the play" (North: 1993:12).

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[1] "Prescriptions mutually understood and predictable enforced (…) by agents responsible for monitoring conduct and for imposing sanctions" (Ostrom 2007: 23).

[2] "Shared prescriptions that tend to be enforced by the participants themselves through internally and externally imposed costs and inducements" (Ostrom 2007: 23).

[3] "Regularized plans that individuals make within the structure of incentives produced by rules, norms, and expectations of the likely behavior of others" (Ostrom 2007: 23).

A third problem is that institutions are sometimes difficult to identify. Formal institutions can be described in the form of law, policies, or procedures (Polski and Ostrom 1999). They are an important and perhaps the most easily identifiable part of institutional frameworks but they are not the only sort of institutions that exists (North 1993). Individuals frequently adopt shared concepts that exist in their minds or implicit knowledge they have without enacting them as an explicit and written law (Polski and Ostrom 1999, Ostrom and Crawford 2005). This kind of prescriptions are informal type of institutions sometimes difficult to recognize. Hence, both kinds of institutions are present within the institutional frameworks. However, it does not mean that they are always consistent with each other. Sometimes formal and informal institutions can be completely different resulting in tensions (North 1993) among individuals.

To sum up, the term institutions refers to the rules, norms and shared strategies used in repetitive situations, such as in service delivery policies, which influence individual´s decisions of each actor involved in the policy arena. They are different form organizations since the latter are composed of institutional frameworks and participants with a common goal. Moreover, they can be formal or informal, spoken, written, or tacitly understood by people. Since decentralization is an institutional reorganization, it is important to look at institutions to understand its implications. Next section presents the debate about the advantages and disadvantages of decentralization in public service delivery.

## Advantages and Disadvantages of Decentralization

The literature on decentralization is very broad and there is no consensus on the definition of this concept (Conyers 1984, Schneider 2003, Treisman 2007). This is due to the different dimensions -such as political, fiscal and administrative- and forms –deconcentration, delegation, devolution, etc. - that it can take. For instance, while some authors refer to decentralization as a the transfer of authority or power from national to local government (Work 2002, Treisman 2007) or as a responsibility transfer to manage public services (Litvack and Seddon 2000) another authors refer to it as the transfer of authority from central to local level of government to manage and raise financial resources (Oates 1999, Bird and Vaillancourt 2006). Nevertheless, it is not the aim of this research to focus on the controversy of the definition of this concept. This research paper will use a broad definition to refer to decentralization as "a transfer of authority from a central government to a sub-national entity" (Boko 2002: 1).

One of the main arguments in favour of decentralization is the increase of efficiency in the provision of services (Rondinelli 1981). Due to the local government is closer to the people, it have access to a reliable information about local preferences, costs and quantity of goods and services demanded by population that allows it to allocate resources and raise revenues efficiently. Furthermore, other authors have point out (Faguet 2014) that the incentives at local levels make politicians more prone to comply with local needs which in turns leads to an efficient public service delivery. Thus, the willingness of local politicians to develop their political careers in higher levels of government can act as an incentive to offer better public services. On the contrary, other authors (Prud'homme 1995) have indicate that asymmetries of information, pressures of powerful local interest groups and greater margins of discretion of local politicians/bureaucrats, mainly in developing countries, often distort or corrupt an

efficient allocation of resources diminishing the efficiency in service delivery policies.

Another advantage of decentralization shown in the literature is the elimination of costs generated by diseconomies of scale in services provided at national level (Rondinelli 1981). The overconcentration of decision-making on service delivery policies at national level increases the costs of carrying out huge bureaucratic procedures. On the contrary, Treisman (Treisman 2007) argues that the numerous government tiers in decentralise structures raises not only administrative but also service delivery cost since they operate in a lower scale of production.

A third element in favour of decentralization is that it increases citizen participation in decision-making and planning which in turn foster accountability and political stability (Rondinelli 1981, Faguet 2011). By providing heterogeneous citizen group's voice and vote in service delivery policies that take into account their needs, the odds of protests against the state are reduced as their needs are satisfied. Yet, it may happen that minorities that emerge at the local level are excluded from the local government participation (Treisman 2007). Therefore, the partial satisfaction of local needs could lead to a conflict that can break political stability.

Administrative capabilities are a fourth element in this the debate on decentralization. Authors in favour of decentralization argue that capabilities that local governments can develop when managing and planning can lead to a better service delivery (Rondinelli 1981). The transfer of managerial responsibilities from national to local level of government gives local bureaucrats the opportunity to improve their administrative and technical skills. Though, other authors (Prud'homme 1995, Bardhan 2002) point out that very often the level of technical expertise and quality at the local level is very low. Thus, it has an impact on the efficiency on service delivery policies.

A final argument in favour decentralization is that it allows greater political and administrative penetration of national government policies in remote areas (Rondinelli 1981). Yet, this seems to contradict the argument that decentralization purpose is an own local planning and managing resource allocation task based on local needs and preferences. If national policy is not a priority in some places, either because it is satisfied or because there are needs of higher priority, resources would be allocated inefficiently, which in turn reduces social welfare.

The scholarship on decentralization has pointed out widely the advantages and disadvantages of decentralization. However, there is no consensus on when the advantages or disadvantages may arise. This raises another debate about the conditions under which decentralization can be successful or a failure. There are many authors that indicate (Oates 1999, Mewes 2011, Rondinelli 1981, Prud'homme 1995) some necessary criteria to decentralization successful be meet. Some of this conditions are find the correct size of local government to not lose efficiency or increase the costs in service or good provision, citizen participation, central government support, local capacities, adequate mechanisms of accountability, sufficient financial resources, strong institutions, sufficient authority transfer from national to local government, etc. Next section provides a brief review of the results of the implementation in the world.

## The Experience of Decentralization in the World

From 1980 decentralization has been widespread as a way of improve governance, efficiency, effectiveness and responsiveness on public service delivery around the world, but mainly in developing countries. The financial crisis in developing countries in the 1980s, population growth and the lag in the provision of public services to the population were some of the factors that international organizations such as the World Bank (WB) and International Monetary Fund (IMF) used to promote decentralization. However, not all the countries that have adopted it have obtain the same and positive results. There is a wide literature that identifies opportunities and challenges in this major institutional reform.

Some authors (Conyers 2007, Wunsch 2014) have pointed out that decentralization in Africa has had both a positive and negative outcomes on the quality of good and service policies in the region. Increase in citizen participation, local development and democracy are some benefits achieved. On the other hand, negative aspects such as weakness of the local governments, not a real devolution of power to local government, patronage and clientelar relationships in the allocation of resources, lack of participation and democratic competition, and the lack of accountability (Conyers 2007, Carlitz 2017) have also emerged. Conyers (2007) argues that the variation in outcomes of decentralization in African countries depends on the policy environment rather than to decentralization *per se*.

In Latin America the experience of decentralization has not been uniform. The impact in terms of efficiency and equity in goods and services provision have been heterogeneous (Bossuyt 2013). The main challenges to achieve the objectives of decentralization have been the lack of accountability and participation, corruption, patronage and lack of capabilities of local governments. Nevertheless, some authors (Andersson et al. 2006) identify that the extensive devolution of political and fiscal powers local governance seems to be more effective. Moreover, Andersson et al. (2006) mention that political incentives are an important and influencing element on decentralization outcomes.

The results of decentralization in the Middle East have also varied. Many authors (Serkan and Yilmaz 2008, Mewes 2011) agree that the main obstacle for decentralization in this region is the lack of real devolution of functions from central to local level of government. There seems to be no real commitment towards decentralization because of the strong centralized political system.

The experience of decentralization in Asia, as in other parts of the world has been mixed. Although decentralization in general has resulted in improvements in service delivery some authors (Ghuman and Singh 2013) have pointed out that it has also led to negative effects such as financial burdens on local governments and a low efficiency in process delivery of public services. These authors also indicate that in order to achieve a successful decentralization, certain conditions at local level of government must be met like a sound financial base, full autonomy, regular capacity building, performance base incentive, and participatory governance (Ghuman and Singh 2013).

As it was shown in this brief review of the experience of decentralization in the world, decentralization has bring mixed results such as merits and strengths but it also have weaknesses and challenges in developing countries. Therefore, as many authors have point out (Ostrom 2001, Bardhan 2002) decentralization is

not a panacea of good governance. It seems that the results may rely on other factors and not only on the decentralization *per se*. Next section presents the experience of decentralization in water utilities in Mexico and the problems that have arisen in its implementation so far.

## The Experience of Decentralization of Water Utilities in Mexico

The decentralization of drinking water management in Mexico started in 1983. This legal and institutional process was driven by a combination of both external and internal factors to the water sector. As an external factor, the decentralization was widely promoted in Latin America by international organizations such as the World Bank (WB) and International Monetary Fund (IMF) in the wake of the debt crisis as a strategy to reduce the costs of state apparatus administration, improve economic performance and ensure good governance trough and efficient service delivery policies (Grindle 2007: 7). In Mexico, the debt crisis made impossible for the federal government to continue allocating large amounts of budget for the investment and operation of water systems (Soares 2007).

On the other hand, many authors (Aboites 2004, Amaya 2009) pointed out that water shortages in some states due to the increase of demand of water services by the accelerated growth of cities as well as the concern to make universal and efficient the water supply were some of the endogenous factors that contributed to the adoption of decentralization in water service delivery in Mexico. However, a decisive factors were the low quality of the water service (Pineda 2002) and financial and technical problems due to a poor revenue collection system (Ozuna and Gómez 1999).

The combination of all this factors leads to claim for a reform in drinking water policy. A reform that changed the centralized policy characterized by long budget investments for infrastructure construction as a way of solve the problems of access and achieve an efficient water management (Soares 2007, Aboites 2004). As Alboites (2004) points out the water policy that Mexico had taken until 1983 had served as a political fortress of national progress in which the presence of a paternalistic state was settled. However, this strategy was not economic sustainable anymore. Thus, "decentralization was seen as an important mean to redress decades of statist development strategies resulted in low growth rates and high levels of corruption in the production of public services" (Grindle 2007: 7).

Based on the classic scholarship on decentralization (Oates 1993, Rondinelli 1981, Tiebout 1956), that emphasizes on the economic comparative advantage of local government in the provision of public goods the arguments in favor of the decentralization of the piped water service in Mexico began to emerge. As local government is closer to the population, they know better the preferences and needs of the users. This fact makes municipalities the most apt units to better meet the demand of the service increasing its quality (Aboites 2004). Unlike state level authorities, municipalities would operate more efficiently. Local government have a comparative advantage in detecting investment needs making them the most efficient decision-makers of piped water systems (Amaya 2011). Thus, the low level equilibrium that exists at federal level in service provision can be overcome by assigning it to the municipal authorities the service provision, decisions over investment, and fixing water rates (Ozuna and Gómez

1999). Furthermore, granting local governments the management of this service would also promote citizen participation in the decision making of the drinking water policy (Amaya 2009).

Therefore, "the idea of decentralization in Mexico was associated with the concepts of effectiveness, development and democratization" (Cienfuegos and Aguilar 2012: 91) since it would be a mean to achieve financial autonomy and improve administrative efficiency, promote public responsibility and transparency as well as citizen participation. All these benefits would result in the welfare of the population.

Hence, in 1983, the government assigned the municipalities -with the participation of state governments if necessary- the faculties to build, operate and administer the potable water and sewage system through the reform of Article 115 of the Mexican Constitution (Pineda 2008). Since the aim of this reform was make financial, technical and administrative efficient the water service provision (Soares 2007, Galindo and Palerm 2007) the axis of the new water policy reoriented the conceptualization of water. The water went from being a public good, administered and provided by the federal government almost without any charge, to an economic good administered and provided by municipalities acting as a small enterprises with emphasis on the revenue collection. To carry such an institutional restructuring, the main policy tools were the collection revenue of water, the increase in the price of water, and the suspension of service among other sanctions in response to the non-payment of water (Soares 2007, Herrera and Post 2014)

However, the municipalities did not present advances in terms of efficiency or responsibility in the water supply service due to the lack of capacities and the politicization of the sector (Aboites 2004, Soares 2007, Herrera and Post 2014). Herrera (2011) argues that while the benefits of the reform in service improvements are long-term, the political costs of it arise in short term. Thus, the unpopularity of fee collection policy generated political obstacles for the local majors to reform the water delivery in Mexico. Spiller and Savedoff (1999) pointed out that coupled with political institutions, the nature of the sector –large sunk costs, economies of scale and massive consumption- also create incentives for governments to behave opportunistically resulting in inefficient water delivery systems which erodes public support. Moreover, lack of citizen participation was another obstacle to achieve the objectives of decentralization (Aboites 2004, Soares 2007, Galindo and Palerm 2007).

The result of the above factors was a deterioration of the maintenance of infrastructure and the persistence of a low quality and efficiency service (Aboites 2004, Soares 2007). In order to the federal government address this problems and carry out an effective market-oriented water policy, it adopts a further decentralization strategy to re-enforce the autonomy of water utilities (Ozuna and Gómez 1999). To do so, it was created the National Water Commission (NWC) in 1989 (Soares 2007). As the only federal authority on the subject of national water resources, the NWC carried out the separation of regulatory and operational functions of water utilities through the creation of Operative Organisms. This new actors were assigned the provision of the potable water systems acting as parastatal or paramunicipal entities with a business orientation (Pineda 2008) -which Herrera and Post (2014) refers as corporatization-, leaving municipalities the role of regulatory entities. Moreover, the NWC also promoted the enactment

of state drinking water and sewerage laws in each state of Mexico and the creation of state water commissions. The latter with the aim of foster modernization of administrative systems to encourage the collection of water service, update rates and promote the participation of the social and private sector in water supply within the Operative Organisms (Soares 2007).

The creation of the Operative Organisms had the objective of 1) strengthening the administrative autonomy in the operation of the water systems providing them legal capacity and own patrimony, 2) promoting citizen participation 3) financial self-sufficiency 4) approval of the water fees by the boards of directors of the Operative Organisms and not by the state legislatures and 5) reinvestment of the quotas in the water sector (Pineda 2002). As Herrera and Post (2014) points out the creation of Operative Organisms in Mexico intended insulate service provision in practice form political interference of the municipalities. It was assumed that by making the water utilities autonomous it would make them more efficient because being in contact with users, they will have to respond to local concerns (Ozuna and Gómez 1999).

This changes bring new actors and institutions to the policy arena consolidating the decentralization process of the drinking water. Nevertheless, the objective of increasing efficiency, quality and access to water has not been achieved in some places in Mexico due to the persistence of politicization of water rates as widely shown in the literature (Pineda and Briseño 2012). In fact, it is argued that the existence of a contradiction on the rationales of decentralization reforms that make it difficult to insulate water service provision in practice. Whereas corporatization of water utilities through Operative Organisms intends to depoliticize operational functions, popular participation and influence via municipalities –regulatory water entities- prevent the elimination of political interference from water services (Herrera and Post 2014).

Many authors' points out that the performance of water utilities under the decentralized model depends on the institutional environment and design. Spiller and Savedoff (Savedoff et al. 1999) pointed out that in a weak or absent formal or informal institutional environment political profitability and government opportunism is more probably to arise leading to a low level equilibrium of water utilities. For instance, if the short term political benefits of keeping low water revenues are higher than the long terms benefits of an adequate set of tariffs in a context of absence of a strong regulatory framework, it is more likely that government take-over leading to a spiral situation of low prices, low investment, low quality, and low levels of coverage. In this regard, Pineda (2008) points out that the prevalence of political criteria within the water utilities institutions in México like in i) the appointment and removal of Operative Organisms members, ii) the high rotation of the Operative Organisms members, iii) the criteria used in the approval of the water tariff and iv) the lack of sanctions for non-payment of the service the main factors that contribute to a poor performance of the service. Since the biggest obstacle to adequate performance in water utilities is the financial issue. Some other authors (Aguilar and Saphores 2009) have argued that payment enforcement strategies are shaped by the institutional context. For instance, high rate of nonpayment is associated with inadequate institutional arrangements that involve utilities, local politicians, and water users.

Pineda and Briseño (2012) also argue that institutional variations have a great influence on the behavior and performance of water utilities. These authors carried out a comparative analysis of the institutions in the water service in two

states of northern Mexico and found that greater institutional capacity and better rules in the planning and direction of the Operative Organisms led to a better performance of the service. They conclude that the Operative Organisms managed at state level seems to be the most appropriate for the management of the service. This is because at state level here is a medium-term planning and greater volume of investment in the sector which is difficult to have at municipal level. Contrary to this position, Ozuna and Gómez (1999) have pointed out that municipalities firms operate more efficiently than state level government even if they do not have separated regulatory and operational functions. This because municipalities are close to the area of the service so they can administrate water utilities in a more efficient manner.

Literature focuses too much on how institutions affect the performance of water utilities from the point of view of the supply side. But also, the informal institutions from the demand side –consumers- should also influence the performance of water utilities. In this regard, the scarce literature (Amaya 2011) indicates that the internalization of water utilities rules by communities also affects the water utilities performance. Based on a case of study analysis of the state of Hidalgo in Mexico, this author argues that the inexistent internalization of water payment rules and the lack of incentives to comply with these rules leads to financial deficits which in turns contributes to a poor performance on water utilities. These facts makes a deficient institutionalization of the water decentralization model in Hidalgo. However, Galindo and Palerm (2007) points out that decentralization has not worked well in this state –Hidalgo- mainly in rural areas, because of an institutional clash. As a result of the decentralization of water services in Mexico, new rules governing water systems were created in places where previously existed relatively efficient community institutions for water supply generating tensions that affect the performance of the market oriented strategy of water utilities. This two perspectives indicate the importance of informal institutions when analyzing the performance of water utilities. Therefore, a broader analysis of institutions and factors that help to explain the performance outcomes in water utilities in Mexico is essential since it allows us to know the incentives that participants face while carrying out the decision-making processes that led to particular outcomes. Next chapter will present the analytical framework to carry out the institutional analysis for the case of water services in Mexico.

# Chapter 3 Methodology and Data

## Introduction

To understand the different performance outcomes of decentralized water utilities in Oaxaca and Tabasco, it is necessary to analyze local level institutional frameworks which influence human beings decision process leading to certain outcomes. The Institutional Analysis and Development (IAD) framework developed by Elinor Ostrom and Margaret M. Polski (1999) is useful for this analysis because it is a comprehensive and systematic method to undertake institutional assessments which takes into consideration all kind of institutions that influence individual's decision process. This chapter first presents the methodology used. Then, it presents the important elements of the IAD framework that were used to collect and analyze the data.

## Methodology

Due to the nature of the analytical framework used, and to gather the necessary data in the most efficient way, this work used a mixed methodology approach based on qualitative and quantitative secondary data sources of information. A document and secondary analysis of official records –legislation, regulation and laws-, government agencies reports, censuses, official databases, organizations reports, press releases and past research was carried out to generate secondary data. This methodology was chosen with the purpose of corroborating qualitative data and doing a more comprehensive analysis.

## Institutional Analysis and Development Framework

One interesting approach to analyze the institutions that influence the different performance outcomes in water utilities in Oaxaca and Tabasco is the IAD Framework developed by Elinor Ostrom and Margaret M. Polski (1999). It is an organized method for undertake systematic and comparative institutional assessments (Polski and Ostrom 1999) "which identify the major types of structural variables present (…) in all institutional arrangements but whose values differ from one type of institutional arrangement to another" (Ostrom 2007: 26).

The key element of the IAD framework is the action[4] arena. This term "refers to the social space where individuals interact, exchange good and services, solve problems, dominate one another, or fight etc." (Ostrom 2007: 28). It is used to "analyze, predict, and explain behavior within institutional arrangements" (Ostrom 2007: 28). The action arena is composed of i) action situation -structured by a set of different rules- and ii) actors –individuals and groups- involved in the situation. In this study, the action arena is where the municipalities, Operative Organisms and users interact according to the established rules –action situation- to provide and receive water supply.

[4] "Refers to those behaviors to which the acting individual or group attaches a subjective and instrumental meaning" (Ostrom 2011:13)

As mentioned above, the action situation or decision-making is influenced by three set of nested rules: constitutional, collective choice and operational rules. Constitutional rules determines "who is eligible to undertake and participate in policy making" (Ostrom 2011: 11). In the water supply services in Mexico, for instance, the municipal responsibility for water provision and the implementation of its own water services policy is determined by the PCM.

Collective choice rules determines "who is eligible to participate in activities at the operational level" (Polski and Ostrom 1999: 19). For instance, the State Water Laws in Mexico determines the participation of municipalities and Operative Organisms as regulators and providers of water supply, respectively. Operational rules "affect participant's day-to-day decision making in any setting" (Polski and Ostrom 1999: 19). They are the rules that guides water utilities decision-making about water provision like who should monitor the service, what information should be made public, and what rewards and sanctions will be assigned in certain situations. Nevertheless, this Research Paper will only focus on the analysis of operational rules since at this level actions that affects and determines water utilities performance are carried out.

At operational level of rules, action arena is also affected by three more variables: physical conditions, community attributes and the rules-in-use or the rules used by participants to order their relationships. Physical condition refers to the material conditions, human and natural resources, and capabilities related to production and provision of goods and services such as capital, labor, technology, infrastructure, sources of finance, distribution channels, the scale and scope of production, etc. (Polski and Ostrom 1999). This factor affects the structure of the action arena because it have an influence over the actions physically possible, the incentives that participants face, and therefore the kind of outcomes that can be produced (Ostrom 2007). However, "the relative importance of this factor varies across different types of settings" (Ostrom 2007: 39). It depends on the economic nature of the resources produced, namely: private, common pool, toll or public.

The second factor that affects the action arena are community attributes. This factor refers to the "norms of behavior generally accepted in the community, the level of common understanding that potential participants share about the structure of the action arena", (Ostrom 2007: 43) basically informal institutions. But this factor also includes the demographic features of the community, and the values, beliefs, and preferences about strategies and outcomes (Polski and Ostrom 1999). Sometimes "the term 'culture' is frequently applied to this element" (Ostrom 2007: 43).

The last but no less important factor for the IAD framework is the rules-in-use. These are "the minimal but necessary set of rules needed to offer an explanation of actions and results used by participants to order their relationships within an action arena" (Ostrom 2007: 37). This set of rules determines the decision making process and is composed of seven types of rules: 1) position rules, 2) boundary rules, 3) authority rules, 4) aggregation rules, 5) scope rules, 6) information rules, and 7) payoff rules which are defined in Table 1.

**Table 1 Rules-in-use**

| Type of rule | Definition |
|---|---|
| Position | They establish position or roles of participants in an action situation, and the number and type of participants who hold each position. |
| Boundary | They specify which participants enter or leave positions and how they do so. |
| Authority | They specify the actions participants in given positions may take. |
| Aggregation | They determine how decisions are actually made in an action situation. |
| Scope | They specify the jurisdiction of outcomes that can be affected and whether these outcomes are or are not final. |
| Information | They affect the amount and type of information available to participants in an action arena. |
| Payoff | They determine how costs and benefits are meted-out in the action arena. |

Source: own elaboration based on Polski and Ostrom 1999.

The analysis of all the elements that influence the structure of the action arena at operational level, namely: physical conditions, community attributes and rules-in-use are used to identify the incentives that actors faces and make them behave in a certain way. This is made through inferences based on the rational choice of individuals in which they prefer maximize their own benefits at the expenses of joint benefits. Therefore, this analysis help to explain why certain outcomes arise in different action arenas. It is important to notice that in tightly constraint action arenas the inferences about individual´s behavior are stronger that in less constraint action arenas where there is a wide range of behavioral options for participants (Polski and Ostrom 1999). In this Research Paper all this elements are used to analyze the patterns of interaction of the actors that participate in the water services. This will allow us to understand the different water utilities performance outcomes in Oaxaca and Tabasco.

# Chapter 4 Data/Analysis

This chapter first presents the empirical evidence collected using the IAD framework. Then, the institutional analysis that explains the differences in water utilities performance outcomes in the two southern states of Mexico: Oaxaca and Tabasco is presented.

## Findings

### *Physical World*

Drinking water service provided through public pipe network in Oaxaca and Tabasco has an economic nature of toll service: low subtractability and high excludability. That is to say, although the consumption of this service does not reduce the availability of it to other people, its consumption access is controlled in order to consumers contribute to the costs of provision and production (Polski and Ostrom 1999). Water supply is an infrastructure and capital intensive service provided by Operative Organisms and regulated by municipalities in both sates of Mexico. Then, it constitutes a natural government monopoly. Oaxaca is constituted by 570 municipalities with a minimum population of up to eighty inhabitants (INEGI 2015). Whereas Tabasco only has 17 municipalities with a minimum population of thirty thousand inhabitants (INEGI 2015). Therefore, the scale and scope of water production and provision is fragmented into smaller units in Oaxaca.

With regard to the availability of water, Oaxaca and Tabasco have similar disposal and quality of this natural resource. National water per capita in Mexico is 3,692 $m^3$ (CONAGUA a 2016) As Table 2 shows, both states of Mexico have water availability per capita well above the national average. Moreover, the second most important sector of water destination in these two sates of Mexico is public supply -after supply for agricultural use- in which both allocate similar percentages (CONAGUA a 2016).

**Table 2 Availability of Water Resources by State, 2015.**

| Water categories, 2015 | Oaxaca | Tabasco |
|---|---|---|
| Renewable water per capita ($m^3$/inhabitant/year) | 13, 798 $m^3$ | 13, 021 $m^3$ |
| Water quality range[5] | Excellent-acceptable | Excellent-good |
| % of water for public supply | 20% | 37% |

Source: own elaboration based on CONAGUA a, 2016.

[5] Water quality range is based on NWC indicators, namely: Biochemical Oxygen Demand (DBO5), Chemical Oxygen Demand (DQO) and Total Suspended Solids (SST) according to CONAGUA (2016).

In terms of infrastructure, Table 3 shows that, except for driving lines, Oaxaca has more infrastructure needed to carry out water supply to households than Tabasco.

**Table 3 Water Utilities Infrastructure by State, 2016**

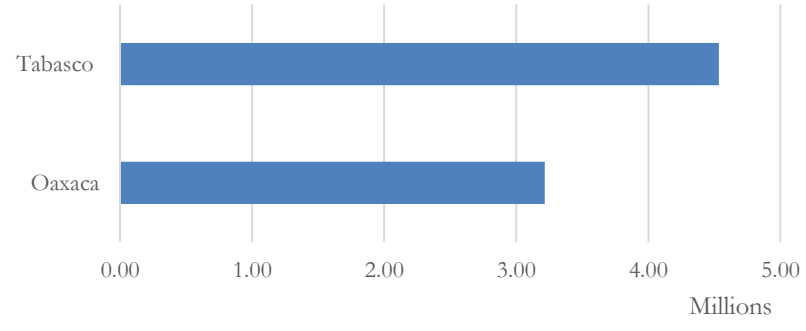
| State | Wells | Surface sources | Driving Lines (km) | Storage tanks and regulation | Pumping plants | Coloration stations | Primary network (km) | Secondary Network (km) | Other |
|---|---|---|---|---|---|---|---|---|---|
| **Oaxaca** | 710 | 861 | 18,773 | 1, 641 | 626 | 706 | 3,065 | 5, 018 | 14 |
| **Tabasco** | 662 | 69 | 28,838 | 372 | 120 | 642 | 1,325 | 320 | 59 |

Source: own elaboration based on (INEGI 2014)

Another aspect within the physical world that is important to look at are the financial resources available to the Operative Organisms for the provision of water service. As Figure 3 shows, Tabasco has invested a greater amount of financial resources in this service than Oaxaca from the year 2006 to 2016 with 4, 535.6 and 3,216.6 millions of Mexican pesos in each state respectively (CONAGUA b 2006-2016). The sources of investment for this service come from the three levels of government: federal and state government -through subsidies- and municipal government –trough revenues of water service made by users. Figure 4 and 5 shows the percentage of investment by type of source for this period in each state. As it is depicted in Figure 4, in Oaxaca almost 70% of the investment in water services comes from the federal government. A similar but relative low percentage of investment in Oaxaca come from the state and municipal level.

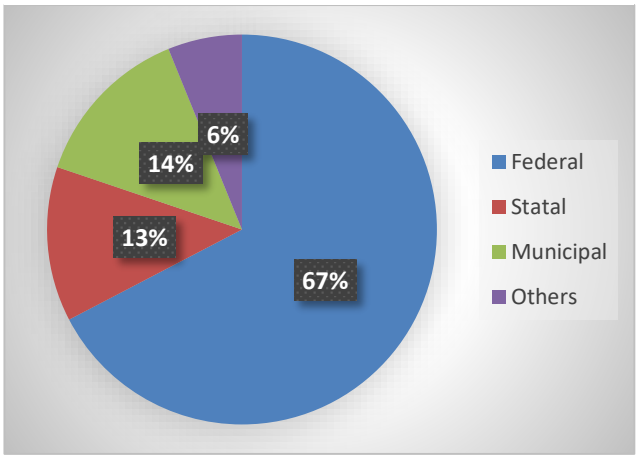
On the other hand, Figure 5 shows that Tabasco´s highest percentage of investment comes from the federal government as well but it is 12% lower than in Oaxaca. Financial contributions from the state government constitute the second largest source of investment for water utilities with a percentage well above that of Oaxaca in the same type of source.

**Figure 3 Total Water Utilities Investment accumulation in Oaxaca and Tabasco, 2006-2016.**
**Millions of Mexican Pesos (MXN)**



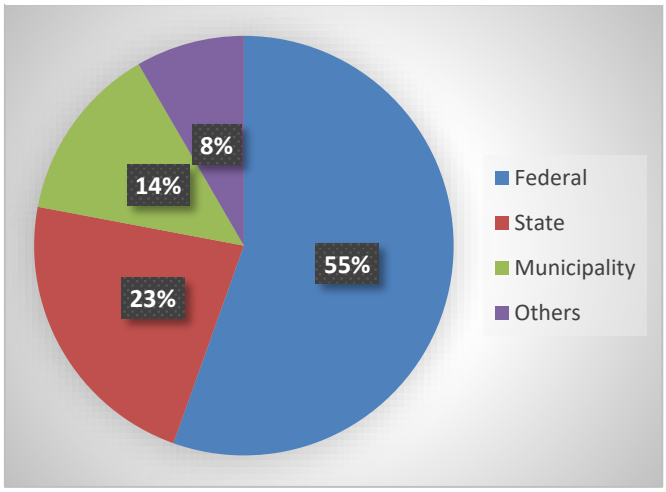

Source: own elaboration based on CONAGUA b (2006-2016)

**Figure 4 Percentage of Total Investment Accumulation in Water Utilities in Oaxaca, 2006 -2016 by Type of Source.**
**Millions of Mexican Pesos (MXN).**




Source: own elaboration based on CONAGUA b (2006-2016)

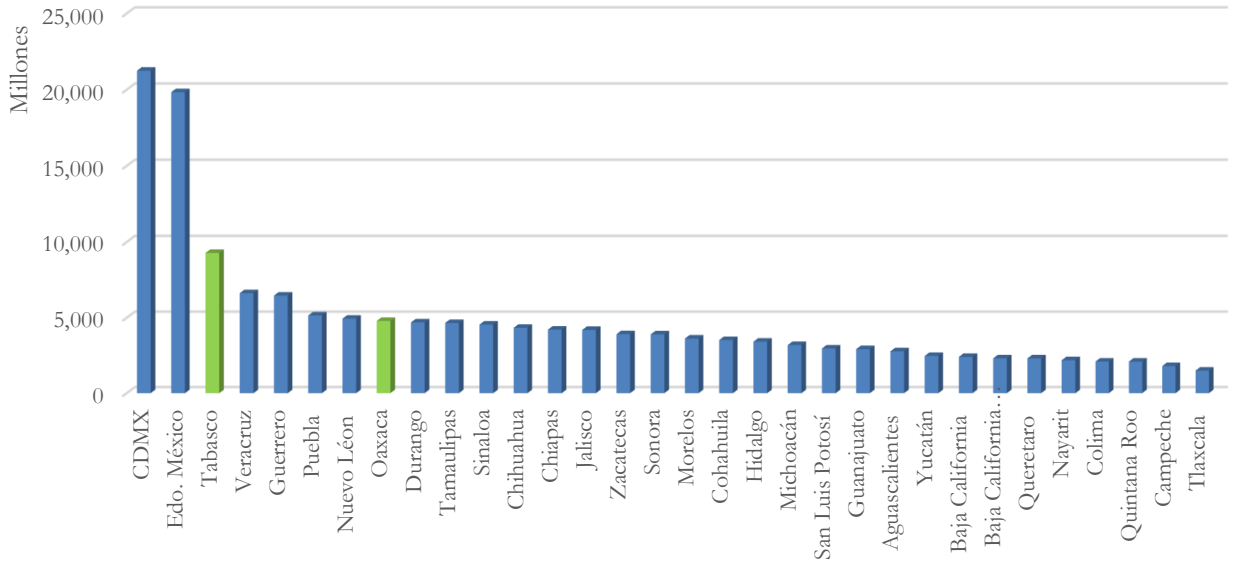
**Figure 5 Percentage of Total Investment Accumulation in Water Utilities in Tabasco, 2006-2016 by Type of Source.**
**Millions of Mexican Pesos (MXN).**




Source: own elaboration based on CONAGUA b (2006-2016)

The income for the investment of water services received by both states of Mexico from the federal government is through subsidies. Figure 6 shows that the received subsidies for water and sanitation services has been greater in Tabasco than in Oaxaca in the last twelve years. It is important to note that federal transfers can only be used for the construction or extension of infrastructure not for its maintenance.

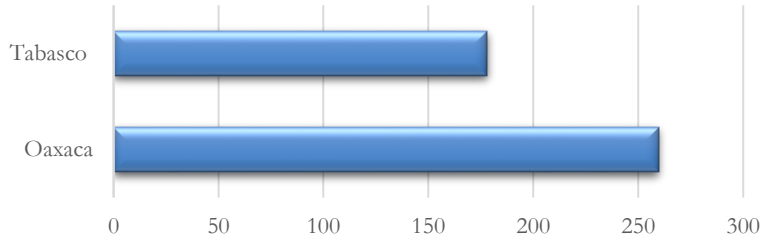
**Figure 6 Total Subsidies for Water and Sanitation Utilities by State in Mexico, 2006-20017. Millions of Mexican Pesos (MXN)**




Source: own elaboration based on Budget of Expenditures of the Federation, Mexico Reports, SHCP ( 2006-2017)

At municipal level, financial resources come from the consumer's payment for water service. Figure 7 shows the difference between the amount of money that is invoiced for the provision of water and the total amount of money that is collected in Oaxaca and Tabasco. As this figure depicts, the deficit in water revenues collection in both states Tabasco and Oaxaca is a structural trend. Nevertheless, it is more acute in the latter state.

**Figure 7 Deficit in Water Utilities Fee Collection in Oaxaca and Tabasco, 2006-2013. Millions of Mexican pesos (MXN)**




Own elaboration based on CONAGUA b (2006-2016)

### *Community Attributes*

Demographic features in Oaxaca and Tabasco are more or less similar. Both states of Mexico have the smallest number of inhabitants in the country. As Table 4 shows, total population in both states is similar and more than half of it live in rural areas. However, in Oaxaca more than half of the population is indigenous. While in Tabasco, the indigenous population only represents almost a 26% of it.

**Table 4 Demographic Characteristics of Oaxaca and Tabasco, 2015.**

| State | Total Population (Millions of inhabitants) | Urban Population (%) | Rural Population (%) | Indigenous Population (%) |
|---|---|---|---|---|
| Oaxaca | 3, 968 | 48.42 | 51.58 | 65.73 |
| Tabasco | 2,395 | 43.54 | 56.46 | 25.77 |

Source: Own elaboration based on (INEGI a 2015).

Oaxaca is the state with the greatest indigenous diversity in Mexico. Indigenous population in Oaxaca is divided into 16 groups with different languages and culture. These population groups are territorially fragmented into 418 municipalities - of the total of 570 municipalities - with their self-organization called *usos y costumbres*. This term refers to historically constructed and repeated social, cultural, economic and political practices (Canedo 2008). These forms of organization are transmitted from generation to generation as a tacit knowledge. Thus, constituting informal institutions. It is important to notice that in the municipalities that are governed by *usos y costumbres* in Oaxaca, the payment of water and, in general, other public services is not covered (Cruz and Salas 2012) because i) services are provided free of charge in exchange for participation and cooperation in community tasks as a form of reciprocity, and ii) indigenous people have a community way of conceiving water, since it is a natural resource that gives nature to them (Cruz and Salas 2012, Canedo 2008, Barabas 2008).

In this regard, Tabasco have four different indigenous groups settled in ten of its seventeen municipalities. They also are organized by *usos y costumbres* but being a minority population in the municipalities, they have to adhere to the municipal rules and therefore the payment of the water service is mandatory.

Apart from that, 97% of the population in Oaxaca lives in poverty and extreme poverty and it has a high level of marginalization (CONEVAL 2016). In Tabasco this percentage is lower. Population living in poverty and extreme poverty in this state represents 62 % of the total population (CONEVAL 2016). Tabasco has a medium degree of marginalization.

### *Rules-in-use*

#### 1. Position Rules

Municipalities of Oaxaca and Tabasco have the role of regulators of water service provision. Their main task is to set the policies and guidelines under which water services are delivered. In Oaxaca municipalities authorize the water service tariffs (HCELSO 2015). Whereas in Tabasco the authorization of the water tariffs is made by the state congress according to the guidelines of the State Water Commission. On the other hand, Operative Organisms main role is the administration of the construction and operation of the hydraulic infrastructure and propose -based on the technical issues- the guidelines for water services, investment projects and budget to the municipalities (CET 2015). As shown in Table 5, in both sates of Mexico, Operative Organisms are composed of four main sub-actors: Government Board, President of the Operative Organism, Advisory Council, and the Director of the Operative Organisms whose roles are depicted in the same table.

#### 2. Boundary Rules

In this set of rules it is important to highlight to important factors. First, the municipal administration length, and second, who determines the boundary rules for the Operative Organisms is the municipal president together with municipality´s members.

In Tabasco, the members of the municipalities are elected through voting systems by political parties. Therefore, electoral rules determine who can participate for municipal positions. In Oaxaca, only 152 municipalities of a total of 570 are governed under this system of rules. The remaining 418 municipalities in Oaxaca are ruled by *usos y costumbres* regime (IEEPCO 2018). The municipal administration length varies in Oaxaca and Tabasco. But it also differs within the state of Oaxaca. In Tabasco the municipal administration in the seventeen municipalities lasts for three years. In Oaxaca 330 municipalities of Oaxaca the municipal administration duration is three years, in 29 municipalities it only lasts a year and a half, in 58 more municipalities this interval lasts one year, and the remaining 158 municipalities local government stays in power for two years (IEEPCO 2018).

On the other hand, as Table 5 shows, members that constitute the Operative Organisms in both states Oaxaca and Tabasco are appointed by the local major with consensus of the majority municipality´s members. It is important to notice that local majors have a high degree of discretion about decision-making of water utilities since they are the principal actors with a great degree of power (CET 2015).

#### 3. Authority Rules

Municipalities have the authority to enforce cost recovery policy tools to ensure the sustainability and efficiency of water services in both states. As Table 5 indicates, they have the authority to invoice water services, order and execute suspension of service for non-payment, and invest the revenues collected for public water service expenses (CET 2015, HCELSO 2015).

## 4. Aggregation Rules

Even when the above rules determine that municipalities have the authority to invoice water service and apply sanction users for non-payment of water services, this in practice is different. While in Tabasco all municipalities carry out the formal invoicing of the water service, in Oaxaca only 50% of local governments carry out this task. Moreover, only few municipalities in Oaxaca enforce sanctions to users who do not pay for water service. In this regard, in Tabaco all the municipalities apply some kind of punishment for the user´s non-payment (INEGI 2017).

## 5. Scope Rules and Information Rules

In both states of Mexico, Oaxaca and Tabasco, the jurisdiction of outcomes is at the local level. That is to say that the consequences of decision-making about water utilities management only has an impact at municipal level of government. For instance, if the local majors make the decision to keep water rates low, this only affects the local water utilities performance. With regard to the information set of rules, the laws of water services for each state determine that municipalities must make public the information about the management of water utilities and they also must collect information about user´s satisfaction. In Tabasco, more than 80 % comply with these rules (INEGI 2017). However, in Oaxaca –as shown in Table 5 – only 3.15 % of municipalities meet these formal rules (INEGI 2017).

## 6. Payoff Rules

Due to the water supply is an area in which local majors can satisfy citizens, they face two set of payoffs in the decision-making of water utilities administration: political rewards in the short term at the expense of the deterioration of water utilities in the long term or an efficient management of water services in the long term at the expenses of political costs in the short term.

**Table 5 Rules-in-use in Water Utilities in Oaxaca and Tabasco**

| Type of rule | Oaxaca | Tabasco |
|---|---|---|
| **Position rules** | **Regulators of water utilities:** municipalities. They set the policies and guidelines under which water services are delivered and authorize water service fees. Their members are politicians or apolitics community members when *usos y costumbres* apply. The main member is the major.<br>**Water service providers:** Operative Organisms. They are composed of: | **Regulators of water utilities:** municipalities. They set the policies and guidelines under which water services are delivered. However, they do not authorize water service fees. These are authorized by State congress in accordance with the guidelines of the State Water Commission. Municipalities are composed of politicians whose main member is the major.<br>**Water service providers:** Operative Organisms. They are composed of: |

| | | |
|---|---|---|
| | • **Government Board's Operative Organisms (GBOO):** propose the guidelines for water services, investment projects and budget. Its members are members of municipalities and staff.<br>• **President of GBOO:** decisive vote in all the water utilities concerns. He/she is the local major.<br>• **Advisory Council of the Operative Organisms:** give recommendations on the management of water utilities. Its members are representatives of public and private sector.<br>• **Director of the Operative Organism:** He/she coordinates technical, administrative and financial activities. He must be a technical engineer. | • **Government Board's Operative Organisms (GBOO):** propose the guidelines for water services, investment projects and budget. Its members are members of municipalities and staff.<br>• **President of GBOO:** decisive vote in all the water utilities concerns. He/she is the local major.<br>• **Advisory council of the Operative Organisms:** give recommendations on the management of water utilities. Its members are representatives of public and private sector.<br>• **Director of the Operative Organism:** He/she coordinates technical, administrative and financial activities. He must be a technical engineer. |
| **Boundary rules** | The electoral and *usos y costumbres* rules determine who can participate in the municipalities.<br>Decisions about who can conform the Operative Organisms are determined by the local major with consensus of the majority of the municipality. However it has the discretion of appoint the candidates and he has the decisive vote to elect them. | The electoral rules determine who can participate in the municipalities. Their members are elected by voting system of political parties.<br>Decisions about who can conform the Operative Organisms are determined by the local major with consensus of the majority of the municipality. However it has the discretion of appoint the candidates and he has the decisive vote to elect them. |

| | | |
|---|---|---|
| **Authority rules** | Municipalities have the authority of:<br>• Invoice water services.<br>• Order and execute suspension of service for non-payment.<br>• Invest the revenues collected for public water service expenses. | Municipalities have the authority of:<br>• Invoice water services.<br>• Order and execute suspension of service for non-payment.<br>• Invest the revenues collected for public water service expenses. |
| **Aggregation rules** | Normally, people who do not pay for water are not sanctioned. Only 13.8% of municipalities apply sanctions for late payment of water bills. | People who do not pay for water are sanctioned. 100 % of municipalities adopts some sanction for unpunctual payment. |
| **Scope rules** | Municipal level. | Municipal level. |
| **Information rules** | 3.15% of the municipalities disseminate information about the water utilities management and user´s satisfaction. | 82.35% of the municipalities disseminate information about the water utilities management and user´s satisfaction. |
| **Payoff rules** | Political costs for an increase in water fees.<br>Political rewards for keep rates low. | Political costs for an increase in water fees.<br>Political rewards for keep rates low. |

Own elaboration based on HCELSO 2015, CET 2015, INEGI 2017

# Analysis

Water provision service through pipes is an investment and infrastructure intensive policy area regulated and provided my local government and para-municipal entities in Mexico. Therefore, it constitutes a government natural monopoly in both states of Mexico: Oaxaca and Tabasco with political implications for its performance. However, the local institutional frameworks in Oaxaca and Tabasco offers another set of incentives that also influences and explains the difference in water utilities performance.

From the findings it was found that a smaller and more fragmented production scale of water services, and a smaller amount of financial resources available in Oaxaca than in Tabasco are the two physical conditions that led to different outcomes in water utilities performance outcomes. Water utilities are an infrastructure and investment intensive sector. Therefore, production costs decreases

while the scale of production increases. In Oaxaca the production costs for 570 Operative Organisms that provide water to a population of up to 80 inhabitants may be higher than the production costs of 17 operators that provide water to a minimum of 3,000 inhabitants in Tabasco. Moreover, these costs may be less affordable for the population in Oaxaca since 97% of the inhabitants live in poverty or extreme poverty. Furthermore, a lower availability of financial resources of the federal government and from the revenues of water utilities in Oaxaca in comparison with Tabasco led to a lower possibility of making the necessary investments for the correct functioning of water utilities in Oaxaca. It is important to notice as well that the predominance of federal transfers in the sources of investment of water utilities in Oaxaca can be a given incentive to local politicians to act opportunistically. This is because according to the formal rules, the rules for assigning federal transfers to Operative Organisms, these resources are labeled for its use in construction or expansion of infrastructure. Therefore, these rules can incentive local major's focus on carrying out infrastructure projects that are more visible to their voters than infrastructure maintenance projects less visible to them to obtain political rewards in their careers to the detriment of the proper performance of water utilities.

Another important difference in this analysis is that unlike Tabasco, in Oaxaca the informal rules present within the indigenous groups, *usos y costumbres*, led to a different performance outcomes in water utilities. This is because, by not paying for the water service, due to their communitarian values and beliefs in managing community resources, there is less financial resources available in Oaxaca to invest in water utilities which in turns led to a poor service. In Tabasco, population that is governed by *usos y costumbres* is a minority. Therefore this fact can have less significant impact on water utilities performance outcomes. It is important to clarify that that these informal institutions in water management are not the result of an opportunistic way of behavior but the market orientation given to the water utilities through the formal institutions with decentralization is not compatible with these ancient informal institutions within the indigenous groups. There is a wide literature that shows the high civic commitment that exists within the indigenous groups governed by *usos y costumbres*.

With regard to the rules-in-use within the Operative Organisms it was found the lack of autonomy of the Operative Organisms in both states, Oaxaca and Tabasco lead to a difficulty to carry out efficient policies in water utilities. Since local majors have the authority of approve the management and budget plans, this situation provides incentives for them to adopt political and clientelar criteria instead of efficient criteria in water utilities resource allocation. The result of this repetitive behavior may negatively affect the performance of water services in the long term in Oaxaca and Tabasco.

Another factor in the rules-in-use that also influences the difference in water utilities outcomes in both states is the mechanisms to set water tariffs. In Tabasco, authorization of water fees is made by the state congress based on the guidelines of the State Water Commission. This process can serve as check and balances mechanism that may discourage political majors to act opportunistically in setting cost recovery inefficient water tariffs. In contrast, in Oaxaca the authorization of water fees in Oaxaca is made by the municipal congresses. This, coupled with an environment of lack of transparency and accountability can incentivize local major sett inefficient water tariffs to obtain political rewards -such as support in their political career- at the expense of an efficient service delivery.

A second factor that influences behavior of actors affecting the water performance utilities outcomes in Oaxaca and Tabasco is the length of municipal administrations. In Oaxaca, rotation of the municipal administration vary from one or up to three years, while in Tabasco all length municipalities administrations is three years. Short length of municipal administrations can encourage local majors in Oaxaca to act opportunistically affecting the performance of water services. This is because local majors can place political clientelist relationships by apply inefficient service cost recovery policies in the short term in order to gain voters support for their future political career or possible reelections at the expense of the quality of services in the long term. Moreover, this dynamic undermine the continuity of long-term policies and do not allow municipalities to develop their administrative skills. Therefore, the three years municipal administration in Tabasco seems to lead to a better water utilities performance outcomes.

Another factor that influences water utilities performance outcomes in both states of Mexico is the degree of enforcement of cost recovery policy tools such as: suspension of service, fines, service disconnection or legal proceedings. In an environment of lax application of sanctions for non-payment of water services such as in the case of Oaxaca, incentives that users face for perpetuating this behavior patterns undoubtedly affect the water utilities performance outcomes in the long term by making collection revenues deficits a structural trend. In Tabasco, the application of the cost recovery policy tools is comparatively greater than in Oaxaca –as shown in Table 5-. Therefore, this can explain the different outcomes in water utilities performance.

A fourth element that influences differences in water utilities performance outcomes in Oaxaca and Tabasco are the existing information asymmetries in water utilities management in Oaxaca and Tabasco as well as the lack of mechanism of accountability and transparency may encourage opportunistic behavior of local majors to detriment of efficient service delivery. While in Tabasco, 82.35% of municipalities make public the information about water management services and collect user´s opinion information to improve the service, in Oaxaca only 3.15% of the municipalities carries out this task. Therefore in Oaxaca local majors face more incentives to behave corrupt and rent seeking at the expense of the quality and performance of the service than in Tabasco.

It is important to highlight that mechanisms of citizen participation and representation within the Operative Organisms can distort the water utilities performance outcomes in Oaxaca and Tabasco. On one side, due to the local majors have the right to appoint and select - with a high degree of discretion- the citizen representatives that constitutes the Advisory Council of the Operative Organisms. - whose function is to act as a mechanism of check and balances and give voice to users in water services decision-making, this can be an incentive for local majors to coopt citizen participation and/or political patronage relationships. On the other hand, this dynamic may also led to elite capture. All these behaviors may result in an inefficient allocation of resources and biased provision of water utilities services in both sates of Mexico.

To sum up, the economic nature of water utilities per se has incentives for political meddling in Mexico. Moreover, each state has its particular local frameworks that lead to different water utilities performance outcomes. In the case of Oaxaca, decentralization coupled with a smaller and more fragmented production scale for water utilities and a lower availability of financial resources, the

formal and informal institutional frameworks within the community, and within the Operative Organisms creates incentives such as the lack of autonomy of the Operative Organisms, the mechanisms for setting water tariffs, the short length of municipal administrations, a weak enforcement of cost recovery policy tools such as: suspension of service, fines, service disconnection or legal proceedings, the mechanisms of citizen participation and representation, and the information asymmetries led to a less efficient water utilities performance outcomes than in Tabasco. This is 85% of the total household water pipe network (INEGI 2015). But only 49% of connected households receiving water supply every day at least one hour per day (INEGI a 2017), and of that percentage, only 35% of households receiving a constant supply or twenty-four hours a day (INEGI b 2017).

In Tabasco, decentralization coupled with a broader production scale of the Operative Organisms and a greater availability of financial resources and the local institutional frameworks, in spite of the existence of lack of autonomy of the Operative Organisms and as well, creates incentives such as higher enforcement of policy recovery tools, long length of municipal administrators, the existence of exchange of information between users and service providers that led to a better water utilities performance outcomes than in Oaxaca. This is 90% of the total households connected to the pipe network and 89% of the connected households receiving proper water supply every day at least one hour per day (INEGI a 2017), and 47% of these households receiving a constant water supply for twenty-four hours a day.

# Chapter 5 Conclusions

It is argued that decentralization increase efficiency in public service delivery by transferring the authority and responsibility to manage service delivery to local level of government. Nevertheless, the experience of decentralization in the world has had diverse results, including Mexico. This paper tries to argue, the role of local institutional frameworks in determining how decentralisation of water utilities can lead to different public water utility performance outcomes based on the local institutional frameworks in Oaxaca and Tabasco in Mexico. For this purpose, the paper uses the Institutional Analysis and Development (IAD) Framework to analyse and compare local institutions in which decentralized water utilities in Oaxaca and Tabasco operates to explain why they have different public water utilities performance outcomes from decentralisation despite having similar characteristics such as water quality and water availability per capita among others.

The results find that difference in decentralized public water utilities performance outcomes in Oaxaca and Tabasco arise due to different local institutional frameworks in these two states. In particular, in Oaxaca, decentralization coupled with a smaller and more fragmented production scale for water utilities and a lower availability of financial resources, the formal and informal institutional frameworks within the community, and within the Operative Organisms creates incentives such as the lack of autonomy of the Operative Organisms, the mechanisms for setting water tariffs, the short length of municipal administrations, a weak enforcement of cost recovery policy tools such as: suspension of service, fines, service disconnection or legal proceedings, the mechanisms of citizen participation and representation, and the information asymmetries led to a less efficient water utilities performance outcomes than in Tabasco. This is a 85% of the total household water pipe network (INEGI 2015). But only 49% of connected households receiving water supply every day at least one hour per day (INEGI a 2017), and of that percentage, only 35% of households receiving a constant supply or twenty-four hours a day (INEGI b 2017).

In Tabasco, decentralization coupled with a broader production scale of the Operative Organisms and a greater availability of financial resources and the local institutional frameworks, in spite of the existence of lack of autonomy of the Operative Organisms and as well, creates incentives such as higher enforcement of policy recovery tools, long length of municipal administrators, the existence of exchange of information between users and service providers that led to a better water utilities performance outcomes than in Oaxaca. This is a 90% of the total households connected to the pipe network and 89% of the connected households receiving proper water supply every day at least one hour per day (INEGI a 2017), and 47% of these households receiving a constant water supply for twenty-four hours a day. Therefore, it is argued that decentralization is a blanket statement and only along with local institutions it determines the results of public service delivery. When studying decentralization is important to look at the local level institutional frameworks because is how human beings decisions process are influenced.

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