DECENTRALIZATION OF A MUNICIPAL WATER MANAGEMENT TO AN AUTONOMOUS WATER SUPPLY AND SANITATION PROVIDER: THE CASE OF TATUMBLA, HONDURAS

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ABSTRACT

In many rural communities of Honduras, quality and quantity of water and appropriate sanitation services (WSS) continue to be inadequate. In response to the inefficiencies of the WSS sector, in 2003 the Honduran Congress passed the National Water and Sanitation Framework better known as the Framework Law. At a national level, this law calls for the decentralization of the WSS service providers and, at the local level, it gives municipalities the responsibility for service provision, oversight and the duty to determine the most appropriate service provider model. The objective of this case study was to understand the circumstances that contributed to the decentralization process from municipal water management to an autonomous WSS service provider model in the town of Tatumbla, Honduras, on the outskirts of the capital, Tegucigalpa. Focus group discussions were arranged with community members who were water and sanitation users selected by means of purposive sampling. Semi-structured interviews and questionnaires with different organizations, field observations and revision of the literature were also included. Qualitative data collected from multiple sources were analyzed following the 6 step framework for thematic analysis.

One major conclusion suggests that the decentralization process in Tatumbla was the result of an external funding initiative (donation) from the IDB to finance the construction of a sewage system and a wastewater treatment plant, which included, amongst other eligibility criteria, the establishment of an autonomous WSS service provider. Consequently, the decentralization process in Tatumbla was not driven by municipal proposal interests, nor by organized efforts from the community demanding improvements in the water and sanitation services. Community

perceptions of WSS services revealed participants were aware of and concerned that there is an increasing water crisis in Tatumbla. Factors most often mentioned included the overall mismanagement of WSS services, and a lack of interest and the limited vision of past and present municipal authorities to invest in water services and even less in sanitation. Participants expressed trust and satisfaction with the performance of the autonomous WSS service provider as well as hope that this new model would improve the services and long-standing problems.

Other relevant findings include the lack of community engagement during the decentralization process resulting from poor communication by the municipal authorities which contributed to the perception that WSS services have never been a priority for local municipal governments. Results validated the vicious circle of deficient services, inadequate maintenance, low collection of water tariffs, scarce improvement and infrastructure investments commonly associated with inefficient municipal water management models. Simultaneously, mismanagement of funds and corruption were issues that emerged which are closely tied to the inadequacy of municipal water service.

National and local regulation to control the efficiency and transparency in the management of WSS service providers remains a challenge. Special consideration and analysis needs to be given to local volunteer-based regulating mechanisms so that they can comply more effectively with their roles and responsibilities. In compliance with the Framework Law and the national goal that all 298 Honduran municipalities will be managing their water and sanitation services by 2038, an important lesson to consider is the need for timely organized community engagement. No service provision model will be effective if it is isolated from a conscious participation process by water users who in the end are the beneficiaries.

BIOGRAPHICAL SKETCH

Marjorie Mayr was born on September 27, 1962 in Tegucigalpa, Honduras. She received her degree as an Agronomist from the Escuela Agricola Panamericana, El Zamorano in 1983 as one of the first four women in an all-male institution and a Bachelor of Science in Agriculture from The University of Florida in 1986. In 1988, she joined the Master of Professional studies offered by Cornell University in International Agriculture and Rural Development. Since then she has worked with non-profit organizations in youth development, environmental education and promoting girls' education. After raising three daughters and with a life-long interest in water issues and conservation, she was readmitted in 2018 to the College of Agriculture and Life Sciences with a concentration in International Agriculture and Rural Development in order to complete her research paper. She is indebted to the University of Cornell for this opportunity.

DEDICATION

I dedicate this research paper to the love of my life, my husband Jeff and my three beautiful daughters; Nicole, Valerie and Aimee

ACKNOWLEDGMENTS

I would first like to express my eternal gratitude to God for giving me the strength, guidance and wisdom every day of my life. My special thanks to ALL the incredible “stars” that aligned during this stage of my life so that I could complete this milestone, especially people who in one way or another were ready to help me without really knowing me and others who have known me for years. Most of all, I will be eternally grateful to my husband, best friend and life partner, Jeff for believing in me and his continuous support during these months. I extend special thanks to my three beautiful daughters; Nicole, Valerie and Aimee who have been my inspiration since the day they were born. Also, I share special thanks to my parents, the best example of caring for others without expecting anything in return.

Two of the “stars” that I need to thank by name are: Dr. Monroe Weber-Shirk and Dr. Alice Pell who did not hesitate to assist me when I approached them and agreed to advise me for the completion of this research paper.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ABBREVIATIONS

CEPAL	United Nations Economic Commission for Latin America and the Caribbean
COMAS	Municipal Water and Sanitation Commission
CONASA	Drinking Water Supply and Sanitation Council
CWB's	Community Water Boards
DIMASTAC	Municipal Water and Sanitation Division for the Center of Tatumbla
ERSAPS	National Water and Sanitation Service Regulator
FHIS	Honduran Social Investment Fund
GoH	Government of Honduras
IDB	Inter-American Development Bank
INE	National Statistics Institute
IMT	Irrigation Management Transfer
MAPAS	Monitoring Country Progress in Drinking Water and Sanitation
MDG's	Millennium Development Goals
NGO's	Non-governmental organizations
NTU	Nephelometric Turbidity Unit
OECD	Organization of Economic Cooperation and Development
PEMAPS	Strategic Plan for the Modernization of the Water Supply and Sanitation Sector
PROMOSAS	Modernization of the water and sanitation sector project
RBU	Biological Reserve of Uyuca
SANAA	National Autonomous Aqueducts and Sanitation Service
SDG	Sustainable Development Goal

TRC	Regulation and Control Technician
UASB	Up flow Anaerobic Sludge Blanket
UMA	Municipal Environmental Unit
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
USCL	Local Regulation and Supervision Unit
WGF	Water Governance Facility
WHO	World Health Organization
WSS	Water Supply and Sanitation

CHAPTER ONE

1. INTRODUCTION

Proper access to and management of water, sanitation and hygiene is a human right and a key element for achieving the Sustainable Development Goals (United Nations, 2015a). An estimated 2.1 billion people worldwide lack access to safe household drinking water and approximately 4.4 billion lack access to proper sanitation, putting them at risk of disease (United States Agency for International Development [USAID], 2017). In Latin America and the Caribbean, 21 million of the 33 million living in rural areas are without access to a source of safe drinking water (The World Bank, 2017b).

According to (The United Nations Educational, Scientific and Cultural Organization [UNESCO], 2006), one of the biggest challenges within the water supply and sanitation (WSS) sector is governance. Why and how are certain decisions made? What stakeholders are involved? What principles, rules and regulations (formal and informal institutions) apply? And is governance process-oriented and thus intrinsically linked to politics and engagement of various actors and their relationship to each other? There is also agreement that the basic principles of effective governance include: participation by all stakeholders, transparency, equity, accountability, coherence, responsiveness, integration and ethical issues (United Nations, 2003).

The topic of governance and management, and the human right to water and sanitation were also acknowledged during the 5th World Water Forum. According to (Domínguez Serrano, 2010), "Recognizing the right to water and sanitation entails setting up mechanisms to ensure their enforcement and to demand responsibilities when they are not guaranteed, thus becoming a

management issue" (p.311). This forum recognized that in order to protect the human right to water and sanitation, and to prevent mismanagement, it is necessary to develop systems that guarantee responsible and accountable governance. The recommendations of the forum include:

> "To empower local and basin-level institutions by strengthening and carrying out decentralization from central governments according to basic recognized principles, as water services are best provided at the local level while having a connection with the national level through coordinated activities. Before decentralization is carried out at a local level, research must be done in order to comprehend the local context under which the reforms will take place and to avoid unexpected and bad consequences. Central governments should create an enabling environment for decentralized institutions to ensure that they have financial, technical, legal and human capacities for effective local management, including coping with rapid urban expansion, poverty and global changes. Strengthen existing local institutions and where local institutions do not exist, establish them while incorporating civil society, user groups, water professionals and other stakeholders in their functioning" (World Water Council, Ministry of Foreign Affairs of Turkey, 2009).

In response to the inefficiencies of the WSS sector, on August 23rd, 2003, the Honduran Congress passed the National Water and Sanitation Framework Law by decree 118-2003. The Framework Law calls for the decentralization of the WSS service providers through the separation of planning and regulation of potable water and sanitation services, and the expansion of coverage of WSS services (Antúnez & Ochoa, s. f.). In 2005, a Strategic Plan for the Modernization of the Water Supply and Sanitation Sector (PEMAPS) was adopted and, in 2011, a Water Supply and Sanitation National Policy was prepared by the Drinking Water Supply and Sanitation National Council (CONASA). At the local level, the Framework Law gives municipalities the responsibility for service provision and oversight as well as the duty to determine the most appropriate service provider model. Municipalities can also decree ordinances to improve and control the service provision.

Honduras is following the trend towards decentralization of political powers and public services seen in other developing countries. Decentralization and governance of WSS services is central and a current issue of concern for the Honduran government as well as the sector's financing (The World Bank, 2017a). Centralized WSS providers have been consistently known for poor performance in the delivery and quality of services. Furthermore, there is limited interest and obligation among customers to pay cost-recovery tariffs resulting in insufficient funding for maintenance. These conditions have led to a vicious cycle of infrastructure deterioration, and the misuse of and inadequate financial resources, which encourage political interference and poor quality of services. Lack of transparency and inappropriate policies both at central and local levels have also been detrimental to the provision of services. Local governments view water as a politically sensitive issue and encounter difficulty in effectively balancing the conflicting demands for affordability, the obligation to expand and improve coverage to poorer communities, and the sector's need for financial viability. Finally, consumers have little leverage for holding WSS providers accountable to meet their needs and preferences (The World Bank, 2017a)

According to the access definition and data of the World Health Organization/United Nations International Children's Fund Joint Monitoring Program, Honduras reached the Millennium Development Goals (MDGs), achieving 92 percent water coverage and 75 percent with improved sanitation facilities, compared to the 1990 goal of 87 percent and 74 percent respectively (World Health Organization & United Nations International Children's Emergency Fund [UNICEF], 2013). Even though coverage levels have increased in Honduras, they continue to remain unequal with limited service quality. The existing infrastructure allows the use of only 5 percent of water resources available in nature, and the provision of safe and sustainable drinking water and

sanitation services to all the inhabitants remains a challenge (World Bank, Water and Sanitation Program Honduras, 2013). In 2010, over 2.2 million Hondurans lacked access to improved sanitation services, and 1 million lacked access to improved drinking water services. Of these, 66 percent and 80 percent, respectively, lived in rural areas (López, 2011). In 2016, 44.68 % of the total population of Honduras lived in the rural area, which represents a population of approximately 4,071,260 (Trading Economics, 2016). Thus, the challenge of sustaining and increasing coverage levels and ensuring the quality of the services remains.

Honduras has made substantial progress regarding the necessary legislation and institutional framework for the WSS sector to allow progress in the modernization of potable water and sanitation systems, but a state of urgency and need to expand and improve the efficiency and efficacy of the WSS services still persists. Additionally, Honduras is experiencing rapid urbanization and growth of small towns. In response, the government of Honduras has recognized the importance of establishing sound institutional models while towns remain small, to help cope with and avoid the anticipated problems of unplanned urban growth commonly seen in the country and in Latin America (World Bank Group, 2016). It is also important to recognize the multiple differences and unique realities among municipalities, and the importance of learning how progress is achieved and measured across distinct municipalities (Dickson, 2006).

Using a case study approach, this paper will lead to a better understanding of the decentralization process from top-down municipal water management to an autonomous WSS service provider in a single, small community, Tatumbla, near the capital, Tegucigalpa. Additionally, the Vision of the Country 2010-2038 and the Nation's Plan 2010-2022 (Congreso de la República de Honduras,

2010), have sector targets such as indicator 27 as shown in Figure 1 within the Nation's Plan, which defines the goal of increasing the number of municipalities on a yearly basis that administer their WSS services through an autonomous service provider (Ente Regulador de los Servicios de Agua Potable y Saneamiento [ERSAPS], 2012). Furthermore, the Monitoring Country Progress in Drinking Water and Sanitation (MAPAS) highlights the need to strengthen service providers in order to advance the institutional reform process by decentralizing the service to municipalities and creating autonomous utilities in order to deliver quality and sustainable services (The World Bank, 2014).

Goal #1: A nation without extreme poverty, educated and healthy with consolidated social security services						
Strategic line #5: Health as a fundamental to improve living conditions						
Indicator: Number of municipalities managing their water and sanitation services according to the Framework Law						
No.	**Indicator**	**Base line (2009)**	**2013**	**2017**	**2022**	**2038**
27	Number of municipalities managing WSS	5	50	150	200	298

Figure 1. Indicator #27 Number of Municipalities managing WSS. Adapted from (Congreso de la República de Honduras, 2010).

1.1 INSTITUTIONAL AND FINANCIAL FRAMEWORK FOR DECENTRALIZATION OF MANAGEMENT OF WATER SUPPLY AND SANITATION SERVICES

In 2000, after more than ten years of debate, the Honduran Congress reformed the Municipal Law, with the objective of regulating, promoting and strengthening decentralization at the municipal level, for planning and implementation of policies and programs for local economic development that guarantee sustainable management and the conservation of natural resources. In relation to the

WSS sector, the law grants municipalities more autonomy and delegates the decision-making process in order to achieve more integrated community development. This law endorses the management of local public services and the right to create local administrative structures to allow municipalities to become more proactive decision makers (Mairena, Smits, & Uytewaal, 2011).

In general, the legal and institutional framework for the WSS sector in Honduras provides the foundation to allow for progress in the modernization of potable water and sanitation services based on clearly established roles and responsibilities in the pursuit of efficiency and efficacy. As shown in Figure 2, the 2003 Framework Law established the National Council on Water and Sanitation (CONASA) to take on a policy-making role and support planning among various agencies involved in the WWS sector. These agencies include the National Water and Sanitation Service Regulator (ERSAPS), which reports to the Ministry of Health, to oversee compliance of the WSS service providers with national legislation and regulations, especially through the collection and dissemination of performance data from service providers; and, the National Autonomous Water and Sanitation Service (SANAA) which historically managed and provided WSS to approximately 30 urban centers and other smaller municipalities, to fulfill a dual role of providing technical assistance to operators, and local water boards, while also serving as the technical secretariat of CONASA (ERSAPS, 2013).

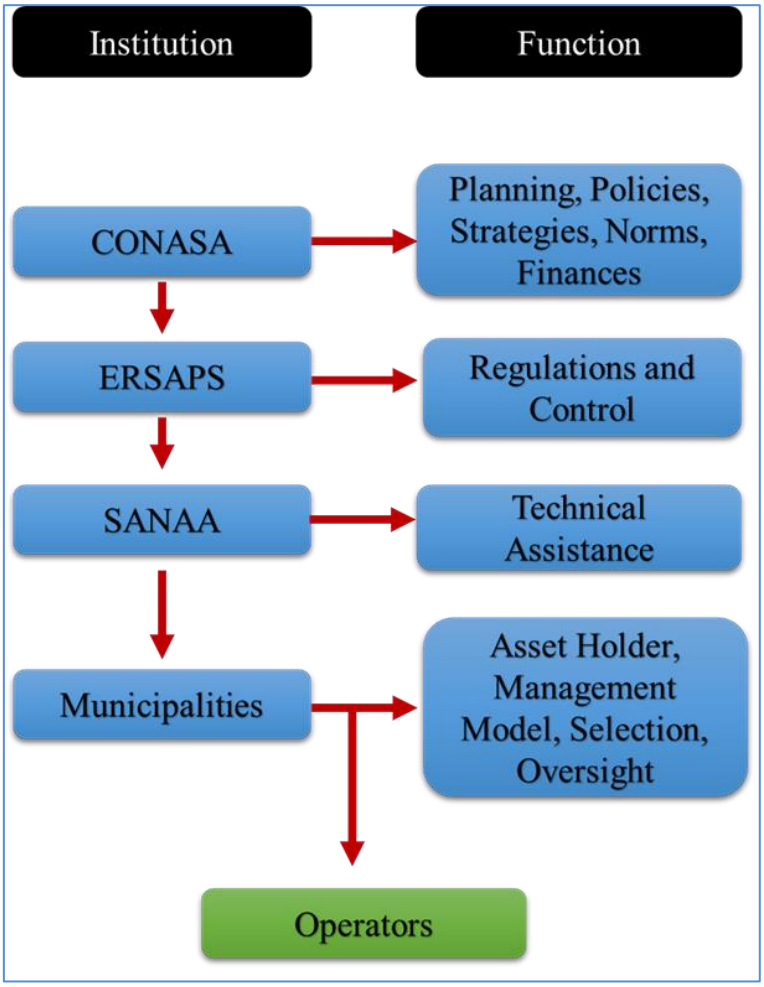

Figure 2. Decentralization model in Honduras. Adapted from (ERSAPS, 2013).

As for the role of municipalities, the Framework Law establishes that they are responsible for ensuring WSS delivery through decentralized service providers such as: (i) community water boards (CWB's); (ii) direct municipal provision; (iii) legally constituted municipal companies; and, (iv) concession agreements. Associations of municipalities known as "Mancomunidades" can also provide support to municipalities in the provision of WSS services (World Bank Group, 2016).

The Framework Law also establishes that a municipality is considered to have decentralized service delivery once it complies with a series of functions and the implementation and operation of six units: (1) a Municipal Water and Sanitation Commission (COMAS); (2) a Local Regulatory Supervisor Unit (USCL) which develops and implements an annual operation plan; (3) a Regulation and Control Technician (TRC); (4) a municipal operation permit structure to subscribe service providers; (5) a municipal registry of service providers; and, (6) a specialized and decentralized autonomous service provider that periodically reports to ERSAPS (ERSAPS, 2013). Nevertheless, in actuality, there is still a lack of understanding of the complexities of the laws in the sector, which is one of the reasons for insufficient compliance and adherence ("Honduras," 2011).

Given the size, diversity, social and political complexities of the 298 Honduran municipalities, this decentralized approach poses challenges in terms of implementation, financing and regulation. Since 2013, more than 70 municipalities have received financial support from sectoral programs and external cooperation, and approximately 60% of the population receives water services from a decentralized autonomous provider in conformity with the Framework Law (World Bank, Water and Sanitation Program Honduras, 2013). This financial and technical support has enabled municipal governments to better understand the Framework Law regarding decentralization of their WSS services as well as contributing with infrastructure improvements and application of regulation to constitute their COMAS, USCL and TRC (ERSAPS, 2013).

One of the most pressing limitations for the sector's financing to further decentralization is the lack of governance (World Bank, Water and Sanitation Program Honduras, 2013). Particularly in

small towns, a major constraint to improving provision and development of sustainable WSS services is the shortage of financing for infrastructure, investments, maintenance and rehabilitation (World Bank Group, 2016). Also, financially the sector can be defined as fragmented. According to the Organization of Economic Cooperation and Development (OECD), there are three main sources of financing referred to as the 3 T's: (1) Tariffs and other contributions collected by service providers from water users (usually to cover operation and maintenance costs, repairs, some infrastructure investments and specific projects); (2) Taxes or public funds generally from government contributions (national or municipal), to service providers, as well as indirectly from fiscal transfers from the national government to the municipalities; and, (3) Transfers, which are mostly for investments, provided in the form of grants or credits from external donors to national or local institutions and service providers (Organisation for Economic Co-Operation and Development [OECD], 2009).

In 2012, the Government of Honduras (GoH) received a US$30 million loan from the Inter-American Development Bank (IDB) as a Supplemental Investment Program for Potable Water and Sanitation (The Program) under IDB - 1793/SF-HO. The Program was designed to assist seventeen intermediate-sized municipalities. The objective of the Program was focused on improving WSS services through technical assistance and infrastructure investments in order to strengthen municipalities in the decentralization of WSS services. These municipalities committed in writing to comply with the necessary reforms in order to improve and renovate their WSS services in the following areas: (1) establishment of a local WSS service provider with administrative and financial autonomy; (2) guarantee financial, administrative and environmental sustainability with the establishment of appropriate tariffs; (3) independent regulation of the WSS services; (4)

involvement of the community in the decision making process; and, (5) establishment of a municipal environmental management unit. Additionally, the Program supported the GoH by improving the quality of life, health service indicators and community development to reach the Millennium Development Goals (Fondo Hondureño de Inversión Social [FHIS], 2014).

The Program was implemented by FHIS, with support from ERSAPS to consolidate regulation through the establishment and training of the COMAS, USCL and TRC, to provide technical support for new service providers, and technical assistance for the development of studies and construction of infrastructure investments. SANAA supported the implementation of the Program by developing new water system designs or validating designs already available. SANAA also provided follow-up field visits from the beginning to completion of the final product, evaluated alternatives and guided the WSS providers for six months on the operation and management of the systems as well as training operators and technicians. SANAA received laboratory equipment for water analysis and their regional personnel were trained in monitoring and evaluation. Municipalities received basic equipment (FHIS, 2014).

The municipality of Tatumbla, was one of the seventeen municipalities that received technical support from the program to improve and renovate their WSS services in adherence to the Framework Law (Banco Interamericano de Desarrollo [BID], 2013). For the first time in the history of the municipality, an autonomous service provider was established to manage the water and sanitation in the urban area and at the municipal level. The COMAS, USCL and TRC were also organized. Funding was provided for the first sanitation facilities with the construction during Phase I of a sewage treatment plant and the installation of 2,375 meters of sewage lines. This initial

phase included 36 sanitary sewers, 142 residential sewer connections, an up flow anaerobic sludge blanket reactor (UASB) for primary treatment and a subsurface wetland for secondary treatment. The system was designed with an anticipated lifespan of 20 years with the potential of a second phase to serve a total of 286 home connections (Convenio para la Administración de la Construcción de la Obra Local "Construcción Primera Etapa del Sistema de Alcantarillado Sanitario y Sistema de Tratamiento de Aguas Residuales de Tatumbla, Francisco Morazán", 2011; Hernández, 2014).

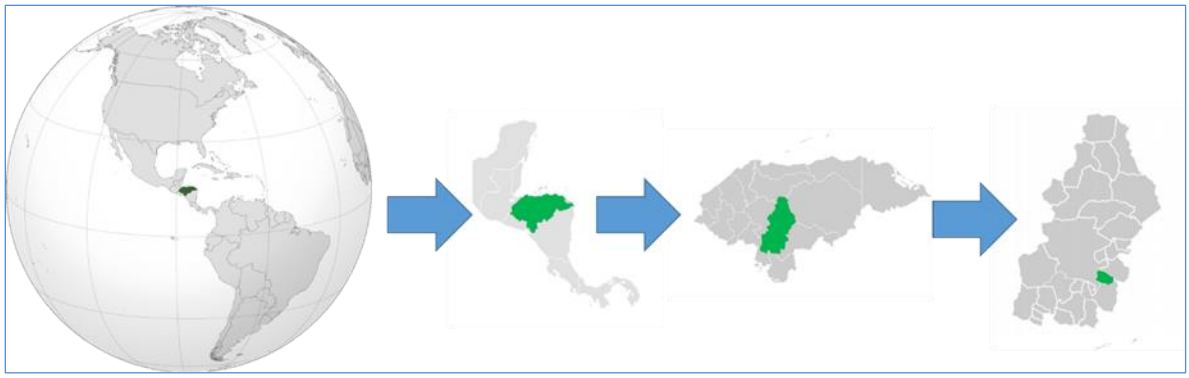

Figure 3. Map of Tatumbla, Honduras

1.2 OBJECTIVES OF THE RESEARCH

The objective of this study is to better understand the decentralization process from municipal water management to an autonomous WSS service provider. Focusing on the town of Tatumbla, Honduras, this case study examines the circumstances that contributed to the establishment of an autonomous water and sanitation service provider. The study identifies community perceptions of the services and their role in the decentralization process. It includes the institutional support and roles of the regulating organization ERSAPS, technical assistance from FHIS and SANAA, as well as from the funding source (the Inter-American Development Bank, IDB). In studying the

successes and challenges of this process, this paper documents the complexities of development strategies that can benefit and facilitate the transition to decentralized models of water and sanitation services and ultimately to the creation of autonomous entities in order to deliver quality and sustainable services. Lessons learned from this process in Tatumbla can potentially be generalized and applied to similar communities either considering or already involved in the decentralization of water and sanitation services.

CHAPTER TWO

2. LITERATURE REVIEW

The research makes reference to decentralization as a popular strategy to improve transparency, accountability and community participation implying the return of control of water and sanitation to the local level. In addition, the United Nations confirms that there is a worldwide trend towards decentralization. The highly centralized nature of government agencies has been a major cause of inefficient supply of services. (UNESCO, 2006). As (Pearce-Oroz, 2006) noted, "Whether or not decentralized operators can more effectively and efficiently provide these services than their centralized counterparts will depend to a large extent on the management capacity of local operators" (p.31).

Even though most countries have established the fundamental institutional arrangements for water and sanitation provision, effective implementation continues to remain poor. In many developing countries, where the provision of basic services frequently has been the responsibility of the central government, there has been an increasing recognition of the importance of decentralizing WSS as a feasible option for improved services (Pearce-Oroz, 2006). Often lack of basic services is due to mismanagement, corruption, absence of appropriate institutions, bureaucratic inertia and a shortage of investments in developing human capacity and physical infrastructure.

Other reasons affecting the decentralization of WSS services include growing fiscal deficits and weak public financial management practices at the central government level, which in turn affect the implementation and financing of the decentralization process. On average between 2002-2011, 70% of the funding for the WSS sector internationally came from the donor community. National

investment levels in the sector are below international standards with a downward trend for capital investments in infrastructure, maintenance, rehabilitation and capacity building, leading to continued constraints for small towns (World Bank, Water and Sanitation Program Honduras, 2013).

Over recent years, the trend in Latin America, as well as elsewhere in the world, has been toward increasing community management capacity as a key response to provision of sustainable WSS services. Lessons from various countries show that when local communities are empowered as decision-makers and are trained to successfully operate, maintain and administer their WSS systems with the use of appropriate technology, the results are improved sustainability. Common impediments towards sustainable rural water and sanitation management systems come from the lack of long-term support at the community level, the recognition of community limitations and the need for some form of external long term assistance in most communities (Lockwood, 2002).

This increasing global tendency towards decentralization of control from national governments and agencies to local authorities, organizations and/or water user groups include river basin management arrangements, transfer of responsibility for water supply and sanitation to municipal authorities, NGOs or community groups, as well as irrigation management transfer (IMT) to farmer/user groups. The potential benefits are compelling, as local management better understands the needs, resources and demands of local communities. A degree of competition between local authorities can stimulate innovation while cooperation between stakeholders can be improved (UNESCO, 2006; The World Bank, 2014).

The experience, knowledge and teamwork within community-based delivery systems are key factors for effective service delivery, but local groups often lack funds, and membership and engagement are limited within their communities. In addition, they face difficulties of replicability and scaling up of good practices (United Nations, 2003). Another complex issue exists, as cited by the OECD: "Even though progress has been made towards decentralization of institutional arrangements concerning water governance some caution is necessary with the process of decentralization, as on occasion basin level management may require national involvement to avoid upstream players in a basin securing most of the water" (OECD, 2009).

Recent research shows that technical and financial aspects are not the only binding constraints: the lack of good governance often results in ineffective public-service delivery. Furthermore, the problem of poor-quality services will likely continue unless strategies are implemented to improve the governance of water and sanitation, and confront problems such as inequality, and inappropriate and unaffordable services. The effectiveness of local water governance is essential for the sustainability of WSS services and programs. Water governance determines who gets what water, how much, when and how, hence the importance of capable and committed local managers to provide efficient services and make responsible decisions (Jiménez, Kjellén, & Deunff, 2015). According to the (Organization for Economic Co-operation and Development [OECD], 2015), governance responses need to be adopted to specific territories, contexts and water policies; thus, worldwide there is no one-size-fits-all solution to water challenges with a wide range of situations across countries.

In spite of international trends toward decentralization of WSS, decentralization alone will not resolve all the problems associated with water services provision. Real and complex challenges remain at the local level. It is important that institutions at all levels support decentralization reforms, enabling local governments and community-based service providers to which new powers are given to make decisions that reflect the will of a majority of their constituents. Strengthening the decision-making processes within decentralized institutions prevents discrimination, and favoritism and promotes sustainability. These in turn are necessary conditions for realizing the full benefits of decentralization (World Bank Institute [WBI], 2000).

In conclusion, appropriate and effective decentralized water and sanitation services remain a challenge (Jiménez et al., 2015). However, the importance of WSS and the trend toward decentralization continues to be a global priority. In September 2015, the United Nations adopted the 2030 Agenda for Sustainable Development. The agenda includes a specific sustainable development goal (SDG 6) dedicated to water and sanitation (United Nations, 2015b). Constraints that affect achieving SDG 6; include scarce information and lack of follow-up regarding WSS, the need to strengthen institutions, lack of synergy between sectors and the impact of climate change (Ballestero et al., 2015). This goal seeks to "complete the unfinished business" of the millennium development goals (MDGs), specifically setting out to 'ensure availability and sustainable management of water and sanitation for all' (United Nations, 2014).

CHAPTER THREE

3. METHODOLOGY AND INSTRUMENTS

3.1 DESCRIPTION OF STUDY AREA

The municipality of Tatumbla with a total area of 81km² was founded in 1684 and is located in the department of Francisco Morazán. The municipal capital (also called Tatumbla[1]), is located approximately 13 kilometers southeast of Tegucigalpa, the capital of Honduras. It is the nearest municipal capital to Tegucigalpa. According to the National Institute of Statistics, the population of Tatumbla totals 8,247 inhabitants defined as rural and distributed in 6 villages and 65 settlements (Instituto Nacional de Estadística [INE], 2018). The supposed "rurality" of this agricultural and forestry-based municipality has misled the presentation of demographic data during times of rapid change. The reality is that Tatumbla is experiencing accelerated urbanization.

INE (Instituto Nacional de Estadísticas) defines urban areas as those with a population of 2,000 or more inhabitants. To this day, the municipality of Tatumbla has not defined, nor mapped out, an official urban area, nor have they defined the limits for surrounding villages and settlements. The lack of information reconfirms the misrepresentation of the statistics reported by INE (author's communication with the municipal officer in charge of land use, delimitations, etc.). This lack of information is important for all WSS service providers in the area in order to define the geographical area and number of users for whom they are responsible.

As shown in Figure 4, the population of Tatumbla in the last 30 years has had an exponential growth of over 100%. The absence of land-use regulation and supervision of other essential

[1] For the purpose of this study the name Tatumbla will be used in reference to the municipal capital.

resources such as water and sanitation are evident with numerous housing developments spreading across the municipality especially in the "urban area" (author's communication with the Municipal Environmental Unit (UMA) manager). Factors such as proximity to Tegucigalpa, road improvements, security, water, pollution and other factors have made Tatumbla an attractive alternative to living conditions in contrast to congested urban centers such as Tegucigalpa, with the result of increasing pressures on the use, preservation and conservation of natural resources, especially water, in Tatumbla.

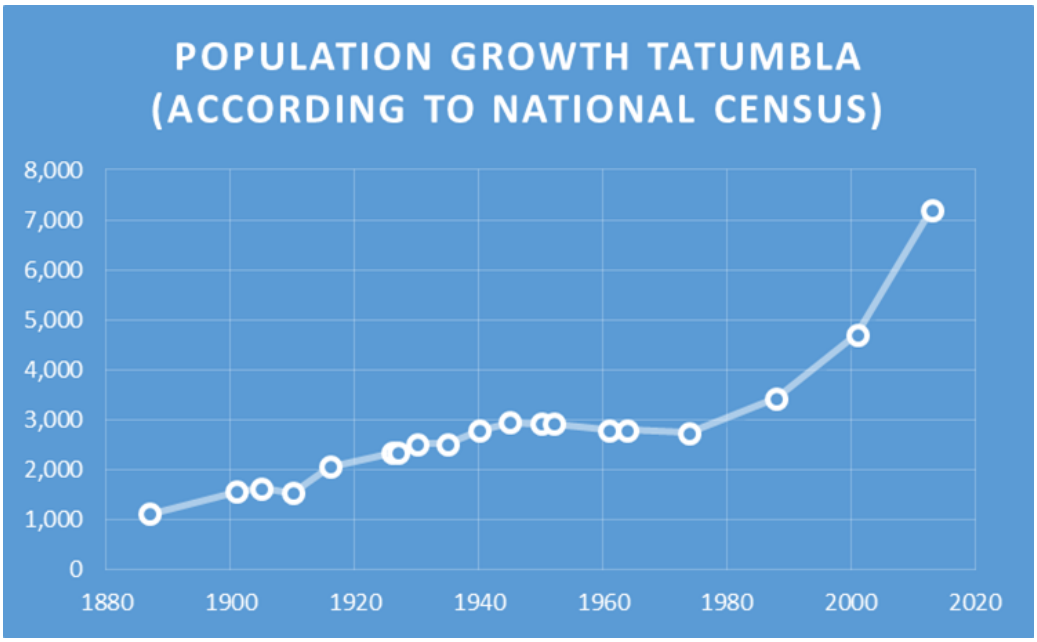

Figure 4. Population growth in Tatumbla (INE, 2018)

The water managed by the municipal system is gravity-fed from small springs and streams flowing from the Biological Reserve of Uyuca (RBU), specifically from four microsheds: Olomina, Golondrinas, Palmira and Murciélago (Hernández, 2014). As shown in Figure 5 and 6, there is a water capture system in each microshed from which water is piped to three water tanks with basic

chlorination treatment. The Olomina water goes directly into the main distribution system without any treatment.

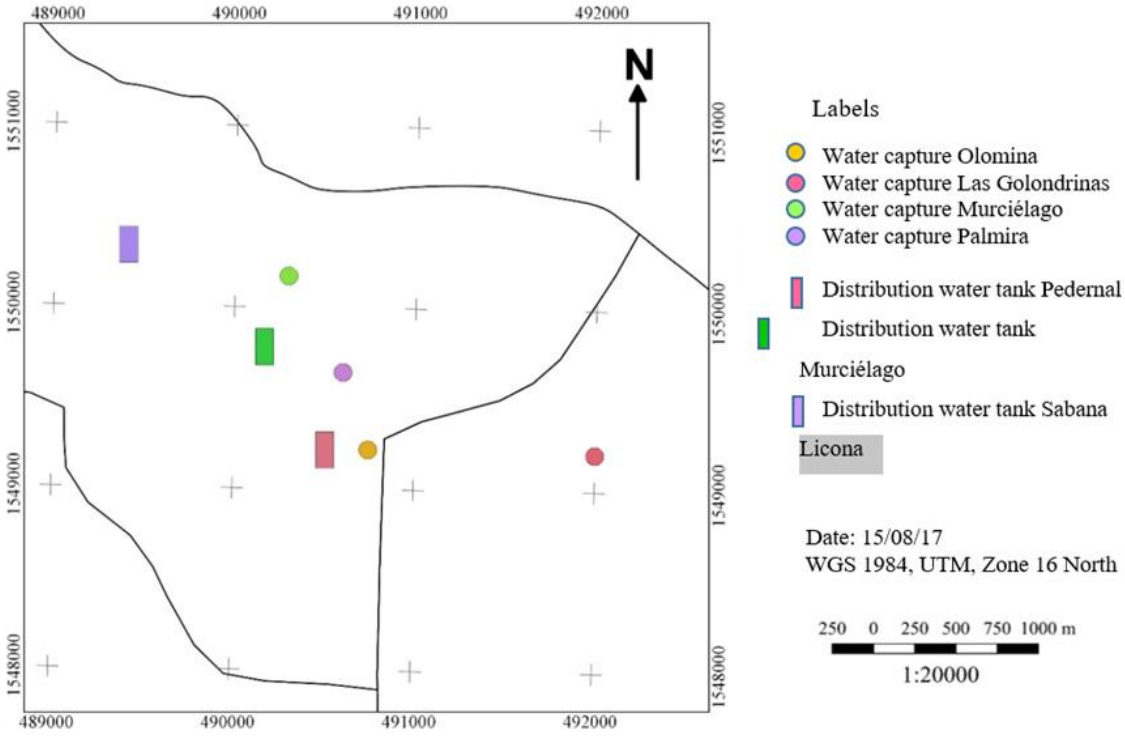

Figure 5. Location of water captures and distribution tanks for Tatumbla. (Muñoz Ventura, 2017).

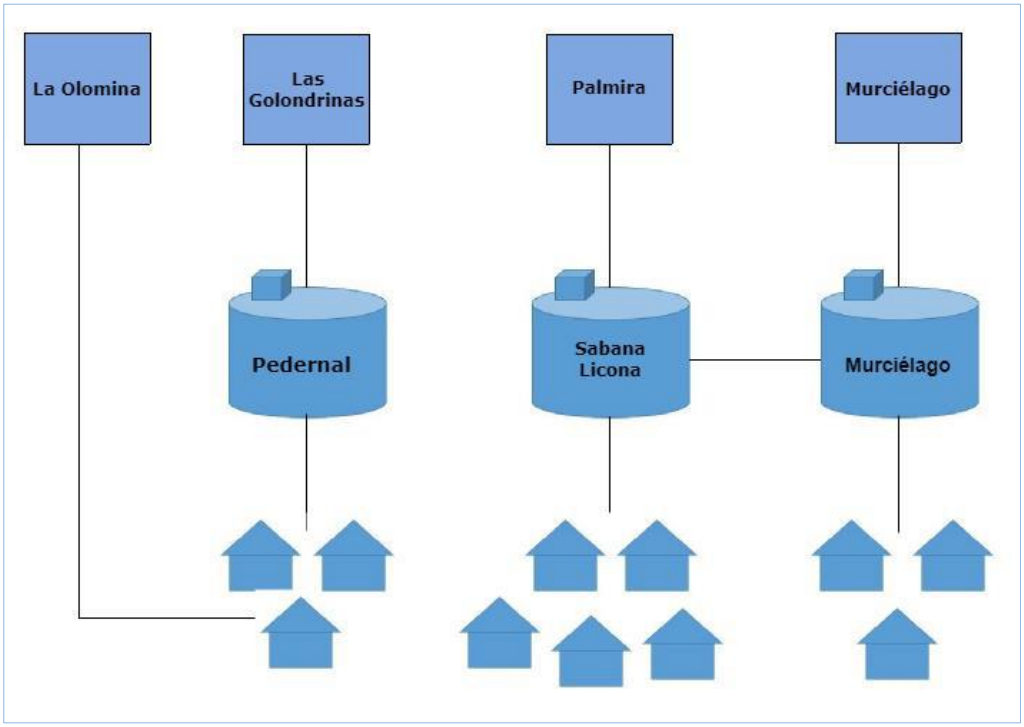

Figure 6. Water distribution system in Tatumbla. (Muñoz Ventura, 2017).

During the rainy season the turbidity of the water of all four sources is above the National Technical Norm of 5 NTU (Nephelometric Turbidity Unit) (Norma Técnica para la calidad del Agua Potable, 1995). After hurricane Mitch in 1998, all water systems suffered some form of damage, with Golondrina harmed the most. In 2016, the Golondrina microshed was severely affected after an attack of the pine bark beetle (Dendroctonus frontalis) resulting in further damage. The level of erosion increased, affecting the quality of the water with extremely high levels of turbidity (Muñoz Ventura, 2017).

With the recent increase in population and resulting construction of housing developments the demand for water has also increased, and the number of sources necessary to supply the demand

as shown in Figure 7. However, the water provided to these housing developments is not supplied by the municipal system, but is purchased from other water providers who truck the water from a local private well built specifically with this purpose, along with other private wells, and water trucks supplied from Tegucigalpa. None of these alternative water suppliers are regulated by the municipality and there is no municipal control or supervision of sanitation. Each housing project decides on how to best dispose of waste water mostly through septic tanks and bio digesters (author's communication with the Municipal Environmental Unit, UMA).

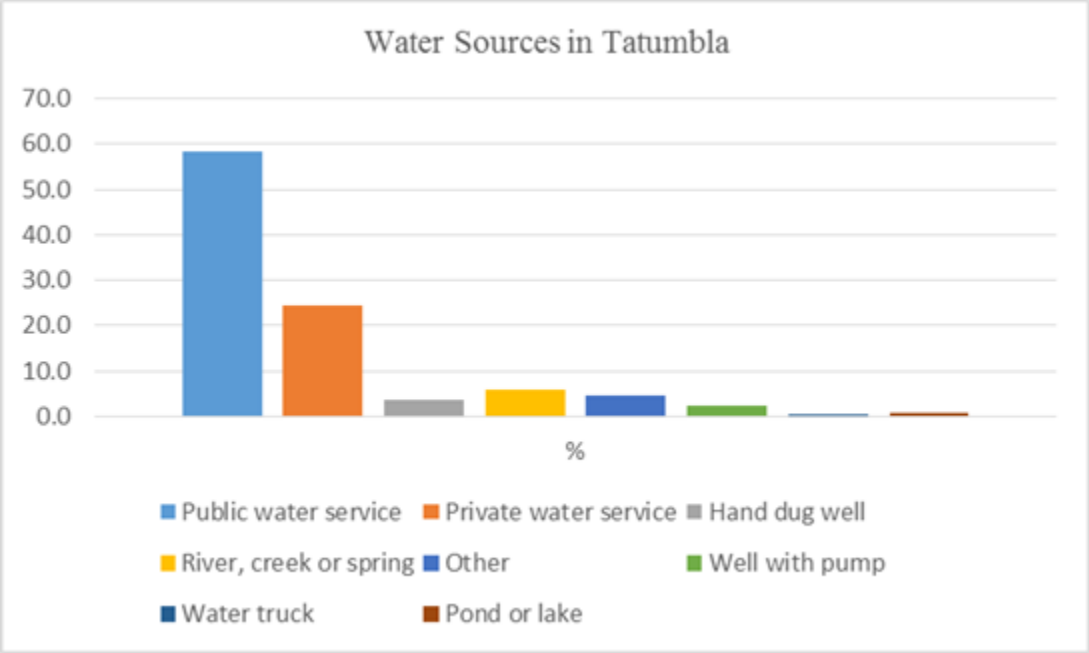

Figure 7. Water sources in Tatumbla. (INE, 2018).

It is important to point out that even though Tatumbla is so near to Tegucigalpa, Tatumbla's schooling level is very low and reflective of local poverty. In relationship to topics such as water and sanitation, this is critically important. In the end, it is the poor people who are most affected by the lack of water and sanitation and who face the greatest constraints in demanding their rights

for better service. Urbanization also affects the disparities between the rich newcomers and poor local inhabitants, thus creating fertile ground for suspicions, miscommunications and confrontations culminating in water disputes.

Historically, the responsibility for management and service provision of water in Tatumbla has been the municipal government. In 2013, in compliance with the IDB 1793/SF-HO investment program, the municipal government of Tatumbla was required to establish an autonomous WSS service provider. In June 2013, a community water board (Junta de Agua Comunitaria de Tatumbla) was elected. This service provider model involves social organization through which communities become responsible for the operations and administration of their water and sanitation services. The community assembly of water users is the primary authority and is represented by an elected board consisting of 7 community members. However, in the same year, there were so many political and personal conflicts in Tatumbla, that the water board was disbanded. (Author's communication with water board members).

In January 2014, ERSAPS pressured the incoming municipal authorities to establish a different service provision model and suggested a decentralized municipal unit ("División") due to the failure of the initial water board. The new provider was named División Municipal de Agua y Saneamiento de Tatumbla Centro (DIMASTAC). A water division is a decentralized municipal service provider with separate administrative, financial and operation management under the guidance of a board. In this service provision model, the elected mayor automatically becomes the president who chooses one municipal council member and an alternate. The community assembly of water users elects 3 community members and their corresponding alternates as representatives

on the board. (Acuerdo Constitución División Municipal de Agua y Saneamiento de Tatumbla Centro "DIMASTAC", 2014; Resolución No. 11-2013, 2013).

DIMASTAC consists of two units: general management, and an operation and maintenance unit responsible for the provision of water (non-potable), sanitation services and the operation and maintenance of the wastewater treatment plant. The provider has a separate office from the municipal building and provides water service to 460 water users or approximately 2300 inhabitants. During this study, there were 82 households connected to the sewage system which has a capacity for 143 connections. There is currently no macro measurement of water distributed in the distribution tanks, nor micro measurements at the household level. (Author's communication with DIMASTAC's administrator, 2018).

3.2 RESEARCH METHODS

3.2.1 DATA COLLECTION METHODS

The process of decentralization of municipal water management to an autonomous water supply and sanitation provider was assessed through focus groups, semi-structured interviews, questionnaires and field observations. Focus group discussions were arranged with water users to obtain relevant information at the community level. Discussion questions (Appendix A) included: past and present knowledge of the situation; management by municipal authorities and the recent autonomous WSS service provider; factors and causes leading to the current situation, decentralization of WSS; and, vision for the future. In addition, semi-structured interviews (Appendix B) were used to understand the roles of SANAA, FHIS and ERSAPS (Appendix E) as

direct implementers of the IDB 1793/SF-HO investment program. Questionnaires were used with the ERSAPS field technical coordinator (Appendix C) and the regulation assistant (Appendix D).

In order to have a better understanding of the reality of WSS services in Tatumbla, visits were conducted to the water sources, water storage tanks, wastewater treatment plant, and the water and sanitation service providers' office. Informal discussions were also conducted with DIMASTAC board members, administrator, plumber, and wastewater treatment plant operators. One important reality, was the fact that DIMASTACs' board was underperforming. Three of the five board members, (the mayor, who is also the board president; and two municipal council representatives) were not actively engaged and, at the time of data collection, were not providing the needed leadership to the WSS service provider. Additionally, two of the four community representatives on DIMASTACs' board were barely fulfilling their responsibilities. Due to this unstable and sensitive situation, it was not possible to include the perspectives of the entire DIMASTAC board through participation in a focus group. Nevertheless, given the central role that DIMASTAC was playing in the decentralization, it was important to include the views of any available member of the board to understand the complexities of the local water and sanitation system. This significant gap in the representation of perspectives was addressed by the researcher supplementing data though field observations and comments from those who were willing and available to participate in organized interviews and focus groups.

Other relevant information to help understand how authority was delegated to an autonomous WSS provider was available through informal communication with the president, general manager and water treatment plant operators of the water board from the nearby town of Morocelí. Prior to the

success that this water board is currently experiencing, the people of Morocelí were faced with years of inadequate service, lack of water, and mismanagement by the municipal authorities. Their water board has worked closely with the Honduran NGO Agua para el Pueblo (APP), a partner organization with AguaClara Cornell and other development and funding agencies. Through these relationships, Morocelí residents are benefitting from a water treatment plant, safe drinking water, and improved storage and distribution capacities. Most importantly, the water board has gained the trust of the people of Morocelí. Presently, this water board serves as a sustainable model of success and is willing to share this experience and knowledge with water boards in other municipalities.

3.2.1.1. RESEARCHER BIAS

It is important to identify any possible bias on the part of the researcher that has to do both with data collection and eventual analysis of those data. In this case study it is essential to acknowledge that the researcher has been an active member in Tatumbla's water issues, and, as such, would be considered a participant observer, in the dynamics of the WSS service provider in Tatumbla. The researcher has been a resident of Tatumbla since 1996, and has been motivated by a strong commitment to environmental issues and community service. These years of service, resulted in recognition and acceptance by the community, which culminated in an elected role on the board of DIMASTAC since 2014. While the researcher was working on this study, she was one of the two active board members of DIMASTAC. Precautions to avoid bias were taken during the focus group discussions and interviews. That this study is an independent and unbiased effort with the objectives of understanding the decentralization process in the management of the water supply in Tatumbla was explained to all participants. The participants also were informed that knowledge of

the roles and perceptions of the community about WSS issues was very important to understanding how water management projects should be run. That the researcher was enrolled as a graduate student at Cornell University was also discussed. Initial invitations sent to community members to participate in the study explicitly stated that this was a study conducted by the researcher, not under the auspices of DIMASTAC or a government agency.

There are a couple of other relationships between the Tatumbla community and the researcher that potentially could give rise to conflicts of interest and should be discussed. Both Zamorano University, a nearby university that is well-regarded nationally and internationally, and the Tatumbla community obtain significant amounts of water from the Biological Reserve of Uyuca. The researcher is a graduate of Zamorano University, who also worked at the university in the 1980s and, since 2014, her husband has been the president of the university. On several occasions, DIMASTAC received technical support from Zamorano including a student research project on water analysis, training on proper chlorination procedures, and, serving as a link between the NGO Agua para el Pueblo and Cornell University. Zamorano students also benefited in their learning-by-doing environmental practices by reviewing how an up-flow anaerobic sludge blanket reactor (UASB) and a subsurface wetland functions in Tatumbla's wastewater treatment plant. These interactions contributed significantly to the community's understanding of the social and biophysical problems associated with Tatumbla's water supply, but it does open the potential for conflicts of interest. Those involved with the project were aware of this possibility and took necessary steps to ensure, through transparency and triangulation that these were taken into consideration.

3.2.2 SAMPLING FRAMEWORK

In Honduras, the call for nationwide municipal decentralization of WSS was formalized through the 2003 National Water and Sanitation Framework law as part of the "Vision of the Country 2010-2038" and the "Nation's Plan 2010-2022" with support from the international funding community. The municipality of Tatumbla, with financial support from the IDB through FHIS, initiated the process of decentralization and regulation of the WSS services. For this study, a specific example of the transition from a municipal water management model to an autonomous water supply and sanitation provider was selected. Twenty community members participated in three focus groups and five outside key representatives also participated through semi-structured interviews and questionnaires.

For the focus groups, community members were selected by means of purposive sampling using DIMASTAC's water and sanitation users' database. This method involved the selection of active community members who were familiar with the socio-cultural, political and environmental context, and could give informed opinions about the research topic. Fifty-five community members (all of whom were water users) were invited to participate in the focus group sessions. Of these, twenty accepted.

Focus group interviews were used as a qualitative data collection technique allowing small groups of participants with certain characteristics to interact. As a result, participants were able to share their perceptions, attitudes, feelings and ideas in a relatively homogenous setting (Dilshad & Latif, 2013). The focus groups for this study were organized into three sessions: Session A included housewives, small business owners, self-employed and retired participants;

Session B consisted of community leaders who were involved in schools, the community library, the church, the "patronato" (a neighborhood organization), and the water committee and health services; participants in Session C were either serving or had served as municipal employees and were represented by a former mayor, an environmental unit manager, a council member, a justice director, a secretary and a registrar.

Participants in each focus group were informed of the purpose of the study. They were also told that their participation was voluntary and that they were not compelled to answer at any given point during the discussion. To encourage equal contributions during the discussions, participants sat in a circle and took turns expressing their opinions. Occasionally the discussion had to be re-directed towards the topic question. Permission to record participants' responses was requested and the three sessions were transcribed to ensure accuracy. Each participant was given a pseudonym to maintain anonymity. Each focus-group discussion lasted 2 hours and included open-ended questions such as: what they remembered about the water situation in the past; how they perceive it at the present time; their understanding of the decentralization process; their perceptions of the municipal local government in relationship to WSS services; and, their knowledge of the actual WSS service provider. Lastly, participants commented about the wastewater treatment plant, the municipal WSS regulatory units, and how they perceive the future in relationship to water issues.

Data was collected through individual interviews with five key representatives who participated during the implementation of the investment program and decentralization process. Interviews were also recorded and transcribed. These included three representatives from ERSAPS; the

technical assistance coordinator; a regulation assistant; and, the field technical coordinator specifically for implementation and assistance in Tatumbla. A civil engineer from SANAA who was responsible for the revision of the design and follow-up on the design and construction of the sewage system and wastewater treatment plant and the civil engineer from FHIS responsible for the construction in Tatumbla were also interviewed.

3.2.3 METHOD OF DATA ANALYSIS

A single case study methodology was used to describe in detail the setting of the case, the contextual conditions pertinent to the issue of decentralization as well as relevant qualitative data collected from multiple sources (Yin, 1994). Qualitative data obtained from community members, technical and administrative implementers using focus groups, semi-structured interviews, questionnaires and discussions were recorded, transcribed and studied to gain a broad overview of the data.

The qualitative data were later analyzed following the 6-step framework for thematic analysis from Braun & Clarke (Maguire & Delahunt, 2017) consisting of identifying evident, recurring and relevant patterns or themes in the data germane to the research or associated with specific issues. The 6-step framework consists of: (1) familiarization with the data; (2) generation of codes; (3) identification of themes; (4) revision of themes; (5) definition of themes; and (6) analysis-supported evidence with the data collected. As stated by Maguire and Delahunt (2017), “this method of analysis is not tied to a particular epistemological or theoretical perspective”.

After familiarization with of the data, each transcription was imported into Atlas.ti8, a computer-assisted qualitative data analysis software for large bodies of textual, graphical, audio and video data which cannot be analyzed by formal statistical approaches. Atlas.ti was first created as a research project of the Technical University of Berlin. Its first commercial version was released in 1993 by Thomas Muhr. Atlas.ti8 version 8.3.16 was used to generate codes through a systemic and inductive analysis by coding each segment of the data that was relevant or captured something interesting about the research topic. The process followed open coding with no pre-assigned codes so codes were allowed to emerge and could be modified as necessary. Codes were assigned based on the researcher's perspective and research questions. With the coding completed, the software was used to generate a summary of codes for further analysis. Once the codes were generated, they were grouped into themes that described relevant patterns in the data pertinent to the research topic. Most codes were associated with a single theme although some were associated with more than one. Each theme was carefully reviewed to confirm coherence, and to ensure that the original data supported the theme as well as to identify links among themes. All themes were organized into two categories: decentralization process and community perceptions. The final analysis consisted of a broad interpretation of each theme supported by evidence using meaningful examples from the data. See Thematic map in Figure 8.

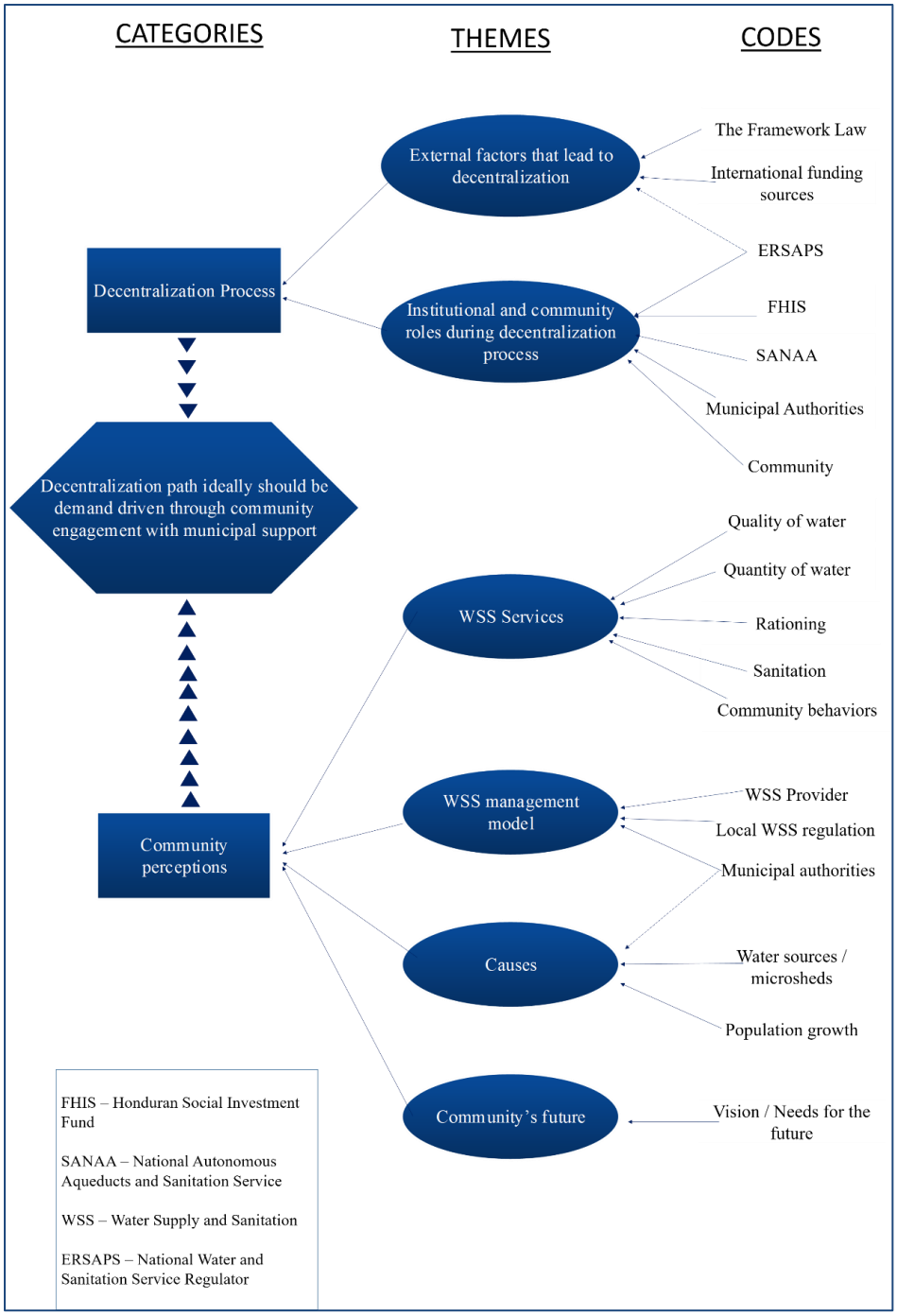

Figure 8. Thematic map: Factors associated in the decentralization of a municipal water management with an autonomous WSS provider in Tatumbla, Honduras

CHAPTER FOUR

4. RESULTS AND DISCUSSION

4.1 EXTERNAL FACTORS THAT LED TO DECENTRALIZATION

4.1.1 THE FRAMEWORK LAW AND FUNDING SOURCES

During the interviews, participants confirmed two fundamental, underlying reasons that initiated the decentralization process of WSS services in Tatumbla: (1) compliance with the National Water and Sanitation Framework Law following decree 118-200 by the Honduran Congress in accordance with the Nation's Plan strategic line 5, indicator 31; and, (2) the specific financial support for the WSS sector from the international community, in this particular case the IDB with special interest in the sustainability of WSS services. As one interviewed participant confirmed: "Honduras is one of the few countries in the region that has a Framework law mandating its regulation". This same participant added: "There have been two significant financial programs oriented towards WSS service providers: PROMOSAS and IDB 1793".

Both reasons were acknowledged by another participant: "... the new WSS provider in Tatumbla was established to comply with the National Water and Sanitation Law (Framework law) and the contract with the IDB 1793/SF-HO program, where it was clearly stated that the municipalities which benefited from the investment program had to update (modernize) their WSS services'. This was also confirmed by an interviewed participant from ERSAPS: "In those municipalities which benefited from the IDB 1793/SF-HO program, we (ERSAPS) began by establishing regulation, implementation of the Framework Law and the local regulatory units that would support compliance with the law."

Participants indicated the IDB 1793/SF/HO investment program was a continuation of another IADB program for cities with more than 10,000 inhabitants. As confirmed by one participant: “This was a request from the central government since 2007 with a list of projects decided by mayors. The projects were built between 2007 and 2015, with loans for big cities, but later they changed the project’s name and turned it into smaller loans for smaller cities and towns”.

Initially, adjustment of tariffs was an eligibility criteria for the municipalities that would benefit from the IDB 1793/SF-HO investment program. Later on, this condition was set aside and instead it was agreed that the municipalities’ contribution would be to provide the land where the wastewater treatment plants or other infrastructure would be built. One thing was clear, as stated by several participants: “...a non-negotiable criterion was that a WSS service provider had to be established. In the end, it was not a loan that municipalities had to pay back; it was a grant”. As acknowledged by another informed participant: “It didn't cost the community anything, it was literally free”.

4.2 INSTITUTIONAL AND COMMUNITY ROLES LEADING TO DECENTRALIZATION

4.2.1 NATIONAL WATER AND SANITATION SERVICE REGULATOR (ERSAPS)

From the interviews, it became evident that the Government of Honduras (GoH) has made important progress to support decentralization, but much more remains to be done at all levels. As summarized by a participant: “Much has been done with respect to regulating instruments, planning, sector policies, development of good practices, while universal adoption is still pending.

But much needs to be done. Institutions in the WSS sector remain fragile with weak political support at the national and municipal level, limited inter-institutional coordination, scarce funding, and deficient communication to promote the importance of water and sanitation and to educate water users and protect watersheds. At the community level, people don't want to participate in these local voluntary organizations nor do they want to pay for the services."

Interviews also helped clarify how funding is critical to move decentralization forward. The IDB 1793/SF-HO investment program included a technical component to assist the municipality of Tatumbla in establishing a WSS service provider in compliance with the Framework Law. This important role was assigned to ERSAPS. They were in charge of negotiating with the municipal authorities, signing of agreements, training, certification and hiring consultants that would work and guide the municipality regarding the different autonomous WSS service provider models. As described by one of the participants: "It was evident they (the municipality) was interested but had a hard time understanding why it was important to establish a WSS service provider. Initially, they chose a water board model, but later they decided on a different model. Our role was to guide them, but in the end it was a municipal decision."

Technical guidance by ERSAPS was a determining factor leading to decentralization, and for the municipality of Tatumbla to be eligible for the IDB 1793/SF-HO grant. As summarized by one of the participants: "We assisted them in establishing and strengthening their WSS service provider (DIMASTAC). We diagnosed WSS services and developed a plan of action, and yes, I believe the process of decentralization was initiated because an administrative and financially autonomous and sustainable WSS provider was established". This was later confirmed by another informed participant: "I do believe the decentralization process was strengthened. One expects that these

processes would have more community participation and that local regulation units would contribute to provision of more efficient services. Maybe not everything was accomplished. Many times assemblies have low attendance and poor community participation."

In summary, regarding the ideal regulation scenario, a participant concluded: "We are interested that the community learns and understands about the role of the USCL, so that at the local level they can deal with WSS issues that cannot be solved by the provider and that the COMAS can prioritize WSS needs and present them to the local government." Or as stated by another participant: "Those municipalities which in reality manage their WSS services are those where the COMAS operate, the USCL works independently from the municipality, and there is a decentralized WSS service provider who is also periodically reporting to ERSAPS".

4.2.2 HONDURAN SOCIAL INVESTMENT FUND (FHIS)

The IDB 1793-SF/HO was managed by FHIS. They were responsible for a series of investments in water and sanitation in 17 municipalities of Honduras (Appendix F). In the case of Tatumbla, FHIS established three agreements: one with SANAA to provide technical assistance and monitor the sewage system and wastewater treatment plant; one with the municipality to comply with the contractual counterpart commitments; and, another with ERSAPS to oversee the organization and establishment of the WSS service provider.

With regards to which investments were to be prioritized in Tatumbla, the FHIS representative explained: "There was total interest (from the municipality), if not they would lose the project. Our relationship was directly with the municipality. We gave them the option to invest in water or sanitation. It was the mayor who decided to invest in a sewage system and wastewater treatment

plant. We had nothing to do with the community. We communicated with the mayor. It was the mayor who had to communicate with the community. If we start requesting permission from the community, we would never get anything done. Overall, the investment in Tatumbla was a donation".

In addition, the FHIS representative explained that the original plan of the sewage and wastewater treatment plant needed revision, and SANAA was asked to do this job. In his own words: "The initial design would have been a total failure. We had to build a functional and operating system. We decided on a conventional sewage system. A few condominial [2] sewerage systems but mostly conventional. We followed normal parameters". One issue that emerged was the fact that several houses were not able to connect to the sewage system even though it was installed in front of their houses. The interview with the FHIS participant reveal the following: "The problem was, that technically speaking, if the neighbor lives in a lower area, it wasn't possible for us to dig so deep. What we did was install the pipes so that later, if they do some modifications within their homes (bathrooms), they can find a way to connect. We could not dig 10 meters below the ground just to connect one household because this person decided to install their bathroom way below the others on the system. If we had done that, we would have had funds only to do one street. This can still be solved later using the condominial sewerage system".

[2] A condominial system is a sanitation model that uses the community participation as a key element on the development of the technical solution for the system. It tries to collect the wastewater from its point of production and take it to the discharge point in the shortest, shallowest and the simplest possible way. With this system the sewerage network is divided in two parts, the public one, constituted by the main network, called public sewer, and the condominial one, represented by the condominial branch, which is considered the collective connection to the public sewer. The condominial branch serves small group of houses such as a quarter or block. In the condominial system this group of houses are linked to the main public network by a single condominial branch Neder (2000).

In summary, the FHIS representative concluded that the investment in infrastructure in Tatumbla definitely improved the sanitation situation considering the previous lack of services and the funds available and that the investment was possible because the municipality accepted the terms for eligibility promoting decentralization.

4.2.3 NATIONAL AUTONOMOUS AQUEDUCTS AND SANITATION SERVICE (SANAA)

As explained by the participant from SANAA, their involvement in support of the decentralization process was at the request from IDB to assist FHIS in the technical evaluation and endorsement of the infrastructure designs that would be built in different municipalities. In the case of Tatumbla, SANAA was involved for the duration of the investment program; from the pre-investment analysis, to construction and follow-up. As summarized by the participant: “We were involved from the genesis of the project, including the design stage, how the bank was going to manage the ‘loan’, as well as providing the specific trainings for the wastewater treatment plant operators”.

The SANAA representative also pointed out that the original sewage and wastewater treatment plant design in Tatumbla did not fulfill the minimum technical norms and therefore had to be redesigned. As expressed in his own words: “The wastewater treatment plant had to be redesigned completely. The original design would have had problems with the slope and would not have performed adequately. Therefore, we suggested an up-flow anaerobic sludge blanket reactor (UASB) and a subsurface wetland and provided FHIS with the technical guidelines”.

The interview with SANAA’s representative provided relevant technical information about the infrastructure of the sewage system built for this purpose. As described by the participant: “The

technology installed in Tatumbla was a conventional sewage system which is feasible, effective and commonly used. There were definitely places where what needed to be installed was a condominial sewage system. This was done because we had very little time and we had to invest the funds as quickly as possible. A condominial system requires more time with the user; you need to go into the house; identify the lowest point; obtain permission from the owner of the property; and, inform the community. It is a lot of work and takes a lot of time, not just a few months. That is the reason why several users could not connect to the system. In Tatumbla there should have been both systems: conventional and condominial".

SANAA's representative also explained that even though several households could not be connected due to financial and technical reasons, the most important thing in Tatumbla was that the sanitation infrastructure had been improved and that the most expensive part of the system was installed, so that future connections could more readily adopt the condominial sewerage system. He pointed out that in this phase of the sanitation of Tatumbla, the main sewage lines had been installed, as well as the wastewater treatment plant.

It was also explained that follow-up visits by SANAA confirmed that the wastewater treatment plant in Tatumbla was well managed by the WSS service provider and the two operators they trained since it was built. The SANAA representative stated: "Tatumbla is doing well. The operators are some of the few that continue and understand the importance of harvesting the plants in the wetland. They know how and when to dry the sludge. We know this because of the monitoring and follow-up we did for a couple of years in order to verify how the operators were working, the condition of the wetland and the reactor as well as the organic load of the discharged waters".

Unfortunately, there was never a formal agreement between the municipality and SANAA for on-going supervision, which SANAA's representative explained should be permanent. The participant concluded: "Our main contact during our follow-up visits was DIMASTAC, I don't remember a meeting with the mayor or any technical municipal personnel. The WSS service provider was doing everything they could during that time. We could see there was a service provider present".

4.2.4 MUNICIPAL AUTHORITIES

The municipality of Tatumbla was included among 16 other municipalities in the IDB 1793 SF/HO investment program with the objective of improving WSS services by strengthening the decentralization processes as well as improving infrastructure for the provision of these services. Findings revealed that the municipal authorities were offered the opportunity to decide if this investment should be in water or sanitation and that the mayor of Tatumbla decided to invest in the first-phase of a sewage system and a wastewater treatment plant. Prior to this, there was no sewage system in Tatumbla and raw sewage was dumped directly into the river. To guarantee this investment, municipal authorities had to give up the management of the water system and service, as well as control of the income generated by water tariffs.

To formalize this investment, as explained by a participant: "The municipality had to commit in writing that they agreed to improve WSS services; establish an independent service provider with financial and administrative autonomy; ensure the financial, operational and environmental sustainability by approving adequate tariffs; accept independent regulation; engage and involve the community during the decision-making process; and, establish an environmental management unit." The municipality's contribution included the land to build that wastewater treatment plant,

an access road to the plant and the environmental study and license required prior to the construction.

Data reveal that in December 2011, the municipality of Tatumbla and FHIS agreed upon the contract for the implementation of the IDB 1793-SF/HO investment program. Prior to the infrastructure investments in April 2012, and in accordance with the criteria requested by the IDB investment program and by ERSAPS's technical guidance, the municipality of Tatumbla agreed to establish a water board according to the WSS service provider. That same month, the municipality organized a general assembly of water users to elect the water board members. In August of that same year, the municipality of Tatumbla signed the transfer of water management to the water board. In September 2012, construction of the sewage system and wastewater treatment plant began. See Figure 9 for a Timeline of relevant events prior to and during the decentralization process in Tatumbla.

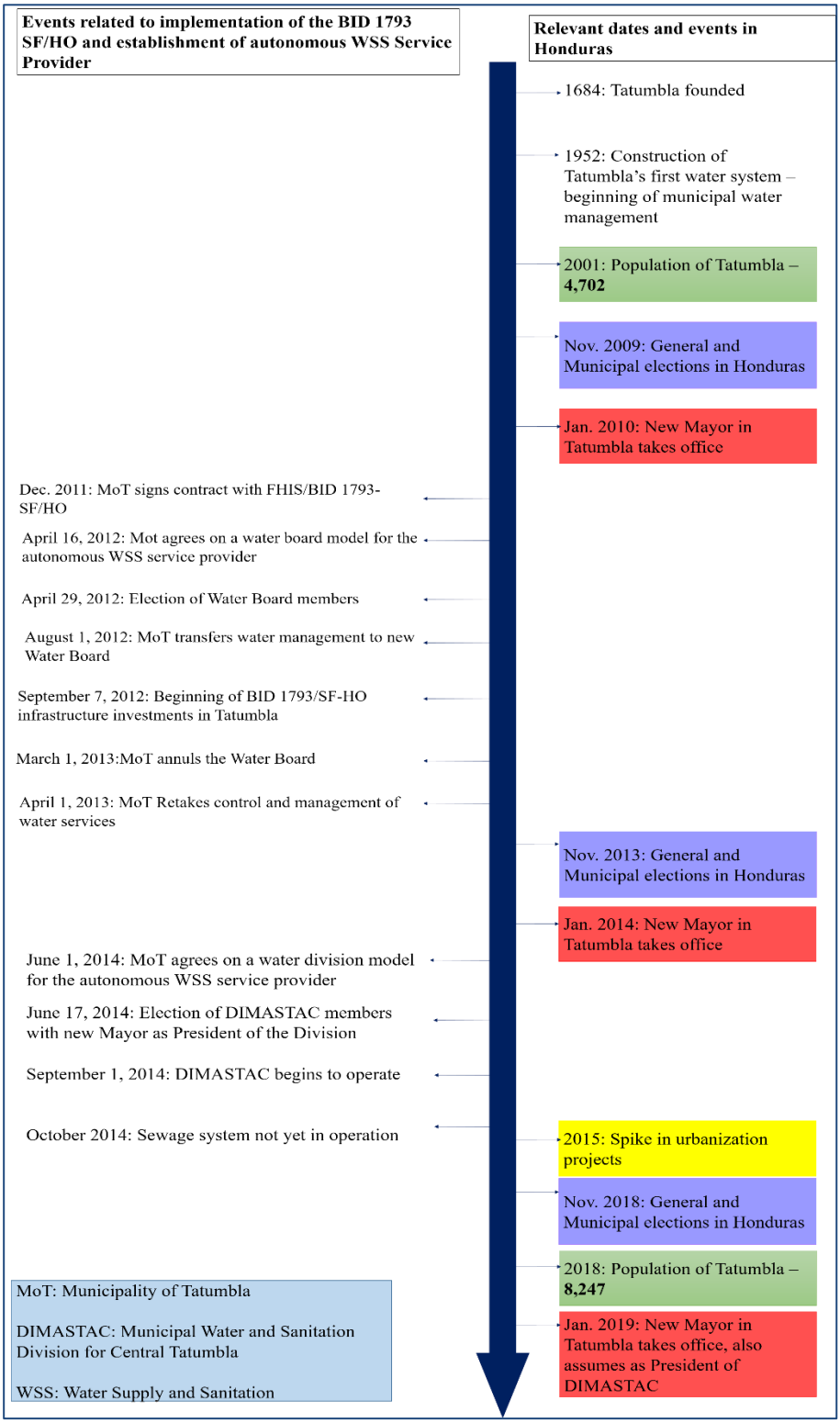

Figure 9. Timeline of relevant events and dates related to the implementation of the IDB 1793 SF/HO and the establishment of an autonomous WSS service provider in Tatumbla, Honduras.

The year 2013 was a political year with elections in November. By January 2013, differences between the mayor and the water board members impeded progress by the water board. As stated by a focus group participant: “Why did the water board disappear? Because of political reasons". In March 2013, the municipality decided to annul the water board and in April 2013 retook control of the water management. Aware of the breach in the contract with the IDB investment program, ERSAPS warned the municipality of Tatumbla that in order to continue within the investment program, the municipality needed to establish a different WSS service provider. On November 24th, 2013, general and municipal elections were held in Honduras and a new mayor was elected. He took office in January 2014.

ERSAPS continued their regulatory role and, in June 2014, with support from the investment program, they provided technical assistance to the recently elected municipal authorities to establish a different WSS service provider model. This time, ERSAPS proposed that the municipality establish a water and sanitation division model. A water and sanitation division is a decentralized unit within the municipal government with financial and management autonomy where the mayor is the president of the division. In June 2014, the recently elected local authorities organized a general assembly of water users to elect the new civil society members to the water division board. The water division was established and named DIMASTAC and began managing the WSS services in September of that same year. As confirmed by an ERSAPS representative: “...the first phase of the investment program with FHIS had already started and since the service provider model had been phased out, we had to assist the new local government to decide on the new service provider”.

The year of 2017 was another political year, with general and municipal elections scheduled in November. A new mayor was elected and took office in January 2018. From June 2014 to February 2018, DIMASTAC was able to operate as the WSS service provider. During those four years, the mayor and local government provided basic support to the newly established WSS service provider in the challenging water and sanitation situation of Tatumbla. The municipality provided DIMASTAC with office space, separate bank accounts, and the monthly salaries for the plumber and two wastewater treatment plant operators. With ERSAPS's guidance, DIMASTAC members organized the administrative and operational management of the water and sanitation services. In the words of a focus group participant: "...at least the intention to decentralize the water from the municipality happened and even though some people think that was nothing, it was a great step forward...just by taking control of the water away from the municipality even if the mayor is the president of the Division, it is not the same as before".

4.2.5 COMMUNITY

From the focus groups and interviews, it became evident that the role played by the community in the decentralization process was not driven by convictions or motivations of community members in dealing with the municipal water mismanagement and inefficient services. As previously explained, it was the IDB investment program mandate which forced the municipality to establish an autonomous WSS service provider. This implied that the municipality no longer managed the service nor the income generated by water tariffs paid by community members.

One of the focus group participants shared his opinions related to these events in Tatumbla: "Why was the water service decentralized during XX mayor? Because there was the opportunity of a sewage project. It was a good investment and this was the opportunity to get something out of it;

that is why". Another participant expressed this view: "Let's remember that the WSS service provider was established by a national policy to decentralize, but our local authorities have not really believed or supported the provider".

Interviews with different participants helped clarify the sequence of events towards the establishment of the WSS service provider, in which the community was involved by attending general assemblies organized by local municipal authorities in order to comply with ERSAPS and the investment program. Initially, the community participated during the election of the short-lived water board, and then during with the election of the water division members. During that same period of time, the municipality was struggling to relinquish the management and control of the water service. As stated by a participant from ERSAPS: "...we proposed that even if it's a municipal unit, that the community becomes part of this unit and that they are taken into account in the decision making process as well as informing the rest of the community". Participants from both FHIS and SANAA confirmed during their interviews that they did not engage the community during the decision-making process, nor was this one of their responsibilities, but that of the mayor and municipal authorities.

4.3 COMMUNITY PERCEPTIONS OF THE WATER SUPPLY AND SANITATION SERVICES

4.3.1 QUALITY OF WATER

During the focus groups, participants were questioned about their past and present perceptions related to the quality and quantity of the water they received. Findings revealed all participants associated quality with clarity and color of the water. Descriptions included phrases such as: “water used to be very clean”, “water was good”, “it was very clear”, “we used to have good water”, “15 years ago or more our water was of better quality”, “I remember it was completely transparent”, “there was less contamination”. Even though they related visual appearance with better quality, they also acknowledged that it has never been potable, as indicated by a participant: “We have always known it is not potable, it is piped water without treatment”.

In general, participants described the actual quality of the water through negative opinions. The level of dissatisfaction was captured by a participant’s comment: “The water we are receiving is completely dirty, brown and rationed, there are moments the turbidity is above 70%, almost mud, it is an insult to the community”. This situation was acknowledged by the other participants as appalling because they were aware the water is not suitable for human consumption and that it has detrimental health effects. According to another participant: “A large percentage of the population drinks water right out of the tap, they are drinking mud, it is a matter of health!”

Another interesting issue that emerged in relationship to the quality of water was the fact that those who could afford buying bottled-water were doing so for everyday use. As expressed by one participant: “I don’t want quantity, I want quality water, even to brush our teeth we have to buy

water". In relation to improvements in the quality of the water, several participants were aware of and optimistic about the possibility of a project to make water potable in one of the community water tanks with support from the NGO Agua para el Pueblo and Cornell University, hoping they would no longer need to buy bottled water.

4.3.2 QUANTITY OF WATER

As for the quantity of water, focus group participants were questioned about their past and present perceptions. Without a doubt, they described the past water situation more positively: "it was sufficient", "it was abundant", "it was permanent", "we had more water", "we had water, we didn't complain", "we had water 24/7", "there was enough for human consumption", "15 years ago we had more water", "there was no rationing". In contrast to the past, they acknowledged that the water situation has changed for the worst, as expressed by the same participants: "There is now less water and higher demand", "Yes, it is true, there is less water now", "Right now we have water because it is raining", "This past dry season we had severe water problems", "There are water problems in the entire municipality of Tatumbla", and "Everybody has water problems in Tatumbla".

4.3.3 RATIONING

Water rationing in Tatumbla, especially in the dry months (February - May) has become the norm. When participants referred to the number of days they receive water it does not necessarily mean 24 hours of service. As mentioned by one participant: "We receive water twice a week, for 4 to 6 hours". General perceptions of rationing were voiced by comments like these: "The situation has gotten so bad because we had never had any rationing", "During the dry months there are days we

don’t receive any water”, “Why is the water rationed? Simply because there is no water”, “It is a critical situation”, “We didn’t have so much rationing before”.

The sense of frustration could also be categorized depending on the participant’s neighborhood: “Those of us who live in the higher neighborhoods suffer more, sometimes 3 or more days without water”, “Sometimes they tell me I will receive water because lower neighborhoods are receiving water, but I know I won’t get any”, “Depending on where you live you will or will not receive water, those living in the lower areas get water much faster than those of us in higher neighborhoods”, “Things have gotten worse even in the downtown area, we used to have water permanently”.

Even under the harsh reality of living with water scarcity, participants expressed a sense of fair treatment. As expressed by other participants: “We agree that it needs to be rationed”, “Even if it’s rationed, at least there is a schedule we can trust”, “Before we did not have a rationing schedule”, “I receive water Wednesdays and Saturdays, so Wednesday is the day I can collect water and wash clothes”, “In that sense, service is better because at least we have a schedule”, “We receive water when they tell us we will receive it”.

4.3.4 SANITATION

With respect to sanitation, specifically sewage and treatment of wastewater, this was still a relatively new concept and service in Tatumbla. Prior to the IDB 1793 investment program, there was no sewage system nor a wastewater treatment plant. Raw sewage and grey water were dumped directly into the small river that crosses the town. This water flows downstream into the Laureles reservoir, which provides water for the city of Tegucigalpa (Reyes, s. f.).

The lack of trust of participants in how the sanitation project had been conceived, financed, built and its functioned became increasingly evident during the focus group interviews. With regards to the conception of the project, participants commented: “The study plan they used was as if I had done it, and I don't know anything about sanitation”; “It was one of those projects like many in our country, always with politics involved”; “It seemed like if it was somebody's idea that it would look pretty and let’s do it”. Participants felt that it was disconnected from other local institutions: “When the project was built there was no coordination between health services and the municipal authorities”; “Imagine, this was a sewage project that had to do with public health, a healthier community, and there was no communication with us (health services)”, “It wasn't built conscientiously, it was completely separated from the real needs”.

Regarding the financing of the project, the majority of the participants were suspicious of how this happened through comments such as: “I am not sure what happened with the municipal authorities, but politics had something to do with this project”, “These projects, they get them from under the sleeve to satisfy someone's wishes and a need for money, because the first thing they do is distribute the funds”, “It seems they did the minimum investment just to get it out of the way” and lastly another participant commented: “They were going to use 16” pipes and they (municipal authorities) thought that by using 8”, they (FHIS) were going to give them the unused funds, but, in the end, this did not happen”.

The actual construction of the sewage system was also questioned during the interviews through comments such as: “They didn't use the design that was approved nor the appropriate pipes”, “From the very beginning it wasn't built with the appropriate capacity...we could see the pipes were very narrow”, “During the construction everyone commented how small the pipes were, that

they were going to collapse". One other issue that was brought to light was that few houses had connected to the sewage system, and others could not because the pipes had been installed at a higher level than the bathrooms. This particular characteristic was commonly found in the houses next to the river, where the main part of the house is at street level and the bathroom is found towards the back of the house which is at a lower level, directly discharging into the river. As expressed by a participant: "You know why they can't connect? Because the bathroom is lower than the house". Another participant confessed: "I told them, I wanted to connect but they didn't pay attention and now it's very complicated to connect".

Perceptions on the functionality of the wastewater treatment plant and sewage system varied from those who believed it was serving its purpose and those who did not. As acknowledged by some participants: "I am impressed on how the wastewater treatment plant is managed although it is not serving everyone", "Overall, the system (sewage) has helped us a lot because before we were all dumping into the river and now it is less", "For those of us who were able to connect it has been very useful", "I think it is good, it has helped with healthier conditions". Unfortunately, and acknowledged by several participants, the system did not cover the majority of the population: "The sewage system only serves the downtown because the neighborhood where I live is not connected", "There are only two blocks of houses connected", "We still have a lot of houses discarding directly into the river", "The sewage system is not complete", "Unfortunately this project only serves some houses", "Sabana Licona, the biggest neighborhood, does not have any sewage system it is a very unhealthy situation".

4.3.5 COMMUNITY BEHAVIORS

A variety of specific community behaviors towards WSS emerged from the interviews. Some were related to how they use water; how they value water, and general attitudes. Overall, behaviors reflected how the community is adapting to the actual situation of water scarcity. As expressed by several participants: “Now, I have to save and store water”, “We are now used to collecting water”, and “We must now save water in our ‘pilas’, buckets or whatever”. Other participants expressed how they were coping and adapting, for example, by washing clothes at irregular hours (midnight) due to rationing service hours.

Regarding behaviors related to how the community values water, responses coincided that there is significant need to educate people that the water service cannot be free, that there is a price to pay for a benefit, and there is a responsibility to pay on time for a service you receive. As confirmed by a participant: “When I was a board member, there were a lot of people who had not paid for their water for 8, 10 or more years”. Some participants stated there were people who had never paid a water bill. A frequent comparison was how easily people buy a soda drink or cell phone data, but complain about paying a water bill.

Nearly all participants agreed on the indifference of the majority of the population towards water issues. They commented on poor attendance and participation during water assemblies, apathy, and lack of interest, especially by those who most needed water and never showed up. In the words of some participants: “They want the service but are never present at the meetings” and “What happens is that we are not united and when they call us, just a few of us show up”. Similar remarks were made regarding the lack of interest and participation during reforestation campaigns. As summarized by a participant’s comment: “The problem is the level of apathy of the community,

we see the problem but we want someone else to fix it, we know the problem exists and we don't do anything, we just sit and watch to see what others will do, because I don't want problems, let someone else deal with the problem".

4.4 COMMUNITY PERCEPTIONS OF THE WATER SUPPLY AND SANITATION MANAGEMENT

4.4.1 WATER SUPPLY AND SANITATION SERVICE PROVIDER

During the interviews, participants were questioned about their perceptions of the WSS provider. It was helpful to quantify these responses to help understand the basic knowledge focus group participants had of DIMASTAC. Five focus group questions were included in this section: Who were DIMASTAC members? Who was DIMASTAC's president? What does the acronym DIMASTAC stand for? When was DIMASTAC established? Did they know there was a wastewater treatment plant, and; whether they had visited the wastewater treatment plant (Appendix G). Additional questions included the perceptions of focus group participants of DIMASTAC's activities and how they have performed in the provision of WSS services.

Participants in session C, who had served or were serving as municipal employees seemed to know more about who DIMASTAC members were (71%). Session A, represented by housewives, small business owners, self-employed and retired participants knew the least of the three focus groups (33%), while community leaders during session B had a better idea who the members were (43%). As far as who DIMASTAC's president was, there was some confusion and again a higher number of participants in session C knew who the president was (86%), followed by community leaders in session B (57%) and a smaller percentage for those participants in session A (33%).

When participants were asked if they knew what the acronym of DIMASTAC stands for, a small percentage (17%) of housewives, small business owners, self-employed and retired participants in session A knew, compared to 42% in session B and 43% in session C knew who knew what the acronym DIMASTAC stands for. As for when DIMASTAC was established, none (0%) of the participants in session A knew, while 57% of the participants in session B and C equally responded knowing when the service provider was established.

Focus group participants were asked if they had visited the wastewater treatment plant. Only half of the participants in session A (50%) knew there is a waste water treatment plant and of those just a few had visited the treatment plant (33%). While all community leaders in session B (100%) reported they knew about the plant, but not everyone had been there (71%). Almost all participants in session C knew there was a treatment plant (86%) and a smaller number had visited (71%).

Participants were asked to explain their perceptions as to what DIMASTAC does, and to describe how they have performed as the WSS service provider. In general, participants had a good understanding of what DIMASTAC does expressed by comments such as: “They are a group of people in charge of the water service and also sanitation”; “It’s the municipal office for water”; “They are the ones managing the water”; “It’s the organization responsible for the water”. Other comments pointed to more managerial roles: “They provide the guidelines for the water service”; “They manage and are in charge of people paying for the water”; “Not everyone knows, but they also have looked for outside help for a bigger water project for the future”; “They have worked hard to cut back on debt”; and, “They have tried to improve the service and make it more efficient”. Other perceptions were expressed on DIMASTAC’s more technical responsibilities: “They control all the repairs and improvements”; “They are concerned about distribution so everyone is satisfied

and has water"; "They are in charge of expanding the distribution of water and changing old water lines"; and, "The water stored was leaking but they fixed the water tanks"; and, "If there is some contamination, they analyze the water to see if its suitable for human consumption".

In general, participants described DIMASTAC's performance positively with comments such as: "They have done a lot"; "I have seen how hard they have worked"; "They have tried to correct the payments for the water"; "Valves and water pipes were a mess, I have seen that that has improved a lot"; "Service has improved a lot, when we don't receive water and if we call the office they tell us what the problem is"; "There needs to be improvement"; "We see big changes"; "They've worked hard to get funding to build the retaining wall"; "At least they have set a schedule, before we did not have one"; "There is more communication and they are better organized"; "The plumber is very efficient and is available even on holidays"; "To me the service is excellent, at the office they are very friendly and helpful"; "I could not connect to the sewage system, but with DIMASTAC's help we did it"; and, "They need to manage the water for everyone, not just for some".

Other perceptions regarding DIMASTAC's performance emerged through comments of concern, such as: "I am worried that they are alone, they should be supported by everyone, because people do not understand about water management"; "It's in the hands of four people, it's not possible that four people will improve our water system"; "Our ignorance causes people to just watch or inform themselves by what they hear others say"; "If only they knew everything they are doing to help improve the quality of the water". Other participants concluded; "The problem is that politics do not allow them to function"; and, "They do not have the financial support to improve the service".

4.4.2 LOCAL WSS REGULATION

Establishing local regulation was also a municipal commitment in order to be eligible for the IDB 1793- SF/HO investment program to strengthen the decentralization process in Tatumbla. This implied that the municipal authorities had to organize and formalize the USCL and the COMAS unit that would serve at the municipal level. In general, participants' perceptions on local regulation emerged in two ways depending on whether: (1) if they knew about the local regulatory units, and, (2) their understanding of regulation of WSS services. Findings showed that very few of the participants in focus group A, which included housewives, small business owners, self-employed and retired, knew about the USCL (17%) and none knew about the existence of the COMAS (0%). Only a few of the community leaders in focus group session B knew about the USCL (29%) and the COMAS (29%). As far as past and present municipal employees in focus group session C, a small percentage knew about the USCL (14%) and COMAS (14%).

In general, focus group participants believed that local regulation has never existed in Tatumbla. They commented that there have never been rules and that everyone has done whatever they please with regards to water. One example given by a participant: "It's important that the water use for irrigation be regulated, nobody regulates it here, and the creeks are full of irrigation pipes". Several participants made reference to the need for water metering as a necessary mechanism to improve regulation. As one of the participants expressed: "The best solution here is for everyone to have water meters and pay what's fair, what they have consumed". This was confirmed by another participant's comment: "It's not fair that I use very little water and others use a lot and we pay the same".

4.4.3 MUNICIPAL AUTHORITIES

This section focuses on how participants perceived the management of WSS services by the municipal authorities and how these perceptions emerged as some of the causes of the present situation. Throughout the interviews, focus group perceptions on the management of WSS by the municipal authorities reflected dissatisfaction, not just of the current authorities, but also of those who had been in power previously. Significantly, it emerged that mayors and municipal authorities have never been interested in water or sanitation and would rather invest in more "visible" forms of infrastructure like roads. One participant summarized the general opinion: "We have one mayor, and then another, and another and the situation continues the same". This situation was described as recurring with all municipal authorities, as exemplified by another participant's comment: "People have gotten accustomed that the water management by the municipality has been non-existent, that water funds were used for other things and never to invest in water". The lack of investments in water throughout different municipal governments was also reconfirmed by a participant's comment: "It did not matter who the mayor was, the municipality would just charge for the water".

Participants repeatedly associated the lack of interest and investments in water from the municipal authorities with how the tariffs from water were used for other things and not for water, as well as the inability of demanding punctual payments from water users. As one participant described: "There have never been enough funds for water in the municipality for the real needs because the municipality would never require people to pay". This was confirmed by another comment: "There were lots of people who never paid and were never pressured to pay, that was the job the municipality never did". Participants expressed that due to the lack of enforcing on-time payments, the water service had been subsidized.

Findings also pointed to participants' perceptions about the present municipal authorities with respect to WSS services, which were not much different from past authorities. This was brought to light by comments such as: "No, he (current mayor) never had a proposal for water, he has no vision" which was confirmed through an exchange of a participant with the actual mayor: "I asked him about expanding the sewage system and he responded: "I won't work on things you can't see because what I want are votes". Several participants made reference to the urgent need of having the actual mayor explain to the community exactly what the water situation is. Participants expressed the sense of urgency that something needs to be done, not just by the municipal authorities, but also by the community. As stated by a participant: "There is such a lack of interest here, not just from the municipal authorities, but also from the people that live here."

In summary, participants associated the role of the municipal authorities and management of WSS services with politics and corruption. In general, participants agreed that politicians have ignored issues like water and general wellness of the community. They blamed politicians for the current water situation and expressed no sense of hope that they would solve any of these issues. As one participant stated: "The political issue we have stressed here is a reality in Honduras, politicians will go to a village and build a park much faster that fix the water pipes, that is why all of us have mentioned this, we all know it, you can't see them (water pipes), there is no way to put a recognition plaque with their (politician) name on it".

4.5 COMMUNITY PERCEPTIONS OF THE CAUSES AFFECTING WSS SERVICES

4.5.1 WATER SOURCES AND MICROSHEDS

In relation to the conditions of the water sources of Tatumbla, it became evident that focus group comments were more than just perceptions because the majority reported they had visited at least one of the four water sources. Almost all housewives, small business owners, self-employed and retired participants from session A (83%) and community leaders from session B (71%) had visited at least one water source. All past and present municipal employees from session C (100%) confirmed knowing at least one water source. Based on their first-hand knowledge of a given water source, participants expressed their concerns about the lack of appropriate care and deficient investments. They reported the water sources were not protected from animals or people and blamed municipal authorities for not having done anything about this in many years. One participant made this clear after she visited one of the water sources: “I could not believe downtown Tatumbla was receiving water from there. There were stones holding some hoses and anybody or animals could get in the water”. There was general concern about how vulnerable all the water sources were since none had been safeguarded with a fence.

The poor conditions and insufficient capacity of the water sources was also expressed by the majority of the participants. They associated the present water scarcity situation with the inadequate size of the water retention structures, the increased number of people that now receive water, and the fact that these are the same sources from more than 20 years ago. This was best expressed by a participant’s comment: “Really, what we have, are these small ‘pilitas’ (cement structures to hold water at the household level), the same kind they build for cows to drink water”. Participants also perceived that the water sources were not capable of producing enough water. As

one participant stated: “They say Uyuca is a great water producer, but unfortunately not for us, most of the water is on the other side”.

Another issue identified by participants in relation to water sources and microsheds was the importance of protecting and conserving the forest where these water sources are located. Some participants mentioned that several of these water sources had been adversely affected by hurricane Mitch in 1998. The need to protect the forest and greater community involvement in reforestations emerged as two major causes for the shortage in water production. Constant deforestation was also associated with poor water quality. As expressed by a participant: “As long as deforestation is not stabilized it won’t do any good to build a bigger water reservoir or install water meters, because the water production needs to be sustained by conserving the forest, but they (authorities) are afraid to confront this problem because there are many interests”.

4.5.2 POPULATION GROWTH

All participants were aware of the increase in the local population and housing developments, and this issue emerged as a matter of high concern for present and future water availability. Participants were aware that the battle against urbanization was impossible to stop, nor could they control the misleading information given to newcomers “that there is plenty of water in Tatumbla”. They associated the increase in population combined with years of absence of efficient water management as two main causes for the present situation. As expressed by one participant: “The way our population is growing, we are all going to run out of water”. They also were aware how “many” of these new housing projects did not receive “a drop of water from Tatumbla” and were buying it from other service providers. Participants repeatedly expressed their concern that the

water sources of Tatumbla were built for fewer people. As summarized by one participant: "...logically the water service was better before because we were less people".

4.6 COMMUNITY'S FUTURE

4.6.1 VISION AND NEEDS FOR THE FUTURE

Participants expressed genuine concern about the present water availability. In the words of a participant: "No one ever bothered to worry that someday we would not have water". They suggested the WSS service provider could help alleviate the situation. As stated by a participant: "I think DIMASTAC needs to think beyond the present needs, because they are the ones managing the water. They need to think how we will have water permanently in the following years". Significantly, it emerged from participants that what Tatumbla urgently needs is a "big water project", and that DIMASTAC should plan on building one. Some participants expressed fear that in the near future people in Tatumbla would be fighting for water.

The topic of contamination was an issue that emerged associated with the availability of water in the future. As one participant explained: 'Most of the population is flushing their raw sewage and solid wastes into our creeks and that is a terrible thing because in the future if we want to use that water, even now, this is not possible because it's so contaminated, and it would be so expensive to purify these waters". Due to the lack of sanitation, participants expressed the need to improve and complete this service in the not so distant future with a sewage system that includes everyone. In summary one participant stated: "To think about the future we need the integration of the municipal authorities, the community and the WSS provider".

CHAPTER FIVE

5. CONCLUSIONS

The challenge of a case study is always that of the generalizability of conclusions and lessons learned as the result of an intervention related, in this case, to a single community, Tatumbla, Honduras. Undoubtedly, there are differences between municipalities, and even between communities within a municipality, as well as a general recognition that no particular process can guarantee the successful transition from municipal water management to an autonomous WSS service provider. From this case study in Tatumbla, relevant issues emerged which may serve as lessons for other communities. These include the recognition and need to end the existing vicious circle of inefficient municipal water management systems. Under the municipal model in Tatumbla, there were deficient services, inadequate maintenance, low collection of water tariffs, and scarce improvements and infrastructure investments. Simultaneously, mismanagement of funds and corruption were issues that emerged which are closely tied to the inadequacy of municipal water service.

The circumstances that triggered the decentralization process from a municipal water management system to an autonomous WSS service provider in the municipality of Tatumbla were identified through a review of literature, and qualitative interviews and questionnaires. These results indicate that the decentralization in Tatumbla was the result of external funding through the IDB 1793/SF-HO investment program to finance the construction of a sewage system and a waste water treatment plant. According to the data, the decision to invest in sanitation rather than water was taken by the mayor of Tatumbla even though the main concern that emerged from focus groups was water scarcity. Funds from this donation were restricted to eligible criteria which included,

amongst others, the establishment of an autonomous WSS service provider. Consequently, the decentralization process was not driven by a municipal proposal for an autonomous WSS service provider, nor by organized efforts from the community demanding improvements in the water and sanitation services. Nevertheless, focus group participants acknowledged that because at the time of the study WSS services were no longer managed by the municipal authorities, Tatumbla had made progress with respect to decentralization. They also recognized that the sewage system, even though incomplete, was serving those who were able to connect to it.

For a small town like Tatumbla, the opportunity to have been chosen for the short list of municipalities benefitted by a grant from the IDB investment program was one that municipal authorities could not afford to let go, even if it meant giving up control of funds generated from water tariffs, establishing an autonomous WSS service provider and complying with regulation. Because this opportunity was generated by a complex investment program with agencies which included the IADB, FHIS, SANAA, and ERSAPS, with a definite budget and time constraints, results indicate that the municipal authorities failed to clearly understand the implications and importance of community participation in decentralization and the necessary municipal support and commitment in order to establish a well-organized and sustainable autonomous WSS service provider and its responsibility to be accountable during the process.

A critical impediment during the implementation of the project was the lack of accountability and poor communication from the municipal authorities with the community, which reinforced suspicion of an already distrusted local government because of lack of transparency and corruption. The lack of support and tensions between the municipal authorities and the recently

elected water board was detrimental in the initial and important strengthening phase, time during which board members should have been trained by ERSAPS in the technical, financial and operational capacities necessary for the management of WSS services. An organized and well-informed water board could have served as a better stage to inform the community about the objectives of the investment, the municipal commitments, the role of the water board and the need for community engagement and participation. These obstacles most probably influenced the community's perception that the sewage and sanitation project was ill conceived, incomplete and fraught with corruption thus fostering the prevailing sense of distrust and apathy in the community.

At the national level, the implementation of the IDB investment program was conceived to improve WSS services through technical assistance and infrastructure investments in order to strengthen municipalities in the decentralization of WSS services. This investment included: construction of infrastructure; subcontracting; land acquisition; obtaining permits; financial complications; time constraints; local social and political issues as well as community engagement; as well as on-time technical assistance to community volunteers and operators. In the case of Tatumbla, as is the case of other small towns in Honduras, there was not an already functioning autonomous WSS service provider. Drawing from the Tatumbla experience, it seems more rational and sustainable to first ensure a transparent, organized and timely transition of the municipal water management to an autonomous WSS service provider allowing time for board members to understand the multidimensional operation of the WSS and engagement of the community rather than pressing challenging local organizational aspects along with complex infrastructure investments and the operation of a waste water treatment plant. It is no surprise that the local regulating entities such as the USCL, COMAS and TRC were also not active nor functioning

during the time of the study, and that only a few of the focus group participants knew about them. Both water boards and local regulating entities depend on community volunteers with limited experience and time constraints who are challenged to assume complex roles and responsibilities.

The initial year of the water board was an important moment to build trust and engage the community, but;, unfortunately, it was a contentious time and resulted with the mayor annulling the board and returning the water management to the municipality. Results also show that participants were well aware of and concerned about the increasing water crisis in Tatumbla due to limited water availability and collection, environmental degradation, contamination, over population, general apathy, mismanagement and lack of municipal government engagement and vision, and the absence of organized community demand for better WSS services. These situations confirm the importance of transparency and commitment on behalf of the municipal authorities to ensure an organized decentralization process that includes the community's involvement, their real needs and the time to adjust and evaluate the expected difficulties during the transition. If this transition had been less confrontational, it could have resulted in a more empowered WSS service provider with a better informed and engaged community whose voice could have been taken into account as to what they considered the most pressing investment needs.

In general, participants expressed satisfaction with the performance of the WSS service provider DIMASTAC compared to the mismanaged water service provided by the municipality. A sense of trust was achieved during the five consecutive years of operation and management by DIMASTAC. Undoubtedly, the fact that DIMASTAC was able to operate as an autonomous WSS service provider during an uninterrupted period was an important step in strengthening the

decentralization process. But it also became evident that DIMASTAC operated with a weak organizational structure due to the lack of leadership from the two mayors who presided over the division, feeding the general apathy of the community in spite of a good understanding of the critical conditions of WSS in Tatumbla. Participants hoped the provider would “fix” the long-standing problems to ensure a better service in the future, underlining the general attitude that “someone else” will solve the situation without “me” getting into problems.

Another important lesson in the case of Tatumbla is the cost-benefit analysis, operation, management and sustainability of the municipal sewage system and waste water treatment plant. The initial phase included the connection of only 88 homes. These few connections were not enough to guarantee the costs for maintenance, operation and expansion of more connections to the system. Even more concerning was the supposition of the investment program that a recently established WSS service provider would undertake the challenging role of managing not just a critical water situation, but also an under-financed sanitation service without the shared responsibility of the municipality, who in the end were the recipients of this donation.

One of the findings that emerged from this research is the dynamic relationship, in this case, between water and sewage systems, both critical to ensure quality of life. Both are "hidden", underground networks that contribute significantly to fundamental human needs, but are of secondary importance to politicians who are interested in visible results which will translate into votes. In Tatumbla, much of the decentralization process was driven by the funding from IADB, based on the mayor`s decision to use external funding to install a waste water management system. In many communities in Honduras, water treatment is an option for the future, but not a reality

yet. Water, however, is fundamental, an essential daily need, and as such needs to be provided in an equitable, transparent, efficient and effective way. The Tatumbla case demonstrates that dynamic interdependence of decentralization with both water and waste management; both require transparent management by educated citizens who have been prepared as stewards of these two valuable community resources.

In compliance with the Framework Law and the national goal that all 298 Honduran municipalities will be managing their water and sanitation services by 2038, it is important to emphasize the need for timely, organized community engagement. A conscious effort to engage the community can encourage better understanding of the reality of WSS services resulting in more proactive attitudes to counter the cultural tendency of expecting the local government or other entities to fix local problems. In the case where infrastructure investments used as incentives from external sources for the establishment of autonomous WSS service providers, it is important to engage the community and municipal authorities with the donor prior to the implementation of any investment project. No service provision model will be effective if it is isolated from a conscious participation process by water users who in the end are the beneficiaries. In addition, active community engagement from the very beginning of the establishment of an autonomous WSS service provider can allow stronger financial and managerial autonomy and serve to demand transparency, accountability and avert corruption.

At the time of submission of this research paper the following important developments had taken place. Due to lack of leadership, support and continuous obstacles from the mayor as president of DIMASTAC, organized community members demanded from the regulating entity ERSAPS the

need to modify the WSS service provider model from a division to a water board with the intention to gain autonomy. With the approval of this petition DIMASTAC no longer exists and a new water board has been democratically elected. There is a growing voice and with it, a sense of empowerment. DIMASTAC played a big role in promoting communication, building trust and raising awareness and prepared the ground for a more collective, responsible approach to addressing the ongoing challenges that Tatumbla continues to face regarding WSS along with the conservation and protection of its natural resources.

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APPENDIX A
FOCUS GROUP DISCUSSION QUESTIONNAIRE

1. What do you remember about the water situation in Tatumbla 10 years ago? 20 years ago?
2. What has changed?
3. How has it changed?
4. What is your opinion on the actual water situation?
5. What do you think are the causes?
6. What is your opinion regarding sanitation?
7. What do you think are the causes of the present situation?
8. What do you know or remember on how the water service was managed 10 years or more ago?
9. What is your opinion on how the water service has been managed during the last three municipal governments?
10. What do you think about the present municipal authorities regarding water and sanitation issues and services?
11. What is your understanding on decentralization?
12. What do you know about DIMASTAC?
13. Who DIMASTAC members are?
14. What does DIMASTAC stands for?
15. Who is DIMASTAC's president?
16. What does DIMASTAC do?
17. When was DIMASTAC established?
18. How would you describe the water and sanitation service since DIMASTAC became the service provider?
19. Have you heard about the waste water treatment plant?
20. Have you ever visited the waste water treatment plant?
21. Do you know what the USCL is?
22. Do you know what the COMAS is?

APPENDIX B
SEMI STRUCTURED INTERVIEW WITH SANAA AND FHIS

1. What was your role within SANAA/ FHIS in the implementation of the BID 1793/SF-HO investment program?
2. What were SANAA/FHIS responsibilities in the implementation of the BID 1793/SF-HO investment program?
3. What was SANAA/FHIS institutional relationship with the Municipality of Tatumbla during the implementation of the BID investment program?
4. How would you describe the interest and capabilities of the Municipality of Tatumbla during the implementation of the BID 1793/SF-HO investment program?
5. Why was the municipality of Tatumbla selected as beneficiary of the investment program?
6. What did the municipality of Tatumbla have to do to be considered as beneficiary?
7. What commitments did the municipality of Tatumbla acquired in exchange of being benefitted by the investment program?
8. Were the objectives and conditions of the investment program shared with the community?
9. What role did SANAA/FHIS play with engaging the community?
10. Explain what support SANAA/FHIS provided the municipality of Tatumbla in relationship to the investment program?
11. Explain what support SANAA/FHIS provided the community of Tatumbla in relationship to the investment program?
12. What kind of follow-up did SANAA/FHIS provided the municipality of Tatumbla after the investment program was completed?
13. Describe how the decentralization process and provision of WSS services was strengthen in Tatumbla?
14. Describe how the infrastructure investments improved WSS services in Tatumbla?

APPENDIX C
QUESTIONNAIRE ERSAPS FIELD TECHNICAL COORDINATOR

1. What was your role within with ERSAPS in the implementation of the BID 1793/SF-HO investment program?
2. What were ERSAPS responsibilities in the implementation of the BID 1793/SF-HO investment program?
3. What was ERSAPS's institutional relationship with the Municipality of Tatumbla during the implementation of the BID 1793/SF-HO investment program?
4. How would you describe the interest and capabilities of the Municipality of Tatumbla during the implementation of the BID 1793/SF-HO investment program?
5. Why was the municipality of Tatumbla selected as beneficiary of the investment program?
6. What did the municipality of Tatumbla have to do to be considered as beneficiary?
7. What commitments did the municipality of Tatumbla acquired in exchange of being benefitted by the investment program?
8. Were the objectives and conditions of the investment program shared with the community?
9. What role did ERSAPS play with engaging the community?
10. Explain what support ERSAPS provided the municipality in relationship to the investment program?
11. Explain what support ERSAPS provided the community in relationship to the investment program?
12. What kind of relationship was established between ERSAPS and the municipality of Tatumbla after the investment program was completed?
13. Describe how you consider the decentralization process and provision of WSS services was strengthen in Tatumbla?
14. Explain what happened with the first water board elected in Tatumbla.
15. Explain how DIMASTAC was established?
16. What WSS service provider model do you believe was the best for Tatumbla?
17. What has happened to DIMASTAC since it was established?

APPENDIX D
QUESTIONNAIRE ERSAPS REGULATION ASSISTANT

1. What was your role within ERSAPS in the implementation of the BID 1793/SF-HO investment program?
2. Since 2003, when the Framework law was emitted how many municipalities since 2003 have received international financial support in order to comply with the law?
3. Nationwide how many municipalities have so far complied with the Framework law?
4. What do you believe is needed to further decentralization at a national level?
5. What does it mean a 'specialized service provider'?
6. How many different service provider models does ERSAPS endorse?
7. How is compliance with the Framework law advancing?
8. What are the most common difficulties a municipality confronts to comply with the Framework law?
9. Are you aware if international donors do any follow-up through ERSAPS regarding the municipalities they have supported and their commitments to modernize their WSS service provision?
10. Describe how you consider the decentralization process and provision of WSS services was strengthen in Tatumbla?

APPENDIX E

SEMI STRUCTURED INTERVIEW ERSAPS TECHNICAL ASSISTANCE

COORDINATOR

15. What was your role within ERSAPS and the implementation of the BID 1793/SF-HO investment program?
16. What were ERSAPS responsibilities in the implementation of the BID 1793/SF-HO investment program?
17. What was ERSPAS's institutional relationship with the Municipality of Tatumbla during the implementation of the BID investment program?
18. How would you describe the interest and capabilities of the Municipality of Tatumbla during the implementation of the BID 1793/SF-HO investment program?
19. Why was the municipality of Tatumbla selected as beneficiary of the investment program?
20. What did the municipality of Tatumbla have to do to be considered as beneficiary?
21. What commitments did the municipality of Tatumbla acquired in exchange of being benefitted by the investment program?
22. Were the objectives and conditions of the investment program shared with the community?
23. What role did you play with engaging the community?
24. Explain what support ERSAPS provided the municipality of Tatumbla in relationship to the investment program?
25. Explain what support ERSAPS provided the community of Tatumbla in relationship to the investment program?
26. What kind of follow-up did ERSAPS provided the municipality of Tatumbla after the investment program was completed?
27. Describe how you consider the decentralization process and provision of WSS services was strengthen in Tatumbla?
28. Describe how you consider the infrastructure investments improved WSS services in Tatumbla?

APPENDIX F
MUNICIPALITIES BENEFITTED BY IDB 1793/SF-HO

Municipalites benefitted by IDB 1793/SF-HO			
No	**Municipality**	**Department**	**Investments**
1	Catacamas	Olancho	Construction of sewage system
2	Catacamas	Olancho	Construction of sewage system
3	Catacamas	Olancho	Construction of sewage system
4	Concordia	Olancho	Construction of wastewater treatment plant, upflow anaerobic sludge blanket reactor (UASB) for primary treatment and a subsurface wetland for secondary treatment
5	Erandique	Lempira	Construction of sewage system (oxidation ponds)
6	Guaimaca	Francisco Morazan	Construction of sewage system, Parshall canal, facultative lagoon
7	Jesus de Otoro	Intibuca	Construction of sewage system, facultative lagoon and maturation ponds
8	La Labor	Ocotepeque	Construction of anaerobic and facultative lagoon
9	Puerto Cortes	Cortes	Rehabilitation and expansion of potable water system and potablization plant in Rio Tulian
10	Reitoca	Francisco Morazan	Construction of Phase I sewage system (anaerobic reactor and biofilter)
11	Salama	Olancho	Construction of Phase I sewage system, facultativelagoon and maturation ponds
12	San Juan	Intibuca	Construction of sewage system, facultative and maduration ponds
13	Santa Rita	Yoro	Construction of Phase I of potable water distribution system (well, pump, distribution lines, clorination etc.)
14	Siguatepeque	Comayagua	Complementary construction of oxidation ponds
15	Sonaguera	Colon	Construction and expansion of sewage system
16	Tatumbla	Francisco Morazan	Construction of phase I: wastewater treatment plant, upflow anaerobic sludge blanket reactor (UASB) for primary treatment and a subsurface wetland for secondary treatment
17	Trujillo	Colon	Construction of phase I: wastewater treatment plant, upflow anaerobic sludge blanket reactor (UASB) for primary treatment, anaerobic filter and a pulim pond

APPENDIX G

QUESTIONS AND RESPONSES FROM FOCUS GROUPS REGARDING THE AUTONOMOUS WSS SERVICE PROVIDER, WASTEWATER TRETAMENT PLANT AND LOCAL REGULATION

Focus Group Sessions	SESSION A						SESSION B						SESSION C					
	Housewives, small business owners, self-employed and retired participants.						Community leaders who were involved in schools, community library, church, "patronato" (neighborhood organization), water committee and health services.						Serving or had served as a municipal employee and were represented by a former mayor, environmental unit manager, council member, justice director, secretary and registrar.					
	Yes		No		Partially		Yes		No		Partially		Yes		No		Partially	
Questions	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Who are Dimastac members?	2	33%	1	17%	3	50%	3	43%	3	43%	1	14%	5	71%	2	29%		
Who is Dimastac's president?	2	33%	4	67%			4	57%	3	43%			6	86%				
What does Dimastac mean?	1	17%	5	83%			3	43%	2	29%	2	29%	3	43%	1	14%	1	14%
Do you remember when Dimastac was established?	0	0%	6	100%			4	57%	3	43%			4	57%	2	29%	3	43%
Do you know there is a wastewater sanitation plant?	3	50%	3	50%			7	100%					6	86%	1	14%	1	14%
Have you ever been at the wastewater sanitation plant?	2	33%	4	67%			5	71%	2	29%			5	71%	2	29%		
Do you know about the USCL?	1	17%	5	83%			2	29%	3	43%	2	29%	1	14%	4	57%	2	29%
Do you know about the COMAS?	0	0%	6	100%			2	29%	3	43%	2	29%	1	14%	4	57%	2	29%
Have you ever been at least to one of the water sources?	5	83%	1	17%			5	71%	2	29%			7	100%				