Collaborative Water Partnerships for sustainability and social justice

Patrick Quinn
Department of Natural Resources
McGill University, Montreal

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Supervisor
Dr. Nicolas Kosoy - Department of Natural Resources, McGill University

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Abstract:

As the era of the Millennium Development Goals draws to an end in 2015, the United Nations members along with World leaders will negotiate how to include water and sanitation targets as part of the Sustainable Development Goals. It is estimated globally that close to 1 billion (14 %) of the human population still lacks access to safe drinking water and over 2.4 billion (36 %) people lack access to improved sanitation services. It is thus essential to examine the mechanisms that have been developed by the United Nations to increase access to water and sanitation services. This thesis aims to provide an exploratory analysis on the role of collaborative water partnerships known as the Water Operators' Partnership. These partnerships were developed by the United Nations to increase access to water and sanitation services in developing countries. Water Operators' Partnerships are not for profit public – public, public – private, private – private partnerships. There has been limited empirical research on the participation of North American Water Utilities in these alternative types of partnerships. In this research, this gap is partially addressed through the examination of the Belize Water Service – Contra Costa Water District, is the first Water Operators' Partnership between a North American and a Central American water utility. Through the exploration of the Belize Water Service - Contra Costa Water District case study, this thesis will highlight the need for decision makers to characterize water resources in terms of plural values operating within the Water Operators' Partnerships framework. This research used observations, interviews and participation in job shadowing sessions completed in the field as part of Belize Water Service – Contra Costa Water District Water Operators' Partnership documenting process. Archival documents were also collected from various stakeholders. Contextual factors such as political, socio-economic and environmental defining how water operators' function, were also examined through an extensive literature review. The reliance of Contra Costa Water District on market mechanisms and technological solutions for addressing water allocation issues has resulted in a techno-centric value system for resolving water distribution issues. The dual role of

the Inter-American Development Bank in the funding of the Belize Water Service – Contra Costa Water District Water Operators' Partnership as well as the development of a water and sanitation project in Belize has characterized this particular WOP as a hierarchical partnership focused on capacity subsitution rather than capacity development. Accordingly, the Belize Water Service – Contra Costa Water District Water Operators' Partnership requires re-structuring to allow for polycentric governance framing that recognizes the plural values that different actors ascribe to water resources. Introducing polycentric governance in the development of collaborative partnerships such as WOPs will enhance the chance of increasing access to improved water and sanitation services for rural and poorer segments of the population. Finally a multitiered WOP framework is proposed in this research, identifying the need to consider several levels of intervention while recognizing their interdependence in order to ensure a sustainable and equitable delivery of water and sanitation services in both the urban and rural sectors in developing countries.

Keywords: SDGs, water and sanitation, multitiered Water Operators' Partnership, Polycentric governance.

Résumé:

Alors que les Objectifs du Millénaire (ODMs) prennent fin en 2015, les membres des Nations Unies de même que dirigeants des pays du monde négocieront comment inclure les objectifs en matière d'accès à l'eau potable et à l'assainissement pour les Objectifs du Développement durable (ODDs). Il est estimé que mondialement, près d'un milliard (14%) de la population n'a pas accès à de l'eau potable et que plus de 2,4 milliards (36%) de personnes n'ont pas accès à des installations sanitaires appropriées. Il est donc essentiel d'investiguer les mécanismes qui ont été développé par les Nations Unies pour améliorer l'accès à l'eau potable et à l'assainissement. Cette thèse a pour objectif d'apporter une analyse exploratoire du rôle des collaborations de partenariat en eau communément appelés Partenariat des Opérateurs en Eau (POEs). Ces derniers ont été développés par les Nations Unies pour améliorer l'accès à l'eau potable et à l'assainissement dans les pays en développement. Les POEs sont des partenariats non lucratifs public-public, public-privé et privé-privé. Il y a eu peu de recherche empirique sur la participation des entités de l'eau en Amérique du Nord dans ces types de partenariats public- privé alternatifs. Dans cette recherche, cette lacune de recherche est partiellement adressée par l'examen du service d'eau du Belize- Contra Costa District Eau (BSE-CCDE-POE), le premier partenariat POE entre l'Amérique du Nord et l'entité d'eau d'Amérique Centrale. Par l'exploration de l'étude de cas du service de l'eau du Belize – District Contra Costa, cette thèse démontre l'importance que les parties prenantes doivent accorder à la caractérisation de la ressource eau en termes de la pluralité des valeurs à l'intérieur du cadre des POEs. Une analyse de contenu qualitative a été effectuée pour proposer un cadre théorique pour mieux considérer les cadres institutionnels et de gouvernance pour des partenariats mondiaux de l'eau. Cette recherche est basée sur des observations, entrevues et participations à des séances de jumelage complétées dans le domaine comme part intégrante des processus du BSE-CCDE-POE. Des documents d'archives ont également été collectés de plusieurs parties prenantes. Les facteurs contextuels tels que politiques, socio-économiques, et environnementaux

qui définissent comment les opérateurs fonctionnent ont également été étudiés avec une revue de littérature extensive.
La dépendance du CCDE aux mécanismes de marché et aux solutions technologiques pour tenter de remédier aux problèmes d'allocation des ressources en eau ont résulté en un système de valeur techno-centrique pour résoudre les problèmes de distribution. Le double rôle de la Banque interaméricaine de développement dans le financement du BSE-CCDE-POE de même que dans le développement du projet d'accès à l'eau potable et à l'assainissement au Belize a caractérisé ce POE particulier comme partenariat hiérarchique qui met l'accent sur les capacités de substitution plutôt que sur le renforcement des capacités. Conséquemment, le BSE-CCDE-POE nécessite une restructuration qui permettra un cadre de gouvernance polycentrique permettant la reconnaissance des valeurs plurielles des différents acteurs se partageant la ressource en eau. L'introduction d'une gouvernance polycentrique dans le développement des partenariats collaboratifs en eau tels que les POEs aura pour fonction d'augmenter les chances d'améliorer l'accès à l'eau potable et à l'assainissement pour les tranches de la population en régions rurales et les plus pauvres. Un cadre POE étagé est proposé dans cette recherche, identifiant le besoin de considérer les plusieurs niveaux d'intervention tout en reconnaissant leurs interdépendances pour assurer un approvisionnement équitable et durable des services d'accès à l'eau potable et à l'assainissement dans les secteurs urbains et ruraux dans les pays en développement.

Mots-clés: ODMs, accès à l'eau potable et à l'assainissement, Partenariat d'opérateurs pour l'eau, Gouvernance polycentrique

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Acronyms

ADB	American Development Bank
ALOAS	Latin American Association of Water and Sanitation Operators
AWWA	American Water Works Association
BEWOP	Boosting the Effectiveness of Water Operators' Partnership
BSIF	Belize Social Investment
BWS	Belize Water Service
CCWD	Contra Costa Water District
CDB	Caribbean Development Bank
CDT	Curriculum Development Team
CEB	United Nations System Chief Executives Board for Coordination
CWWA	Caribbean Water and Wastewater Association
GWOPA	Global Water Operators Partnerships Alliance
HLCP	UN High Level Committee of Programs
IADB	Inter-American Development Bank
IWA	International Water Association
KPI	Key Performance Indicators
LAC	Latin America and Caribbean Countries
MDGs	Millennium Development Goals
NGO	Non-Governmental Organization
NPM	New Public Management
OECD	The Organization for Economic Cooperation and Development
PPIAF	Private Infrastructure Advisory Facility
PPP	Public – Private Partnerships
PUC	Public Utilities Commission
PUP	Public – Public Partnerships
RDD	Rural Development Department
SCADA	Supervisory Control and Data Acquisition
SDG	Sustainable Development Goals
SIAAP	Syndicat Interdépartemental pour l'assainissement de l'agglomération parisienne'
SIF	Social Investment Fund
SOP	Standard operating procedures
SSIP	Small-Scale Independent Providers
UN	United Nations
UNDP	United Nations Development Program
UNSGAB	United Nations Secretary General's Advisory Board on Water and Sanitation
USWP	United States Water Partnership
VWB	Village Water Board
WASA	Water and Sewage Authority
WSS	Water and Sanitation Services
WOPs	Water Operators' Partnership
WSSD	World Summit on Sustainable Development

1 General introduction

1.1 Understanding water

Water is the most common substance on earth and over the course of time the total quantity on the planet has not increased or decreased. The value that is assigned to water impacts the accessibility and distribution of water and sanitation services. Through the course of history, the role of water in society has changed. From a physical standpoint, water is a transparent colorless substance that has bonded two hydrogen atoms with one oxygen atom. Historically, societies have defined water as much more than a cluster of molecules or a resource in functional terms (Feitelson 2012). To assert that water is what society makes of it is not a novel concept. In modern times, society has relied on the scientific abstractions and has removed the historical context of the meanings associated with water (Linton 2014). Modern western societies have essentialized water to a point where it is discussed in terms of an element or a resource to be managed by private or public institutions (De Villiers 2001). This epistemological shift in societies' views of water results in a fundamental divide between the natural and social realms of water (Euzen and Morehouse 2011). In the twentieth century, water was discussed in terms of efficiency, then becoming an integral component of the current water management paradigm (Feitelson 2012). Specifically, the State became a champion in controlling water and extracting the optimal use of water at the least possible cost.

The scientific community was relied upon to develop the capacity to measure and inventory the stock of water, identify the limits of its supply through a quantitative approach to water management (Bakker 2007). This resulted in a new context for water, implying the prospect of scarcity and new roles for actors to exercise power over the allocation of what is inherently a finite resource. Ultimately, the discussion over water scarcity provided the opportunity to "control" the supply of water by vested interest (Swyngedouw 2013). Water was historically described as it circulated and flowed through the earth. In modern times, water is described as

inputs or outputs of the hydrological cycle, allowing for government and non-government actors to abstract water as a potential commodity identified as "global water" in order to articulate the global water crisis and set in motion processes and policies advocating the accumulation for water (Linton and Budds 2013, Bakker 2000). The transformation of water to a commodity in modern times provides society the ability to circumscribe an economic value to water (Polanyi 1944, Bakker 2014). Defining water as a resource in this context implies that water is either economically useful to society, or it has no value. To maximize the value of water results in its exploitation through processes of accumulation; to yield the highest return to capital or society in order to promote a maximization of wealth (Hoekstra 2000). Within this framework the question of allocation or access to water and sanitation services are reduced to technocratic approaches. The difficult question of social justice and equity as defined in terms of human rights to access to water becomes sidelined within this economic context, so too does an understanding of the water crisis as one of unsustainable demand (Bakker 2007).

1.2 A historical description of the global water development agenda. From Mar del Plata (1977) to the Sustainable Development Goals (2015).

The Mar del Plata conference, held in 1977, is described as one of the most significant water meetings held, shaping how water and sanitation services are currently managed (Biswas 2004). The Mar del Plata conference was one of a series of mega conferences organized by the United Nations to address global development issues. The themes of these conferences included; Environment (Stockholm, 1972), Population (Bucharest, 1974), Food (Rome, 1974), Women (Mexico City, 1975), Human Settlements (Vancouver, 1976), Water (Mar del Plata, 1977), Desertification (Nairobi, 1977), and New and Renewable Sources of Energy (Nairobi, 1979)(Biswas 2004). The Mar del Plata conference convened high-level political leaders to address the problems of ensuring that the world had an adequate supply of quality water to

meet the socio-economic needs of expanding populations especially in developing countries. Examining the 20-year period following the Mar del Plata Conference limited discussions appeared within the UN including water in the international political agenda (Biswas 2004). Despite this paucity of activity, the 1980s was known as the International Water Supply and Sanitation Decade. The slogan "Water and sanitation for all", was adopted not only to highlight the requirements of growing segments of the population who did not have access to clean water and adequate sanitation facilities, but also aimed to mobilize the political will and investment required to improve access to water and sanitation services for the millions of people who relied on unsafe water and sanitation services (Biswas 2004).

1.3 The Dublin Statement

The Dublin Statement adopted in 1992 is an example of a significant change in the management of water and sanitation delivery (Muller 2015). The introduction of these principles identified water as an economic good (Savenije and Van Der Zaag 2002), which was in sharp contrast to sentiments adopted 15 years earlier at the Mar del Plata conference urging the adoption of "appropriate pricing policies with a view to encourage efficient water use, and financing operational cost with due regard to social objectives" (Biswas 2004). Table 1, illustrates the four basic Dublin Principles to address the freshwater crisis adopted by World leaders in 1992.

	The four Dublin Principles
1	Water is a finite, vulnerable and essential resource, which should be managed in an integrated manner.
2	Water resources development and management should be based on a participatory approach, involving all relevant stakeholders.
3	Women play a central role in the provision, management and safeguarding of water.
4	Water has an economic value and should be recognized as an economic good, taking into account affordability and equity criteria.

Table 1: The Four Dublin Principles (ICW 1992)

The seminal Dublin Statement set out principles that formed the bases for

most of the water reform that has occurred in the past decades. Recognizing water as an economic good has specific implications (Bakker 2007). Firstly, the adoption of the Dublin Statement marked the end of water being considered to be a good provided by governments only as a public good. Secondly, the economic emphasis saw water as a finite good requiring a shift in focus towards managing water demand and increasing the efficiency of all water uses. Additionally water became a tradable good and, as a result, full cost recovery became an operating principle. The recognition of water as an economic good has implication for other conceptualizations of the values assigned to water. The definition of water as exclusively an economic good conflicts with other conceptualizations of water (Biswas 2004). In the 1990's, water and sanitation services were primarily controlled by the public sector, which was perceived as inefficient and in some countries corrupt (Birdsall 2014). In both developing and developed countries, the private sector was seen as a way to bring the required funding and efficiency to the water sector (Beecher 2013). However there are strengths and weaknesses associated with both the public and private sectors. No one, public or private sector model will fit equally well in all countries (Ostrom 2010a). Each case should be considered on its own merits and constraints, and the prevalent local conditions, countering the approach that "one size fits all" (OECD. 2009).

1.4 Millennium Development Goals established to reduce extreme poverty

In September 2000, 189 heads of states and delegates met at the General Assembly of the United Nations to set quantitative goals to address extreme poverty and many of its dimensions. An outcome of this meeting was the revitalization of international cooperation on behalf of developing countries and the establishment of eight Millennium Development Goals (MDGs). The goals identified specific targets to be achieved by 2015 to combat poverty, hunger, reverse environmental degradation, achieve improvement in the fields of education, health and promote gender equality

(Phumpiu and Gustafsson 2009). As the MDG era comes to a close in 2015, Global leaders have begun discussing with stakeholders on how to transition to the Sustainable Development Goals (SDG) for the post - 2015 development agenda. The literature states that the World has met the target of halving the proportion of people without access to improved sources of water, five years ahead of schedule (United-Nations 2012). Yet currently close to 1 billion or (14 %) of the human population lacks access to adequate freshwater (Gupta and Lebel 2010) and or 2.5 billion individuals (36 %) lack adequate sanitation services and approximately 1.1 billion people practice open defection (UNICEF 2012). Inadequate sanitation not only impacts the quality of water but also has implications on health and economic conditions. As a result of inadequate sanitation, 6000 children under the age of 5 years old die every day from water-borne illnesses (Liu et al. 2014).

The World Health Organization defines improved drinking water as sources of water that are protected from external contamination. These sources may include the use of household connections, public standpipes, boreholes, protected dug wells, protected springs and rainwater collection. Unprotected sources include unprotected wells, unprotected springs, river, ponds, vendor-provided water, and bottled water. Unprotected water sources are classified as such due to potential limitations in water quality (World Health Organization 2006). By 2025 it is predicted that close to 2 billion people will be living in countries or regions experiencing absolute water scarcity, and two-thirds of the world's population will be living under water stress conditions (FAO Water 2013). Water is essential for human well being, and a basic requirement for healthy functioning ecosystems (Postel and Thompson 2005). Adequate clean freshwater for domestic purposes, coupled with adequate sanitation services is recognized as a precondition for a healthy human life. Increasing access to adequate water and sanitization services are necessary conditions to assist in fighting poverty, hunger, reducing child mortality, promoting gender equality as well as the management and protection of natural resources. Consequently it is essential to examine the mechanisms that were developed by the United Nations to increase

access to water and sanitation services and review how they may be improved. This thesis aims to provide an exploratory analysis on the role of novel collaborative water partnerships known as Water Operators' Partnerships (WOPs) developed by the United Nations to increase access to water and sanitation services in developing countries (Rusca and Schwartz 2012). The United Nations development of alternative public – public water partnerships in a not for profit context is a response to the controversy of the private sectors involvement in the delivery of water and sanitation services in developing countries. Segments of society see the inclusion of the private sector in this novel collaborative partnerships as a compromise; others argue it is an attempt by the UN to preserve the concept of public water (McDonald 2013). The public – private debate in the delivery of water and sanitation services is fueled by the renewed participation of the private sector and non-governmental organizations in resource management, the development of market-based trading instruments and environmental governance (Bakker 2014).

The central argument of this thesis is that meeting Global water and sanitation needs requires strengthening human and institutional capacities of water operators, while meeting the dual challenges of improving services (including access, availability, and quality) and providing fair, equitable and effective delivery services. Through the exploration of the BWS - CCWD case study, this thesis analysis the hegemonic narrative on water and discussed its implication within a WOP framework. It recognizes the values assigned to water as they may relate to social, cultural, political and historical constructions of ecosystem services. At times these plural values will result in conflicts given water issues are characterized by complex and divergent interests (Lemos 2015).

1.5 Novel water operator partnership

In this thesis, the role of the water operators' partnership (WOPs) will be examined. The United Nations Secretary General's Advisory Board on Water and

Sanitation (UNSGAB) created WOPs in 2006 to accelerate the achievement of the Millennium Development Goal (MDG's) 7c. (i.e. "Halve by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation"). A WOP is defined by the UN, as any form of water operator partnerships aimed at capacity development, on a not for profit basis, and can include both public and private operators. UN – Habitat mandated the Global Water Operators Partnerships Alliance (GWOPA) to promote and coordinate activities related to WOPs at the international level (United Nation 2007). Since the inception of WOPs segments of society, including members of civil society, have argued that the inclusions of the private sector in the delivery of water and sanitation services increase the commodification of water (Boag and McDonald 2010) and results in increasing inequities rather than resolving distributive issues (Bond 2000). Thus, the establishment of WOPs as a mechanism to advance MDG 7c has resulted in tensions amongst water stakeholders.

Since the early 1950s, collaborative water partnerships have been developed to address water management issues, and have operated at different scales globally (Margerum and Robinson 2015). Collaborative partnerships are 'typically defined as inclusive decision processes that bring together multiple stakeholders, help build networks and trust, and emphasize consensus decision procedures and voluntary compliance' (Lubell, Henry, and McCoy 2010). Although the term water partnership has been used to describe a multitude of collaborative arrangements (Rusca and Schwartz 2012), typically water partnerships are categorized as Public – Public or Public – Private partnerships. Table 2 illustrates Public – Public water partnerships according to their spatial scale and to organizational definition.

	Intra-state (Domestic partnerships)	Inter-state (North-North or South-South)	Developmental (North-South)
Public authority-public authority	Municipal water provider and national water department	National water departments from two different countries	Municipal water provider in the South and a municipal water provider in the North
Public authority-non-state entity	Municipal water provider and a trade union	National water department and an NGO from another country	Municipal water provider in the South and a union in the North
Non-state entity-non-state entity	A water cooperative and an NGO in the same municipality	Unions from two different countries	An NGO in the North working with a community group in the South
Beyond twinning: multi-partnerships	Municipal water provider working with a local union and a local community group	A regional water utility working with more than one national government	A municipal water provider in the South working with an international NGO and a municipal government in the North

Table 2: Typology of four main water partnerships across organizational scales. Source: Boag and McDonald 2010.

1.6 The public – private debate

Access to improved water and sanitation services is emblematic of the broader debates over the roles of the public and private sectors in the management of natural resources (Bakker 2007). In the mid 1980's the private sector expansion into the water and sanitation sector facilitating the introduction of full – cost pricing in the management of water utilities. The ensuing public – private debate was not restricted to developing countries or rural areas, but also included those public urban water utilities in developed countries who were procured by multinational companies (Bakker 2014). The diversity of both formal and informal arrangements in the management of water utilities makes it difficult to assess the full extent of the private sectors involvement in the delivery of WSS (Bakker 2013b). In this thesis, it is argued that concepts such as public or private water are not value free (Bark et al. 2014). These concepts produce particular ways of

defining the delivery of water and sanitation services, and how water sources are governed and managed (Gunawansa and Bhullar 2013).

1.7 Expanding the debate beyond public – private

Moving beyond the public - private water debate recognizes the need for multi-stakeholder dialogue and empowering individuals at the local level to collectively manage water and sanitation services. The literature has extensively documented a number of private sector failures in meeting expectations in the delivery of water and sanitation services (Akhmouch and Kauffmann 2013, Bakker 2007). These failures have resulted in a highly politicized debate with positions closely aligned to the interest of private sector, civil society and other stakeholders with little concern for the environment and long-term sustainable solutions (Ioris 2012a).

A second element of this highly politicized debate has been to direct public attention to the role of the private sector's participation in the delivery and management of water and sanitation services (Akhmouch and Kauffmann 2013, Koo et al. 2012, Dellas 2011). One example of this new role of the private sector is their involvement in collaborative water partnerships focused on capacity development. This type of partnership focuses on capacity development versus capacity substitution, with a strong emphasis on financial investments linked to key performance indicators (KPI) (Wehn de Montalvo et al. 2013). The management of water is often provided at the local or quasi-local level. The public – private debate of the 1980's facilitated a transnational movement seeking new ways to value and manage water as well as the introduction of the concept of 'Global Water' which refers to " the global suite of water related human, physical, biological, and biogeochemical components and their interactions' or as a coupled social–ecological system" (Hoff 2009). Prior to the 1980's, there was no mention of an international water sector. Actors in the water sector were of a local nature and multilateral

agreements relating to the delivery of water and sanitation services (henceforth WSS) were limited (Biswas 2004)

The examination of values associated with water offers a point of entry into the administration of public policy and management of water and sanitation services, and an opportunity to examine the Dublin Statement on Water and Sustainable Development. Following the 1992 Dublin Statement on Water and Sustainable Development, various attempts have been formulated to deploy markets as the solution to environmental, water and sanitation challenges. Private sector solutions to WSS challenges are formulated on economically efficient growth models based on environmental conservation through the establishment of private property rights, and employing markets as allocation mechanisms (Bakker 2007). These Solutions rest on the assumption that a market mechanism would incorporate so – called environmental externalities through pricing resulting in a more efficient allocation of water and sanitation services. To further these rationale supporters of treating water as an economic good point out the failures of the State in providing adequate WSS in developing countries, given the low levels of efficiency and limited potential for cost recovery of public utilities. Market advocates argue that water is increasingly a scarce resource and therefore must be priced at full economic and environmental cost if it is to be allocated to its highest value uses and managed profitably by private water companies (Bakker 2007). Critics of the Dublin Statement often refer to this approach as the neo-liberalization of nature and question the premise advanced by the private sector given the distributional implications, and environmental impact on market approach to water governance (Kopnina 2015).

1.8 UN – Water

UN–Water was formally established by the UN High-Level Committee of Programs (HLCP) and officially endorsed by the United Nations System Chief Executives Board for Coordination (CEB) in 2003. It was conceived of as an interagency mechanism to coordinate action for achieving water-related targets set

by the UN Millennium Declaration; specifically, Target 7.C of the Millennium Development Goals. It was also meant as a mechanism for implementing decisions concerning water from the 2002 World Summit on Sustainable Development (WSSD) in Johannesburg. As described in the literature the development of UN–Water reflects a paradigm shift in global water governance, from a National level paradigm to the global water governance level (Baumgartner and Pahl-Wostl 2013). Yet UN - Water lacks formal decision making power and as such operates in the background of global water governance frameworks acting as a bridging organization advancing multilateral environmental agreements (Baumgartner and Pahl-Wostl 2013).

2 Research purpose

2.1 Knowledge gap

Although WOPs were established in 2006, there is scant empirical research on the participation of North American Water Utilities in this type of not for profit water partnerships. In this research we aim to address this gap by examining the first WOP between a North American water utility and a Central American water utility. Although defining the management of water and sanitation services in terms of the public or private dichotomy is problematic, assuming the public – private narrative as a starting point for a critical reflection on the historical concepts of the state and market failures provides a historical lens to examine the delivery of water and sanitation services to the marginalized and disenfranchised segments of society (Bakker 2013a).

2.2 Research aim of the project

The main aim of this research project is to provide an exploratory analysis of the Belize – Contra Costa Water Operators' Partnership as a case study in focusing on key success factors, weaknesses and identifying institutional reforms that are necessary to facilitate capacity development at various levels and in diverse context.

2.3 Research objectives

1. Examine the role of collaborative partnerships in the management of natural resources by identifying the role of stakeholders in the management of water and sanitation services.
   1.1. Document the BWS – CCWD case study and further develop the conceptual framework of a collaborative water partnership operating in a not for profit environment.
   1.2. Develop a framework of Water Operators' Partnerships to ensure equitable distribution of WSS in advocating a shift in the way these partnerships operate in the future.

2.4 Research protocol

In line with the research aim and objectives, a research protocol was developed. Table 3, identifies the research aim, units of observations and methods used in addressing the specific research question: what criteria are required in the design of Water Operators' Partnerships to enhance human well being while maintaining sustainable ecological flows and an equitable delivery of water and sanitation services?

Aims	The main aim of this research project is to document the BWS – CCWD Water Operators' Partnership and identifying institutional reforms that are necessary to facilitate capacity development at various levels and in diverse organizations.		
	Process in meeting research objectives	**Units of Observation**	**Methods**
	1. Examine the literature on the institutional and governance architecture for WSS.	1.1 Literature review. 1.2 Interviews. 1.3 Archival documents.	1.1.1 Analytical review of institutional and governance literature based on common pool resources framework.
	2. Examine the role of collaborative partnerships in the management of natural resources, identifying the role of stakeholders in management of water and sanitation services.	2.1 Literature review. 2.2 Interviews. 2.3 Archival documents.	2.1.1 Analytical review of institutional and governance literature based on common pool resources framework. 2.2.1 Interview protocol. 2.2.2 Participant observations. 2.3.1 Archival documents.
	3. Document the BWS – CCWD case study and further develop the conceptual framework of collaborative water partnership operating in a not for profit environment.	3.1 BWS –CCWD stakeholder. 3.2 BWS – CCWD WOP funders. 3.3 GWOPA Participants. 3.4 Belize Domestic water end-user.	3.1.1 Interview protocol. 3.1.2 Participant observations. 3.1.3 Archival documents. 3.2.1 Interview protocol. 3.2.2 Archival documents. 3.3.1 Interview protocol. 3.3.2 Archival documents. 3.4.1 Interview protocol. 3.4.2. Archival documents
	4. Develop a framework of Water Operators' Partnerships to ensure equitable distribution of WSS in advocating a shift in the way these partnerships operate in the future.	4.1 Literature review.	4.1.1 Institutional framework. 4.1.2 Common pool resources. 4.1.3 Ecosystem service framework. 4.1.4 Novel nested institutional framework.

Table 3: Research Protocol

3 Literature review:

3.1 A Governance: Road map

There is mounting scientific evidence that socio-ecological systems are being modified beyond their normal operating conditions (Kuzdas et al. 2015). A major global challenge facing humanity is achieving wellbeing for all while simultaneously maintaining biophysical processes and ecosystem services within scientifically informed boundaries of sustainability (Dearing et al. 2014). Accessibility to water resources and services will be among the major challenges facing close to fifty percent of the human population in the near future (UN Water 2011). The management of water resources is often viewed as a technological issue (Akhmouch and Kauffmann 2013). History has demonstrated that social institutions and political

relationships are as critical as infrastructural considerations and technological advancements in providing adequate services across water supply, sanitation services and other water needs (Morgan and Smith 2013). The successful management of water and sanitation services encompasses governance processes, capacity development, social equity as well as environmental issues at various spatial and temporal scales. Ultimately the delivery of adequate water and sanitation services is a local issue, even if global concerns such as climate change influence them(Bakker 2007).

The increased competition for limited fresh water resources among agriculture, fisheries, and urban and industrial users has resulted in increased conflicts and criticism of traditional approaches in the management of water and sanitation services (Pahl-Wostl et al. 2011). The traditional approach focused on a top-down, agency dominated approach with little provisions for public participation (Hill 2013). Institutions in this research are defined as systems of rights, rules and decision-making processes that assign roles to participants and give rise to social practices amongst participants (Gupta and Pahl-Wostl 2013). Environmental and resource governance regimes are types of institutions that address the use, and management and distribution of ecosystems services and resources. Institutions are distinct from organizations, which play a role in the administration and management of the rules and norms established by institutions. As described by Ostrom (2009), an organization is groups of individuals bound by some common purpose to achieve objectives whereas an institution is any form of constraint that humans devise to shape human interaction. Institutions set the rules by which the organization operates (Ostrom 2009).

Shifting from a technological approach in the management of water and sanitation services requires novel institutional and governance frameworks (Lobina 2012). A collaborative approach in the delivery of water and sanitation services is seen as a shift from the traditional top down, agency dominated approach, to a greater bottom up process involving a variety of government and non-governmental

stakeholders (Kallis, Kiparsky, and Norgaard 2009). The development of collaborative institutions such as GWOPA entails stakeholders agreeing to a set of institutional rules and norms that will structure the decision making process used in the water operators' partnership. As reiterated by Ostrom (2009), the institution defines the rules for collective choice, while the management plan defines the operational rules.

Young's institutional research emphasizes three research foci: causality, performance and design. Causality examines the impact the institution has on influencing the actors in a variety of social settings. Performance examines the institutions efficiency, equity, robustness and sustainability. The selection of what is to be assessed and measured in terms of outcomes or impacts of the institutional performance remains a challenge. Given that water and sanitation institutions interact with a wide range of stakeholders and political factors, institutional principles should focus on using a diagnostic approach applicable to a wide range of possible interactions with stakeholders, and environmental institutions (Ostrom 2007). Globally since the early 1990s, collaborative water partnerships have been the main focus for improving the service delivery of water and sanitations services (Margerum and Robinson 2015). This collaborative approach attempts to include stakeholders from government, nonprofit, private sector and the general public in a deliberative process to address complex water issues. The governance of social-ecological systems associated with water management requires recognizing the different perspectives, capacities and goals of these diverse stakeholders (Margerum and Robinson 2015). As described in the literature, the fit between institutional governance and social processes must take into consideration the cross-scale interactions, at both the temporal and spatial scales of the various stakeholders. Identifying the dimensions of institutional fit are central in the transfer and integration of knowledge in the capacity development of water operators to address local water management issues (Lebel et al. 2013).

Stakeholders are increasingly analyzing the sustainable use of ecosystem services to understand human – nature relationships through both monetized and

non-monetized values associated with ecosystems (Schröter et al. 2014). In many contexts, healthy ecosystem services are a prerequisite for the provisioning of clean drinking water and the decomposition of waste. Understanding the functioning of ecosystems services is essential in examining human-well being given that ecosystem services are embedded in social-ecological systems (Anderies, Janssen, and Ostrom 2004). As described in the literature, the common pool characteristics of ecosystem services suggests that market mechanisms are not always suitable in the management of water and sanitation services (Muradian and Rival 2013). The governance of ecosystem services should be addressed within a nested institutional or multitiered approach given the complexity of addressing and recognizing the different perspectives, capacities and goals of these diverse stakeholders (Yashiro, Duraiappah, and Kosoy 2013).

3.2 Historical development of collaborative Water Partnership

The understanding of what constitutes a public or private good or service and the role of the public and private sectors has changed radically in the last decade (Brinkerhoff and Brinkerhoff 2011). In examining the historical development of WOPs, several concerns are raised. The first deals with the terminology used in defining public and private water operators. It must be questioned what the term "public" means in water operator partnerships(Boag and McDonald 2010). In the literature, the term "public" is seldom defined as part of the discourse on privatization or commercialism of the water sector. The second is the engagement of neoliberal notions of New Public Management incorporating elements of commodification or commercialization in the delivery of water services with a public utility similar to the private utility participation(Bakker 2007). A final concern is the normative values associated when assessing success or failure of Public – Public Partnerships (PUP) when compared to Public – Private Partnerships (PPP) (Boag and McDonald 2010). These three concerns form part of the examination to identify what criteria are essential in designing WOPs (Seppälä, Hukka, and Katko 2001).

The participation of both the public and private sectors in water management can be traced to the beginning of the development of water and sanitation systems (Hukka and Katko 2003). Although historically the public sector has dominated the delivery of water and sanitation services, many types of service modality, such as community based, private utilities and co – production service providers have existed. The private sector has been involved in water management in a number of cities around the world, such as London and Paris since the 19th century (Goubert 1989, Euzen and Morehouse 2011).

3.3 Public – Public Partnerships (PUP)

The introduction of the partnership concept in the water sector emerged after World War II, not as a means to improve the delivery of water services, but rather on strengthening inter- municipal or intercultural collaborative efforts providing a political foundation for public – public partnerships (Katko, Juuti, and Schwartz 2012). These types of collaborative partnerships were often referred to as twinning projects. In the literature, there is no specific definition of what constitutes a twinning project, though traditionally it refers to two public utilities voluntarily cooperating with the goal of introducing new procedures, technologies or management systems in the daily operations of the water utility (Rusca and Schwartz 2012). In developing countries, twinning arrangements in the 1960s and 1970s should be understood from a postcolonial context. During the colonial period, a two-system approach to water and sanitation services developed. The colonial elite, an economically powerful minority group, developed a specific set of principles for public water utilities reflecting a highly standardized and globally applicable service provision ideal. The challenges to meet this standardized idea provided by a single water utility resulted in twinning projects having a strong technological focus given the required utility infrastructure and technical expertise. Twinning projects during this period were predominantly between public utilities given the view that water and sanitation services were the responsibility of the public sector (Katko, Juuti, and Schwartz

2012). The term partnership in the water sector has been used to describe various forms of cooperation arrangements between water operators. The literature describes twinning partnerships as one of the first formalized examples of water partnerships (Boag and McDonald 2010).

In the early 1980s, there was a significant movement to change the modalities of public participation in the management of water. Governments in OECD member countries were under increased pressure to reduce expenditures in large water projects given their under performance resulting in the inquiry on the effectiveness of the public sector. This lead to the development of a new model for public administration termed New Public Management (NPM)(Denhardt and Denhardt 2000, Hood 1995). The move to lessen or remove the differences that existed between the public and private sector, and a shift to the increase in results- oriented management were central themes in the water management model of the 1980s and 1990s, in both developing and developed Nations. The World Bank played a central role in the internationalization or globalization of this management approach (Bakker 2013a). Within the context of the economic slowdown that occurred in the early 1980s in most OECD member countries, international development banks, bi-lateral donors and water sector professional were advocating increased private sector participation through the development of public – private partnerships (PPP) in the delivery of water and sanitation services (Prasad 2006).

Several of the basic elements of NPM are central to understand the interplay of the conflicting elements (i.e. shift to public – private or introduction of private sector) of water partnerships. Hood (Hood 1995) identifies several key concepts that were prominent in the NPM model introduced in the water and sanitation sector to improve performance of water utilities. Table 4, summarizes the seven dimensions required in the transformation of public water management. Primarily the working environment needs to shift to a competitive approach when providing services compared to orderly hierarchies as done in the past. Public sector employees would be evaluated based on measurable performance standards.

	New Public Management
1	A shift towards separate managed business units based on "service to be produced" with budgets, mission statements and managerial autonomy.
2	Reorganizing public sector departments with management practices drawn from the private sector. " Focus on results"
3	A shift to greater competition between public and private sector actors providing water and sanitation services.
4	Policy focused on seeking least costly alternatives to delivery or services and use of resources. " Do more with less"
5	Senior management exercising a more active participation in day-to-day operations of business units.
6	The introduction of measurable standards of performance with an emphasis on accountability.
7	Organizational shift to performance base career advancement and compensation of employees, versus education or expertise focus.

Table 4: Summary of New Public Management concepts
Adapted from (Hood 1995)

Remunerations would be linked to achieving these standards versus based on education, service or level with the organization. Hood (Hood 1995) identifies that not all OECD countries have adopted the NPM model to the same degree and that variations of the themes was prevalent in developing countries.

3.4 Public – Private Partnerships (PPP)

The introduction of PPP terminology in Argentina in the early 1990s allowed for the privatization of the water and sewage systems that serviced the population of Buenos Aires (Franceys 2008). The introduction of a PPP concept appeared less threatening to society, than privatization of the water system. This introduction of PPPs was based on the expectation that increased private sector technical and managerial expertise would increase efficiency and reduce public budgetary pressures. PPPs were also seen as a method to raise additional funds from the private sector for infrastructure investment(Prasad 2006). As described in the literature, PPPs focus on the replacement of public service providers with private service providers (Furlong 2010). Conversely, twinning arrangements focused on the development or the capacity building aspects of one of the partners. In relation to

these twinning arrangements, the PPP model has remained controversial particularly on the involvement of the private sector (Bakker 2013a).

At the 4th World Water Forum held in Mexico in March 2006, Ryutaro Hashimoto, Chairman of the United Nations Advisory Board on Water and Sanitation, stated that the majority of the MDG's would not be achieved without resolving WSS issues in developing countries. Vincente Fox Quesada, the former President of Mexico, highlighted in the opening statements to the Forum, that water is both a human right and public good. The ensuing discussions at the 4th Water Forum highlighted the debate concerning the roles of the public and private sectors in the management of water and sanitation services in developing countries to achieve the MDGs. At the conference, there was growing recognition of the widespread failure of the private sector to facilitate access to the poor to water and sanitation services (Prasad 2006).

Currently approximately 1 billion people live without access to improved drinking water sources and 2.5 billion lack access to improved sanitation services (UNICEF 2012). Although the complexity of problems may vary, water operators in developing countries often experience similar problems; such as weak financial and operational management skills, absent or weak customer service orientation, and political interference and weak governance of institutional frameworks. The development of a collaborative mechanism between performing and non-performing utilities is seen as a first step in developing the capacity of water operators in developing countries to provide improved WSS to poorer segments of society (Breevelda, Hermansa, and Veenstrab 2013).

3.5 Hashimoto Action Plan: Water Operator Partnerships (WOP)

As part of the Hashimoto Action Plan in 2006 to assist developing countries achieve their Water and Sanitation Millennium Development Goals, the United Nations Secretary General's Board on Water and Sanitation (UNSGAB) mandated UN-Habitat to coordinate activities related to the development of Water Operators' Partnerships (WOP) (Rusca and Schwartz 2012). The WOP process is meant to

provide a means for water operators to systematically communicate amongst themselves, share common experiences with the goal of improving the capacity of water operators in the delivery of WSS. The WOP process provides a flexible yet structured cooperation platform amongst water utilities. Given that publicly owned water utilities represent approximately 90 % of the world's piped water, small incremental improvements of water operators' operations is argued to result in large contributions towards achieving the MDGs for WSS (United Nation 2007). A WOP can be initially formed as a method for two water operators to exchange information in attempts to discover common grounds for a more elaborate collaborative partnership (Breevelda, Hermansa, and Veenstrab 2013).

Capacity development in water operator partnerships is based on the assumption that operators can benefit from sharing their knowledge and experiences. The GWOPA Secretariat has identified a key component of WOPs as being the inclusion of all stakeholders, involving the private sector, non-government organizations (NGOs), and other stakeholders who may contribute to improving the delivery of water within a not for profit context (Wehn de Montalvo et al. 2013).

The availability of adequate safe water supplies is a prerequisite for enhancing human well being (McGregor, Camfield, and Woodcock 2009). One of the characteristics that WOPs share with PUPs is to engage in not for profit partnerships built on solidarity and knowledge sharing to improve the efficiency of the water operator (Rusca and Schwartz 2012). WOPs provide for multi-stakeholder partnerships at the transnational level, with water utilities in developed countries, whether in the public or private sectors, acting as mentors to developing country water operators. Despite these advancements, the progress to improve access to adequate freshwater and sanitation services has been a slow and complicated process. Changing the approaches water operators' use in developing countries to manage the delivery of WSS requires developing their capacity to challenge path dependencies and develop innovative local solutions (Wehn de Montalvo and Alaerts 2013).

Since the implementation of the Hashimoto Action Plan, UN-Habitat hosts the Secretariat of the Global Water Operators Partnerships Alliance (GWOPA). The UN-Habitat mission is to promote socially and environmentally sustainable human settlements with development focusing on building a brighter future for villages, towns, and cities of all sizes (Habitat 1996). The availability of improved water and sanitation services is identified as being critical to the overall urban development (World Health Organization 2006). UN-Habitat provides both policy, technical, and financial support to governments and local authorities, contributing to the achievement of water and sanitation goals. Subsequently to its foundation GWOPA has been promoting and enabling water operators' partnerships (WOPs) aiming at capacity development of water operators and scaling up peer-to-peer support between water and sanitation operators around the world.

3.6 Capacity development

Capacity development refers to: "the approaches, strategies and methodologies used by developing country, and/or external stakeholders, to improve performance at the individual, organizational, network/sector or broader system level" (Bolger 2000). As described in the literature, WOP partnerships' focus on capacity development versus capacity substitution and extend beyond the historical twinning arrangements given the possible participation of the private sector in the partnership(Wehn de Montalvo et al. 2013). A second element differentiating historical twinning arrangements from WOPs is the partners agreeing to a code of conduct and adhering to the following eight guiding principles: a) inclusiveness, b) non-profit based partnerships, c) mutuality of benefit, d) transparency, e) learning from the past and others, f) supporting WOPs processes worldwide, g) fostering sustainable change and h) building a culture of solidarity. WOP partnerships are often associated with third party funding such as International Development Banks or Multilateral-funding agencies, where accountability for results in both capacity development and key performance indicators (KPIs) are identified as critical funding

requirements. Capacity development is linked to the availability of funds and resources and therefore is not "power neutral". Recognizing the issue of power in designing capacity development projects to ensure a balance between the process (how to improve capacity), product (the new capacities) and the results (outcomes) Capacity development efforts may result in winners and losers given the competition of resources and control over them (Morgan 2006). A common practice is for WOP partners to sign a project document that identifies specific targets and timelines to be achieved as part of WOP process. This project document may at times be referred to as a contract between the partners and funding organization (Katko, Juuti, and Schwartz 2012). This document should not be confused with traditional management contracts. In a WOP, the focus is on developing peer-to-peer relationships, where the mentor water utility acts as the catalyst to transform the mentee water operators into efficient water operators in their respective regions. It is assumed that by focusing on specific targets or key performance indicators, the operational capacity of the mentee water utility will improve over time. As stated in the literature, this enhanced operational capacity can be aligned with supportive investments to improve services to existing end-users and extend WSS to areas of the population not currently serviced (Wehn de Montalvo et al. 2013). Within the WOP model, the funding or external agent can at times be viewed as a change agent or trainer orienting the development of the mentee water operator to meet specific key performance indicators.

In large part it has traditionally been the responsibility of governments and NGOs to facilitate the transfer of the knowledge required. The private sector focuses principally on the technological or capacity substitution to achieve required improvements in operations. As described in the literature, capacity development often not only requires new knowledge but at times re-learning methods and ways to perform operational practices. This requires a long-term commitment to developing capacity and an understanding of the new explicit knowledge requirements as well as

how to incorporate this knowledge into local operations. This capacity enhancement incorporates local challenges and constraints (Wehn de Montalvo and Alaerts 2013).

Historically development policies have focused on the infrastructure and technical investments to increase efficiencies in water operator facilities. Currently, there is a shift recognizing the need to invest in capacity development projects that rely on transferring capabilities from water operators in developed countries to achieve more effective and sustainable capacity of water operators in developing countries. Although development banks and bilateral development agencies have recognized this shift and focus on individuals and organizations in the context of the water sector, capacity development often needs to be extended to include the development of capabilities of multiple actors and their interconnection at different levels (Wehn de Montalvo and Alaerts 2013). A central objective of GWOPA is to incorporate this expansion of capacity development within WOPs to address the various levels of interconnection of stakeholders in the delivery of WSS. As described in the literature these levels of interconnection can be defined as the following: (1) knowledge, experience, skills and attitudes of the individuals; (2) the operating procedures, management and organizational expertise; (3) the legal, fiscal, policy and administrative frameworks of the sector; and (4) the collections of various interest groups, cultures, orientation, and social values. WOPs consist of formal or informal training, or sharing of knowledge and experiences with interventions aimed at facilitating change processes, which are not always easily identifiable or measurable in terms of outputs or standard metrics used by funding agencies (Wehn de Montalvo et al. 2013). Identifying the success of capacity development of water operators is complex to measure and requires a long-term approach to achieving objectives. Institutional frameworks that facilitate and support multitiered and multi – stakeholder engagement are central to increasing the availability of WSS for larger segments of the population in developing countries. It is important to recognize that measuring outputs or results is difficult but forms an integral component in increasing WSS delivery to poorer segments of society. Water operators in developing

countries need to develop and use metrics that ensure the efficient and effective use of water resources for local end-users. This will safeguard the sustainable use and availability of WSS for larger segments of the local population.

WOPs were conceived as mechanisms to facilitate what is often referred to in the literature as the virtuous cycle of water services (Akhmouch and Kauffmann 2013). The cycle refers to satisfying water operators' need to focus on providing a sound administration of water services to build trust amongst end-users and policy administrators, who in turn will see value in paying a fair and equitable fee for water services. The revenue generated from these fees will be used to cover costs of operating the water utility and potentially allow for an expansion of the water network. The focus on revenue generation to cover operational costs of water utilities is often a contentious issue with certain stakeholders involved in the delivery of WSS, who see this approach as resulting in a narrow value on water (Akhmouch and Kauffmann 2013).

3.7 Latin America and the Caribbean (LAC) context

Currently close to 51 % of the 220 million people living in poverty in the LAC region lack access to adequate water services (Andrés, Schwartz, and Guasch 2013). During the 1990s, most LAC countries experienced substantial reforms in the public sector. These reforms lead to the increase of the private sector in the delivery of water and sanitation services. The private sector advocated the promotion of increased competition within the water sector as the main instrument for improving accessibility, quality and efficiency of services (Ioris 2012b). Some reforms successfully achieved their objectives. For example, access to potable water increased from 73 % of the population in 1990 to 86 % in 2010 in the LAC region (WHO–UNICEF 2008). However the reforms experienced increased political opposition and strong dissatisfaction with privatization and liberalization policies of water and sanitation services(Bonnet et al. 2011).

The Water Operator Partnership – Latin America and Caribbean (WOP-LAC) was established as a Regional Platform of GWOPA in 2007 in Bogota. UN-Habitat and Inter-American Development Bank (IADB) worked in collaboration on the WOP-LAC Secretariat in supporting the MDGs related to water and sanitation in Latin America and the Caribbean. UN-Habitat involvement on the steering committee ensured that the values attributed to water conformed to GWOPA's vision of plural values for water. The coordinated efforts by UN-Habitat as well as financial support from IADB resulted in considerable achievements by WOP LAC. In the initial development of the WOP – LAC, concerns were raised by members of civil society that the focus on the expansion of water utilities would result in the commercialization of public water. Currently the Latin American Association of Water and Sanitation Operators (ALOAS) acts as the WOP LAC Secretariat. This change in the composition of the WOP-LAC Secretariat is facilitating the introduction of plural values for water in the WOP process in order to move away from a market dominant approach to valuing water and sanitation services.

3.8 Cochabamba in Bolivia

The Water War in Cochabamba in Bolivia is an example of the strong opposition to the privatization of the water sector in the LAC region. The strong opposition was based on increases of the price of water up to 200% (Olivera and Lewis, 2004) as well as the continued exclusion and marginalization of indigenous populations (Crespo and Laurie, 2007). Until the 1980s, public operators were responsible for water and sanitation services in the LAC region. LAC governments were directed to the private sector to enable financial security for necessary infrastructure development while the private sector saw the opportunity to invest in emerging economics (Checchi, Florio, and Carrera 2009). LAC government's experienced strong political pressure for the devolution across all areas of government agencies, creating the conditions for a shift toward decentralized control of water and sanitation services. The changes in the water sector comprised three

main elements: decentralization, regulation, and private sector participation in water utilities.

In 1988, Chile became the first country in the region to shift the responsibility of water provision to the private sector followed by Mexico and Argentina. A second wave occurred in the mid 1990s with Peru, Colombia, Bolivia, Brazil and Central American countries enacting legislation to transfer responsibility to the private sector. By the late 1990s, most LAC countries had enacted measures to privatize the water and sanitation sector. As measures to counter political pressures and to control the private water utilities, several LAC countries created national regulatory agencies for water. These national regulatory agencies were fashioned similarly to the Water Services Regulation Authority model developed in the United Kingdom. However, the agencies did not have final authority to determine tariffs (e.g. Peru), and regulatory functions were often organized at the state or provincial level (e.g. Argentina, Brazil, and Mexico). National regulatory agencies were usually responsible for tariffs, approval of financial plans and objectives, oversight of the quality of water service, and protection of end users. Although the coverage for water and sanitation service increased during the last two decades of the 20th century, these improvement are consistent with existing trends and would arguably have occurred even in the absence of private sector participation (Andrés, Schwartz, and Guasch 2013).

Additionally, there exists a sharp divide between rural and urban water and sanitation coverage within the LAC countries. Access to water and sanitation services in rural areas tends to be much lower. Compared to urban water service coverage more than 86 percent of the urban population of most countries in the region have access to safe water, rural access in Brazil (58 %) and Chile (59 %) is lower than in much poorer African countries, such as Burundi (78 %) and Zimbabwe (74 %) (Fay and Morrison 2006).

4 Methodology

This research used qualitative content analysis to provide a theoretical framework examining institutional and governance frameworks for global water partnerships. This research is based on observations, interviews and participation in job shadowing sessions completed in the field as part of the second phase of the BWS – CCWD WOP process. Archival documents were also collected from the various stakeholders. Contextual factors such as the political, socio-economic and environmental elements within which the water operators' function were also examined through an extensive literature review.

4.1 Conceptual Framework

In the development of the conceptual framework, this research integrates insights from several bodies of scholarship. These include: collective action and common pool resources (Aligica and Tarko 2012, Ostrom 1990) the interactions between institutions that operate on different spatial scales, the fit (or misfit) and interplay between institutions (Young 2002); and an emerging nested institutional framework that articulates the linkages between social–economic processes that are related to human well-being (Kolinjivadi, Adamowski, and Kosoy 2014). These theories provide a framework to contextualize the management of water resources and identify structural variables currently present in the BWS – CCWD case study.

As identified in the Conceptual framework Figure 1, this research examines common pool resources, self-organizing and self-governing theories with a particular focus on water resources. The second theoretical component of this research examines institutional and governance frameworks. It focuses on the examination of the typology of collaborative water partnerships while drawing attention to opportunities and limitations within the current institutional and governance frameworks within which they operate (Boag and McDonald 2010).

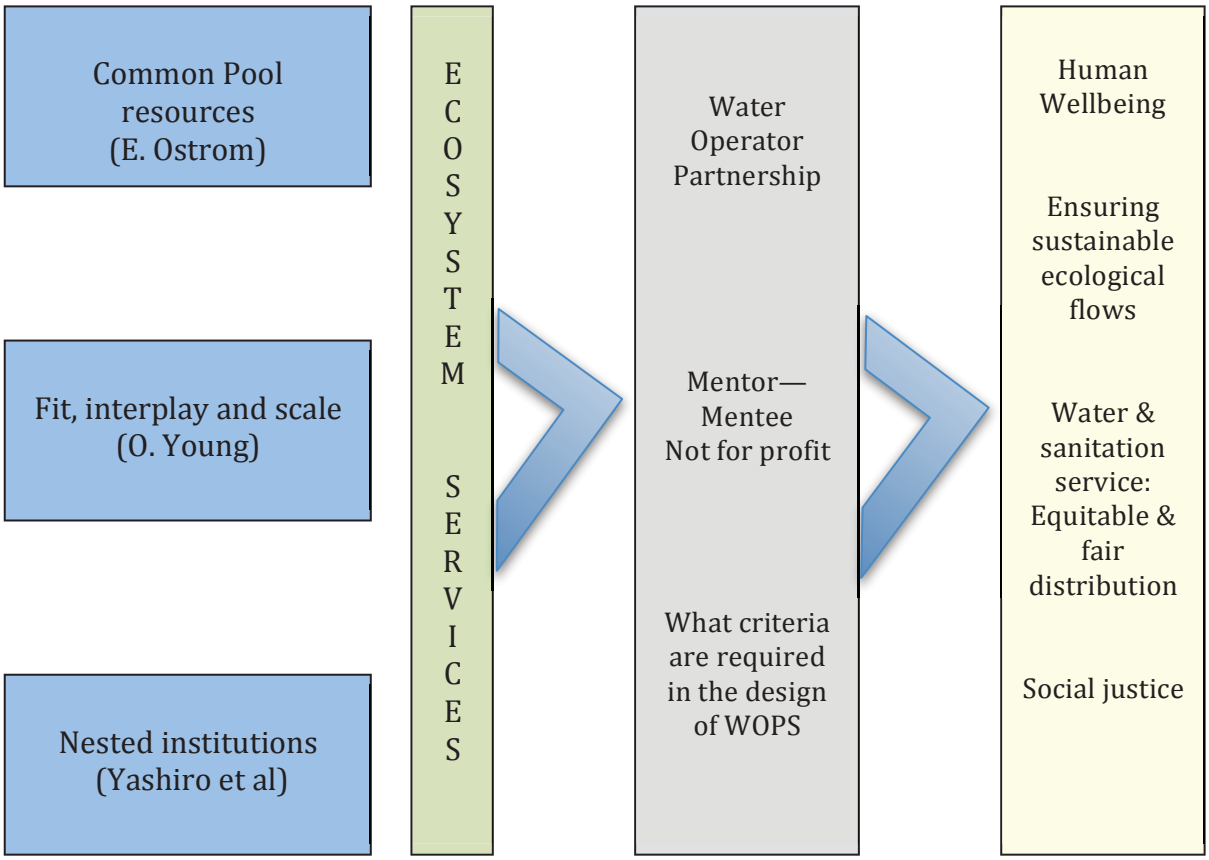

Figure 1: Conceptual framework

Key concepts and interaction of the partners within a water partnership and linkages to the required criteria for water operators.

As described in the literature, uses related to the management of the commons have been one of the key themes examined in the field of water governance (Bakker 2007, Ostrom 2012). The challenge is to halve the proportion of people without sustainable access to safe drinking water and basic sanitation while maintaining sustainable ecosystem services provision. This will require the combined efforts of the public – private and civil societies; stakeholders' though organizing these groups remains an ongoing debate. Furthering this debate beyond the current public - private discourse is necessary given the Global challenges of climate change,

economic inequality and degradation of ecosystem services faced by developed and developing countries (Bakker 2010).

In the development of the conceptual framework offered in this research, several iterative steps were followed to address the research question. A preliminary literature review and a systematic mapping of GWOPA operator profiles were completed in preparation for the GWOPA Steering Committee Meeting held in February 2013. Subsequent to the GWOPA Steering Committee meeting, the primary researcher of this study presented the preliminary operator profile findings, which resulted from a more detailed literature review.

The development of the research protocol and questionnaire used in the semi- structure interviews as part of the BWS – CCWD case study emerged out of the second literature review. During the World Water Week GWOPA sessions held in September 2013, interviews were carried out with members of the GWOPA Secretariat and Boosting the Effectiveness of Water Operators' Partnership (BEWOP) research team to discuss integrating components of the methodological framework into the BWS – CCWD case study. The BEWOP methodological framework was presented to a selected group of participants at the BEWOP workshop held in November 2013 in Barcelona prior to the second GWOPA General Assembly meeting. At this workshop, further interviews with senior management representatives from BWS and CCWD were conducted. The field study for examining the BWS – CCWD case study took place between February and April 2014.

4.2 Research process

This research has three reflective phases involving the incorporation and synthesis of new information emerging from GWOPA meetings, interviews and literature reviews. Figure2 illustrates the research process and how these three reflective phases are incorporated into the project design and action plan to address the research objectives and research question.

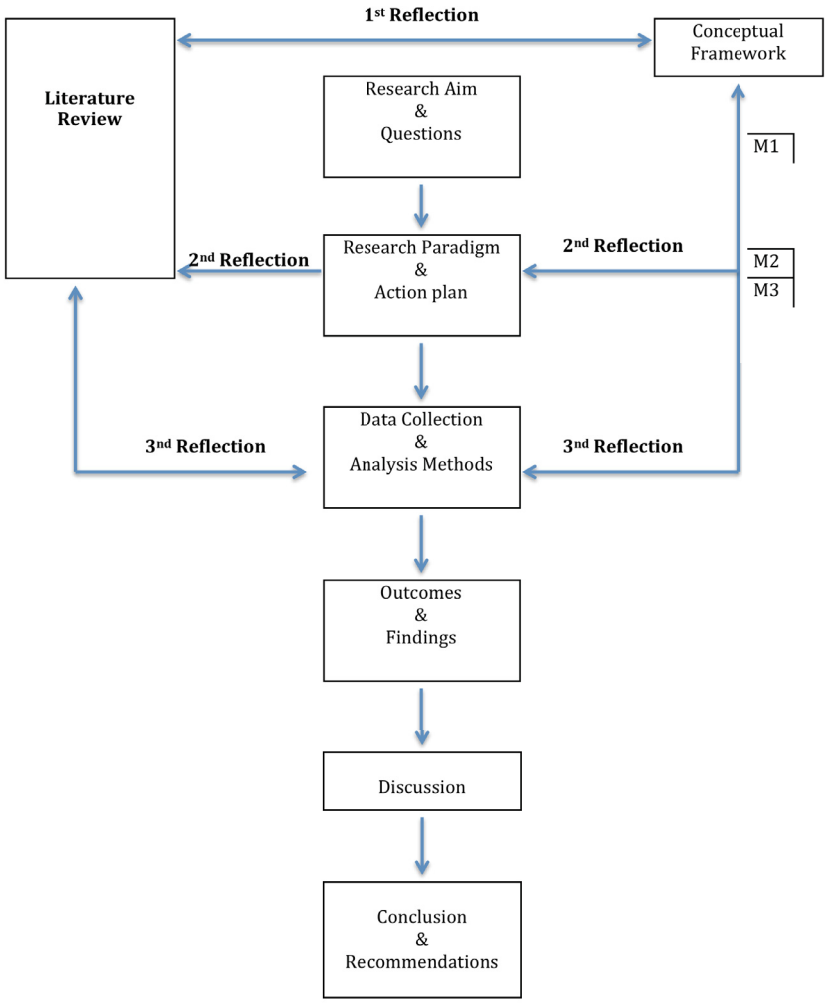

Figure 2: Reflective phases of research process. Adapted from(Medema 2008)

In the first reflective phase, a literature review was conducted examining the institutional and governance frameworks for water and sanitation services as well as the role of collaborative partnerships in the management of natural resources. As described in the literature, uses related to the management of the commons have been one of the key elements examined in the field of water governance (Ostrom, 1990). The literature review also revealed that little research has been conducted on collaborative water partnerships operating within a not for profit platform (Boag and McDonald 2010). A second component of the first reflective phase was a preliminary mapping of Global Water Operators' profiles, identifying trends and

criteria currently utilized by water operators globally. The findings of the preliminary mapping were presented at the 5th GWOPA Steering Committee Meeting held (M1 of Figure2) at the Headquarters of 'Le syndicat interdépartemental pour l'assainissement de l'agglomération parisienne' (SIAAP) in Paris. The presentation of the Global Water Operators' profiles focused in part on capacity development of water operators through the following four questions:

1. Was the Utility staff capacity enhanced by the WOP?;
2. Have Utility practices changed as a result of the WOPs?;
3. Have service provisions improved as a result of the WOP?,
4. Has a WOP led to increased access to improved water and sanitation services?

The second reflective phase (M2 of Figure2) captured a series of meetings and discussions with experts in the financial and water and sanitation sectors as well as global water operators' in preparation for meetings with the Belize Water Service – Contra Costa Water District Water participants. The insights gained from this reflective stage were then examined with the relevant literature with the aim of improving the initial conceptual framework. The second reflective phase included outcomes from a series of workshops and meetings (M3 of Figure2) that were held in Barcelona, Spain at the Bi-Annual Global Water Operators' Assembly meeting. A key element of this phase was the introduction of the BEWOP Framework for Analyzing Water Operator Partnerships to participants who attended the BEWOP workshops. The questionnaire developed as a result of this BEWOP workshop forms an integral component of the semi-structured interviews conducted as part of this research. A summary of primary and secondary data sources is illustrated Table 5.

	Global Water Operator Alliance	Belize Water Service	Contra Costa Water District	Inter America Development Bank	American Water Works Association & International Water Association	Belize
Sources of data	3 Participant observation events. 3 Semi-structured interviews. Archival documents.	26 Semi-structured interview BWS employees. 215 Household questionnaires. Archival documents.	21 Semi-structured interviews. 20 Participant observation events. Archival documents.	3 Semi-structured interviews. Archival documents.	Archival documents.	5 Semi-structured interviews. 13 Water Boards members. 10 End users. Archival documents.
Role in Water Operator's Partnership	Secretariat	Mentee	Mentor	Financial (LAC) Secretariat (LAC)	Identify potential WOP partners.	Unaware of WOP process.
Motivation of Water Operator's Partnership	Promote and enable WOPs.	Operational focus.	Operational focus.	Promote technical cooperation of Water operator.	Improve operations developing utilities.	Efficiency & support rural users.
Evaluation of Water Operator's Partnership		Positive	Positive	Mixed	Mixed	Interested in WOP process.
Capacity develop focus	Capacity enhancement to increase WSS access to the poor.	Reduction of bad debts. Non-Revenue Water. (NRW) Employee Safety.	Disaster preparation. Employee moral.	Accessing market mechanisms for financing.	Management & technical skills of employees.	Urban water sector & Rural water sector.
Challenges for Water Operator's Partnership	Development of alternative PUP model.	Identifying mentors. Funding for WOP.	Identifying mentee Funding for WOP.	Securing funds. Identifying suitable partners.	Commitment of US water utilities.	Method to operationalize to achieve MDG 7c.
Definition: End User		Identified as ratepayer.	Identified as ratepayer.	Identified as ratepayer.	Identified as ratepayer.	No knowledge of WOPs.

Table 5: Summary of primary and secondary data sources

The final reflection was completed as part of the field visits to Belize and the Contra Costa water district in California. As part of the final reflection, additional literature was investigated to help analyze the data collected. This phase of the research occurred in March 2014 in the Contra Costa water district and in April 2014 in Belize.

4.3 Fieldwork

A series of meetings with the GWOPA steering committee members, partner organizations and water operators were conducted in which the primary researcher

used the opportunity to engage and interview key informants. Interviews with stakeholders who interact with the Global Water Partnership Alliance were also conducted in addition to the exploration of the case study in California, USA and Belize. Table 6, summarizes this information. A second series of interviews were completed with stakeholders who interacted with the Global Water Partnerships Association but were not necessarily involved in the Belize – Contra Costa partnership.

Location	Dates	Event	Activity	Participants	OUTCOMES
Paris France: SIAAP HQ	Feb 28th. to March 1st. 2013	GWOPA General Assembly.	5th Steering Committee meeting.	GWOPA Steering Committee, partner organizations, observers and Secretariat members.	Presented preliminary findings. Primary & secondary data.
Stockholm	September 1st. to 6th. 2013	World Water Week.	GWOPA & BEWOP conference meetings.	GWOPA Secretariat members and select steering committee members.	Draft BEWOP framework. GWOPA strategic plan.
Barcelona Spain	November 25th. to 26th. 2013	BEWOP consultative workshop.	Final of three consultative workshops.	Chaired by UNESCO – IHE researchers plus 20 participants diverse backgrounds associated with GWOPA, Incl. water operators, private, financial institutions.	BEWOP methodological framework.
Barcelona Spain	November 27th. to 29rd. 2013	2nd GWOPA Congress and General Assembly.	2nd GWOPA Congress and General Assembly.	Steering Committee, partner organizations, observers and Secretariat members.	Interviewed Sr. Managers: CCWD & BWS.
California	February 2014	Fieldwork	27 interviews. 2 meetings.	CCWD employees: 15+3 Bay Area water utility employees: 3 Other 6	Primary and secondary data. Archival documentation.
Belize	March - April 2014	Fieldwork	54 interviews. 215 Household surveys.	BWS employees. Gov't employees. Village water boards. Domestic users.	Primary and secondary data. Archival documentation.
Washington	July – Sept 2014	Financial Institutions.	Phone interviews.	Inter-American Development Bank.	Primary and secondary data. Archival documentation.

Table 6: Summary of meetings, interviews and periods of fieldwork

The main source of primary and secondary data collected emerged from attending phase two of the BWS – CCWD WOP. A series of interviews were conducted with participants of phase one as well as observations gleaned from a series of job

shadowing exercises at CCWD facilities. A second source of primary data collection entailed a series of interviews conducted as part of a field study in Belize. Content analysis of interviews was conducted to identify key themes emerging from the case study and from perspectives of key informants within the GWOPA platform.

5 Analysis of the WOP framework

5.1 Global WOP analysis

At the 5th GWOPA Steering Committee meeting held in Paris in February of 2013. The GWOPA Secretariat presented the 5-year Strategy (2013-2017). A key element of the strategic plan was to mobilize more resources to support WOPs through national and regional WOP platforms. The meeting scheduled was extended to a two-day format allowing for a meaningful and open dialogue between participants. The results of the GWOPA database analysis were presented to the 39 members of the Steering Committee, partner organizations, observers and Secretariat members. The preliminary mapping of the GWOPA database identified 300 water operators' profiles in the GWOPA database, Figures 3 to 8 summarize the data presented at the meeting. There was a general discussion on the low participation rate of water operators in populating key information such as the objectives and themes of partnerships, timeframes, WOP activities and expected results of partnerships. It was clarified that increased participation rates by operators was needed in order to draw meaningful conclusions from the GWOPA database. Steering committee members requested clarification on the objectives of the collection exercise; the nature of information captured, and how the profiles were submitted. The stakeholders identified that communicating the benefits of the GWOPA database to water operators would encourage the latter to populate the database.

On the GWOPA website, Water Operators may enter information relating to their utility operation, potential WOP partnerships and past WOP partnerships. Upon creating an account with GWOPA, Water Operators enter information by means of

drop down panels. Figure 3, illustrates ten specific themes plus an additional category, "other" that water operators could select to identify the reasons for entering into a WOP partnership. A concern arising from these results was that it was not possible to differentiate the rationales for participation within the "other" category, as these were not specified in data entry. This is particularly significant given that the "other" category represented the majority of responses. In total 77 water operators identified their motivation for participating in a WOP.

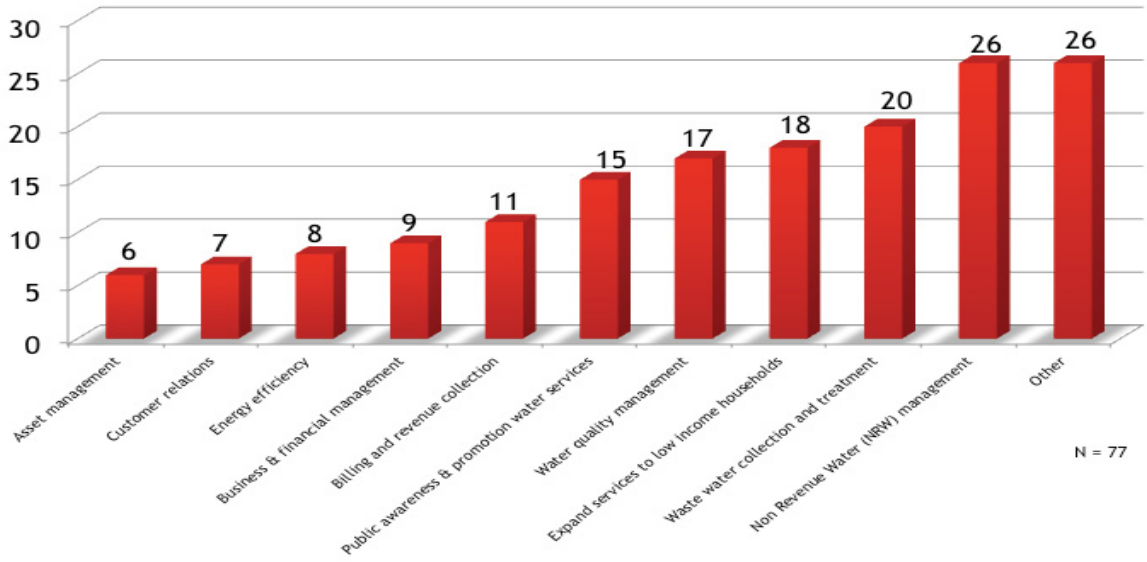

Figure 3: Water Operator Partnership categorized by themes

Non Revenue Water management [1] (NRW) was identified as the most frequent motivation for engaging in the WOP process. 20 % of water operators identified the wastewater collection and treatment theme as the reason for entering into a partnership. On a global scale, expanding service to low income households represented 18 % of the focus of WOPs. Meanwhile, collaborative partnerships related to water quality management represented 17 % of WOP partnerships.

Themes related to non-technical aspect of WOP partnerships, such as public awareness and promotion of water service, represented 15% of WOPs. The responses

[1] Non-revenue water (NRW) is water that has been processed and is unaccounted for or "lost" before it reaches the end user. Losses can be due to leaks in the system or theft or metering inaccuracies.

to four questions that focused on the capacity development aspect of WOP partnerships are illustrated in figures 4 to 8.

Figure 4, illustrates the responses by water operators as to whether the capacity of the water utility was enhanced as a result of the WOP

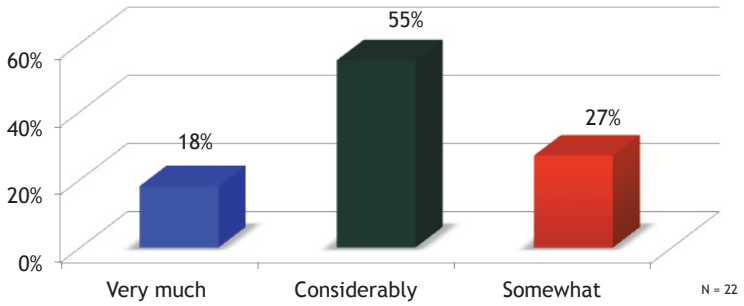

Figure 4: Staff Capacity: Did the WOP enhance the Utility staff's capacity?

Only 22 water operators responded to this question. 18 % of responses expressed that the WOP process " very much" impacted on enhancing staff capacity, 55 % stated the WOP process had a considerable impact, and 27 % state it had somewhat of an impact on increasing staff capacity.

Figure 5, illustrates to what degree the WOP process changed practices of the water utility.

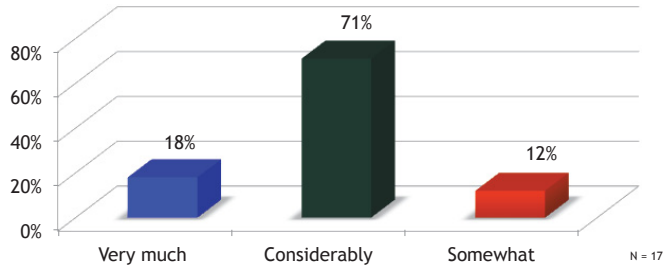

Figure 5: Have Utility practices changed as result of the WOPS?

17 water operators responded to this question. 18 % of water operators responded that the WOP process had changed utility practices "very much", while 71

% indicated the WOP process had a considerable impact on changing practices at the water utility, and 12 % indicated the WOP process had somewhat of an impact on changing practices of the utility

Figure 6, illustrates to what degrees service provisions had improved as a result of the WOP.

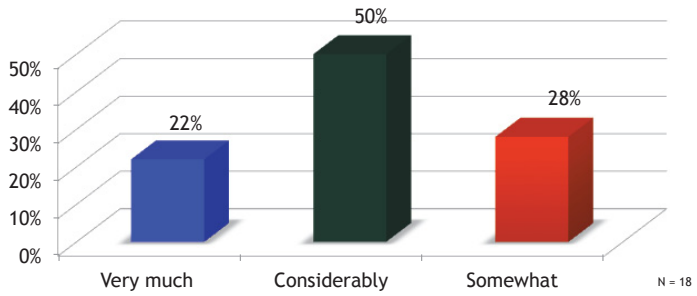

Figure 6: Have service provisions improved as a result of the WOP?

18 water operators responded to this question. 22 % of the water operators responded that the WOP process had "very much" improved the water utility service provisions; 50 % responded that participating in the WOP process had "considerably" improved the service provisions of the water utility and 28 % responded that the WOP process had "somewhat" of an impact on improving service provisions.

Figure 7, illustrates the response to whether the WOP process led to increased access to improved water or sanitation services.

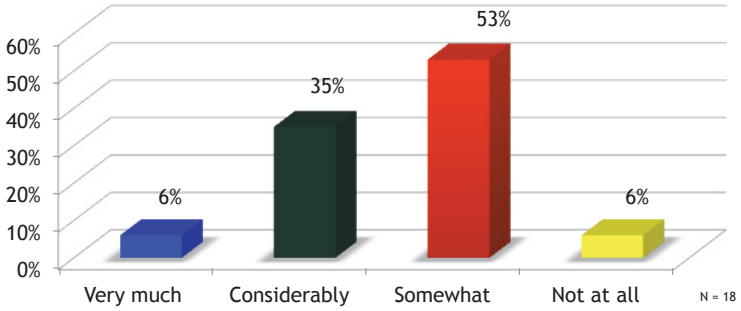

Figure 7: Has the WOP led to increased access to improved water or sanitation?

Of the 18 water operators who responded to this question, 6 % indicated that the WOP process had led to substantial enhancements to water and sanitation services. 35 % of the water operators indicated participation had a "considerable impact " while 53 % indicated "somewhat" and 6 % "not at all".

In the next section water operators were asked to identify which factors had a positive influence on the success of your WOP? Figure 8, illustrates the response. The partner selection process was identified by 16 % of the respondents to have the most significant impact on the successful completion of a WOP.

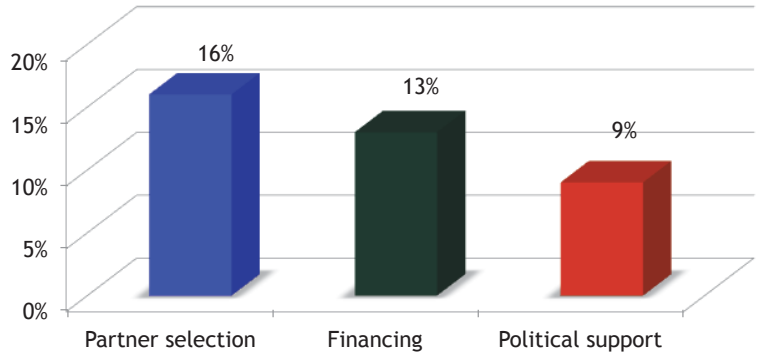

Figure 8: Factor influencing success of WOP process

13 % of the respondents identified the availability of financial support as a factor that influenced the successful completion of a WOP partnership. 9 % of respondents identified political support as a factor. Several issues were raised with the type of conclusion that could be derived from the information obtain in this question. There was no reference to if the respondent was a mentor or mentee in the partnership or how did the respondent define political support. It should be noted in addition to low participation of WOP operators in populating sections of the GWOPA database, the categories available for selection were highly subjective, making it difficult to draw conclusive arguments.

5.2 BWS– CCWD case study

5.2.1 Operator profiles

The Belize – Contra Costa collaborative partnership is the first known Water Operators' Partnership between a North American Water Utility and a Central America Water Utility. Table7, provides a descriptive profile of the Belize and Contra Costa water operations. The Contra Costa Water District Utility is located in Concord California situated in the Sacramento – San Joaquin Delta. CCWD provides water and sanitation services to approximately 500,000 people in central and eastern Contra Costa County in Northern California.

Utility	**Wop Role**	**Model**	**Market Structure**	**Tariff Structure**	**Water Loss**	**Average Consumption per users**	**Sector**	Service Customers	Service area
CCWD	Mentor	Regulatory	Public	Metered	6.8%	49210 Liters/month	Regional	500,000	Urban Water
BWS	Mentee	Regulatory	Public	Block rate	27.6 %	12348 Liters/ month	National	49,138	Urban Water & sanitation

Table 7: Belize and Contra Water operations

The Contra Costa Water District was established in 1936, and started to service households in 1940. The period between 1960 and 1970 witness rapid growth and modernization of CCWD water distribution system. In 1966 The Bollman Water Treatment Plant was constructed and is the district's largest facility and currently treats approximately 75 million gallons of water per day. The average consumption of CCWD customers is 49210 liters/month. CCWD nonrevenue water lost at 6. 8 % is well below the United States water utility average loss of 20 %.

Belize is situated on the Caribbean Sea, south of Mexico and east and north of Guatemala in Central America. Belize Water Services Limited is the water and sewage utility for the country of Belize, servicing approximately 50, 000 people mainly in the urban areas of the country. The average customer consumption of water serviced by BWS is 12348 liters / month. BWS Nonrevenue water loss at 27.6 % is below the Latin American and Caribbean average of over 50 %.

5.2.2 History of the BWS – CCWD WOP

The first phase of Belize – Contra Costa Water Operators' Partnership was initiated in the fall of 2010, when the representative from Belize Water Service (BWS) and Contra Costa Water District (CCWD) identified a mutual set of interests and goals for the partnership at a regional meeting in the Caribbean. The Inter-American Development Bank (IADB) and UN-Habitat funded the first phase of the partnership. The WOP partnership included a series of visits by BWS and CCWD representatives in 2011 to the respective facilities with the first phase of the partnership completed in 2012.

The overall objective of the first phase of the BWS - CCWD partnership was to integrate safety into all areas of BWS operations. The key departments identified to achieve this objective were; Operations, Engineering, Customer Service, Information Technology and Finance. Changing the safety culture at BWS was a central theme linking all areas of operation from engineering design and construction of water treatment plants to office ergonomics. The second phase of the BWS –CCWD WOP commenced in February 2013 and formed an integral part of the fieldwork component of this research. The focus of phase two of the WOP is for CCWD to broaden its understanding of non-local water issues and assist BWS in improving water treatment plant capabilities. The objectives of BWS are to continue capacity development with measurable improvement in areas that were identified in Phase 1 as well as establish a certification program for BWS water treatment operators similar to those existing in the United States.

The Infrastructure Finance Analyst Public – Private Infrastructure Advisory Facility (PPIAF), funded the second phase of the BWS - CCWD WOP. PPIAF is a multi-donor trust fund providing technical assistance to governments in developing countries. PPAIF supports governments to develop specific infrastructure projects with private sector participation. The U.S. Water Partnership (USWP) played an instrumental role in securing funding for this phase of the WOP. USWP is a U.S.-based

public-private partnership (PPP) established to coordinate American expertise in addressing water challenges globally.

5.2.3 Water and Sanitation in Contra Costa Water District

The Contra Costa Water District is located in the watershed of the Sacramento – San Joaquin Delta in California. The Delta is an important source of water for farmland areas and other ecosystems that provide habitats for countless species including 23 million Californians. The Delta is cited as one of the most important water bodies in California. The Contra Costa Water District (CCWD) is the largest water utility in the Delta, providing water services to approximately 500,000 people. The Delta is the sole source of water for CCWD, which relies on diversions from four intake locations throughout the western, central, and southern Delta. The 77-kilometer Contra Costa Canal conveys the water to four untreated water reservoirs. The largest of these reservoirs, the Los Vaqueros Reservoir in southeastern Contra Costa County, was completed in 1988 to provide water supply reliability during excess water demand and droughts. Water management in California is often described as a state of extremes (Lund 2012) given that it is vulnerable to both droughts and flooding(Hanak et al. 2011). California has struggled with these water extremes since its earliest development as a State. In modern times Californians have relied on, 1,400 dams, reservoirs and thousands of kilometers of canals, to manage the flow of water to 38 million people in the State (Hanak and Lund 2012). In large part, this movement of water is required given that the majority of the water sources flow north from Sacramento while the majority of water demand lies in Central or Southern California.

Five elected Directors govern the Contra Costa Water District, each representing a division of approximately 110,000 people. Board meetings are advertised in local media and on the CCWD website. Individuals can subscribe to receive CCWD agendas notices and meeting proceedings. From interviews with CCWD representatives regarding the WOP, the following sentiment was expressed:

"This partnership continues to be a valuable opportunity for CCWD to share our experiences as a water provider. At the same time, CCWD is benefitting from the information exchange about common challenges and ways to improve our services." (Representative from CCWD)

California manages its water resources using a combination of the Prior Appropriation Doctrine and riparian principles. The Prior Appropriation Doctrine was enacted to secure the water needs of miners during the California Gold Rush(Gopalakrishnan 1973). Miners and mining operations were oftentimes not situated adjacent to water sources, requiring water to be diverted. Miners needed to be able to establish rights to these water diversions. Thus, with the establishment of the Prior Appropriation Doctrine, the first miner to make a water diversion created a right to that water so long as the diverted water was put to what is deemed a "beneficial use"[2]. The doctrine evolved to protect settlers who made claims to water diversions for agricultural use, given that the overall water supply is often insufficient for crops on the arid or semi-arid landscape in California.

The doctrine has been designed to maximize human beneficial use within the context of scarcity, which may result due to fluctuations in the source of water or from over-extraction of water by users (Gopalakrishnan 1973). Through the application of the doctrine, water rights can often be lost. For instance, a senior appropriator maintains his right to a water claim over a junior appropriator so as long as the senior's claim to water is put to "beneficial use", as captured by the statement, "*Use it or lose it*". In times of drought, special provisions are applied, but only a few users may have access to water (Schutz 2012).

With the Governor of California declaring a drought in January 2014, the discourse regarding the positive aspects and normative properties of the Prior Appropriation Doctrine has been heightened. Although the doctrine has evolved from early origins, advocates state that the doctrine functioned well providing both a stable mechanism for managing water rights within "both a regulatory and a market

[2] Beneficial use is the basis, the measure, and the limit of the right to the use of the (ground) waters (Gopalakrishnan 1973).

environment" (Schutz 2012, Tarlock 2001). However there is little evidence that such the doctrine accounts for the added pressure placed on finite water resources given the rapid growth of the population of western States and climate change.

The doctrine was constructed to prioritize water uses for humans, with limited understanding of hydrological functions for environmental flows. The infrastructure and institutions in California require a rebalance in order to account for environmental values and include plural values associated with water. Currently California is experiencing less precipitation in the form of snow or rain while the demand has been increasing, requiring the shortfall to be made up from groundwater sources, creating an unsustainable situation (Ackerman and Stanton 2011). The water narrative in California has been expressed with little distinction between the public, private, state or nonstate, actors, but has been construed within the context of the priority of water uses associated with human needs(Carroll 2012). For instance, although CCWD is a public utility, the discourse advanced by the utility has considered water as a source of revenue to recover the cost of supplying water to ratepayers or customers. Water is defined singularly as having an economic value and is subject to competition, whether it is supplied to agricultural, industrial or consumer purposes. With the declaration of the California drought, a concern was raised that required conservation measures would result in less revenue for water utilities in California; the CCWD utility has thus been looking for alternative avenues to recover costs. The power of the Prior Appropriation Doctrine has resulted in reducing or even removing the opportunity to consider plural values of water in California. This aspect is pivotal to understanding the role of the mentor in the development of mentee water operator capacity associated with the BWS-CCWD WOP.

5.2.4 Overview of Belize water and sanitation

Belize's geographical location in the North Western region of the Caribbean has provided a dependable tropical - subtropical rainfall pattern resulting in plentiful

surface and groundwater resources. Ground water is the primary source of freshwater in Belize. There are 18 major river catchments and 16 sub catchments that drain from the Maya Mountains. The availability of freshwater in Belize is comparable or more plentiful than most countries in Central America and the Caribbean. In 2005 the Belize government purchased BWS from Cascal B.V., a privately owned company. Currently the Belize government holds 83.17 % of the shares, the Belize Social Security Board holds 10 % and the general public holds 6.83 % of shares. The Water Industry Act regulates BWS and in 2003 the Public Utilities Commission (PUC) granted BWS a 25-year operating license as the sole water utility in Belize. The Belize cabinet can appoint up to 10 (currently 7) directors to the BWS Board as well as one director from the Social Security Board. The Belize government and the Social Security Board can appoint an additional director for every 10 shares they own.

5.2.5 Belize Urban water sector structure

In Belize the delivery of water and sanitation services is divided into two sectors, one servicing the urban households and a second servicing the rural households. While the reduction of poverty and inequity is a key objective of the Belizean government, in practice there are no clear plans to coordinate the legislation and regulations regarding water and sanitation services. The water governance and institutional frameworks in Belize are compartmentalized and lack pluralism in their approach to address water and sanitation issues for urban and rural populations. Belize has the second highest income per capital in Central America but this figure masks the income disparity between the rich and the poor. Figure 9, illustrates the Belize urban water and sanitation sector structure and key stakeholders. BWS is the sole water utility in urban areas and also services 23 neighboring urban village areas, representing approximately 59 % of Belize's population. BWS operates three sewage systems (Belize City, Belmopan, and San Pedro), which represents approximately 10,000 sewage connections. 97 % of the population has access to improved water services. However increasing population and economic activities mainly in

agricultural and tourism sectors are threatening the quality and quantity of adequate freshwater resources. Sanitation services are limited to Belize City, Belmopan, and San Pedro, which represent only 11 % of Belize population. To provide water to the town of San Pedro in Ambergris Caye, BWS purchases water from Consolidated Water Co. Ltd. (Consolidated Water) a private company. Consolidated Water operates a desalinization facility that can supply up to 510,000 US gallons of water per day to tourist and residential accommodations.

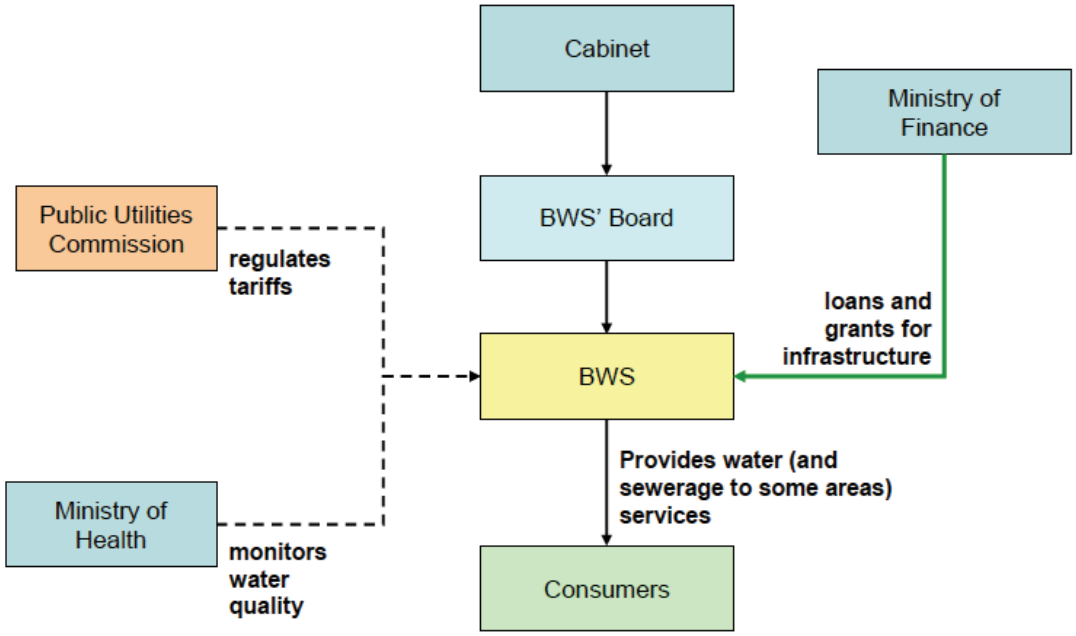

Figure 9: Belize Urban Water Sector Structure (RDD, 2012)

Ambergis Caye in recent years has experienced rapid development in tourist accommodation; which has resulted in an increased demand for bottled water by tourists. In 2003, BWS and Belize Water Ltd., signed a new 23 - year exclusive supply agreement. The agreement sets out the conditions for supplying water, establishment of the water rate, and regulations for quality and provisions if either party fails to meet their obligations under the contract. Also BWS is responsible for the sanitation services provided to households and commercial establishments that are connected

to a central sewage system on Ambergris Caye. Solid waste collected on Ambergris Caye is discharged into a partially controlled dump adjunct to the desalinization facility. Solid waste management collected in urban areas is discharged into open or partially controlled dumps in several areas in Belize. Local populations have raised environmental concerns about the lack of technical and environmental regulations of these controlled dumps, their proximity to costal regions and the potential impact of a natural disaster on ecosystems (Kuratomi et al. 2014).

5.2.6 Belize rural water sector structure

Figure 10, illustrates the Belize rural water and sanitation sector structure and key stakeholders. The Rural Development Department (RDD) is responsible for the water management of rural communities in Belize. The Village Councils Act Chapter 88 establishes the structure of village water boards and responsibility for providing water services in rural Belize. To ensure a separation of power and authority the village water boards are financially and operationally independent from the village council(Kuratomi et al. 2014).

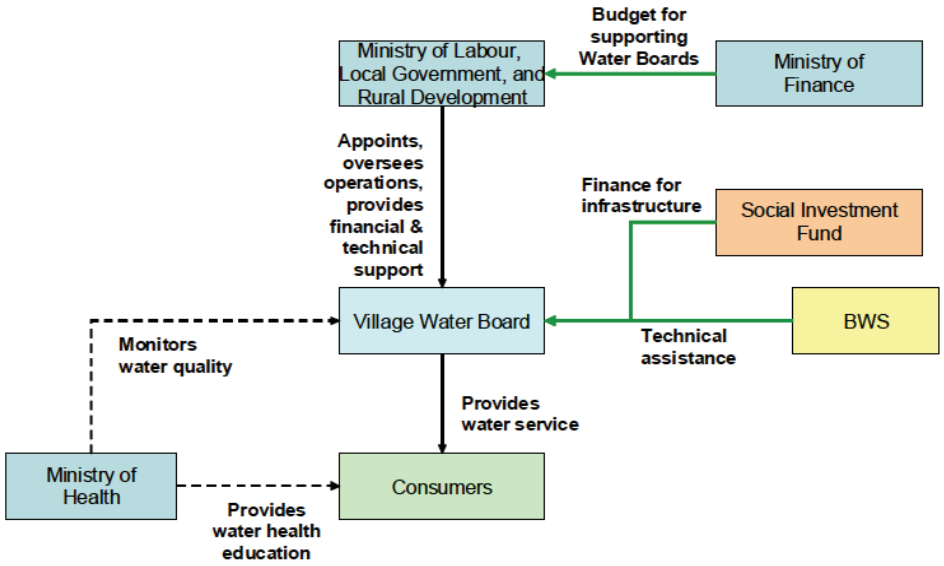

Figure 10: Belize Rural Water Sector Structure (RDD, 2012)

VWB are responsible for the day-to-day operations and maintenance of the village water system. The Village Council Act requires that the Minister of Labor appoint 5 of the 7 members to the VWB. VWB members are appointed in consultation with the village council and RDD area representatives. The two remaining positions on the board are assigned to the council chairperson and a council member. Local Water Boards cover 25% of the rural population (Kuratomi et al. 2014). Historically there have been tensions between the VWB and the Village Water Council. Village Water Council members' appointments tend to be politically oriented, whereas the local villagers select VWB members.

In 2013, 125 VWBs were established to serve 159 villages and smaller rural communities. Smaller rural areas rely mainly on localized well extraction and rainwater harvesting for their water needs. The rural water systems are rudimentary and use chlorine as the primary form of water treatment. Most rural water systems rely on wells as the primary source of water and use gas-powered generators in villages that are not connected to the national electricity grid. Recently-installed water systems in rural areas are connected to household meters, and fees are structured on both a volumetric tariffs or flat rates. Rural households serviced by older water connection lack meters and therefore are charged a flat monthly fee. The rural water sector is structured so that most VWBs provide service to only one village. Currently there are five rural villages serviced by independent water boards. These independent water boards are run as not-for-profit community initiatives and are administered by a donor group (e.g. Mennonites). These independent water boards do not report to the RDD and have the ability to establish user fees for water consumption (*Pers. Comm.* RDD Representative).

In 2013, 35 villages were without adequate water and sanitation services; this represents approximately 5% of the Belize population. In rural areas, 81% of households have access to improved sanitation services, which is primarily in the form of pit latrines and septic tanks. One of the challenges of providing improved sanitation services in Belize is the low density of the 190 rural villages in diverse

geographic locations. Over a third of these villages have a population of less than 4000 inhabitants. The RDD and the Social Investment Fund (SIF) are the principle sources funding for VWBs capital expansions.

5.2.7 Belize Water Policy

The Public Utilities Commission (PUC) and the Social Investment Fund (SIF) are two key government entities charged with responsibilities in the urban and rural water sectors in Belize. In 1990, the Public Utilities Commission Act Chapter 223, and Revised Edition 2000 established the Public Utilities Commission (PUC), as an autonomous institution responsible for regulating the electricity, water, and telecommunication sectors. The Water Industry Act 2001 sets out the function and duties of the PUC, as well as its composition, and governing rules. The Water Industry Act provides the legislative authority to the PUC to issue regulations on rates and procedures for reviews, appeals, accounts, and reports. The Water Industry Act gives the Minister of Public Utilities the responsibility for water and sewage. However, in practice, the ministry's responsibilities over water and sewage are limited since many of its powers and functions have been delegated to the PUC. The Water Industry Act gives the Minister of Natural Resources and the Environment responsibility for promoting a national policy for water. In 2001, the Government of Belize enacted the Water Industry Act to replace the Water and Sewage Authority (WASA) and designated the Belize Water Service as the sole entity responsible for water service provision in Belize. At the same time, the PUC issued a 25-year exclusive license to BWS to provide water and sanitation services in the areas previously served by WASA.

The Village Councils Act, Chapter 88, and Revised Edition 2003, governs the Village Councils and determines the legal procedures for establishing a village. It defines the procedures for electing members to the Village Council, the powers and duties of the Village Council, and the regulations for the VWBs. Furthermore; Part VII:01 of this Act establishes the composition of VWBs, and the responsibilities and

powers of the VWBs. It defines the financial aspects such as the rates to be charged to households for water supplied, and the accounting procedures for VWBs.

An interview was conducted with the Belizean Public Utility Commission Director for Water and Waste Water, to discuss the role of the PUC and the role of BWS in the delivery of water and sanitation services. The conversation focused primarily on the rates and tariffs charged and the existing mechanisms to ensure an equitable delivery of water and sanitation to the Belizean population. The Director for Water and Waste Water indicated that although the Commission was reluctant to grant tariff increases, he expressed the opinion that BWS is inefficient:

"Any rate increase is not to increase service to the general population but rather to covers inefficient use of resources at BWS."

When questioned about GWOPA's role in increasing water service and sanitation in developing countries, the Belizean Public Utility Commissioner stated he was not familiar with the initiative. He was not aware that BWS had partnered with CCWD.

5.2.8 Funding opportunities for water and sanitation services

Development agencies technical and financial support in Belize can be grouped into three categories; BWS' activities in the urban WSS, Non – BWS activities in WSS and projects in solid water sector. The Caribbean Development Bank (CDB) is the main funding source for BWS projects, accounting for US $12 million or 52 % of BWS borrowing (Kuratomi et al. 2014). The Inter-American Development Bank (IADB), which is additional funding the BWS program for the construction of a collection network and wastewater treatment plant in the Placencia Peninsula.The Social investment Fund (SIF) is a primary funding source for water and sanitation services for rural sector in Belize. The Belize Social Investment (BSIF) was incorporated in 1996 as a Statutory Body through the Belize Social Investment Fund Act. According to the Act: (page 8 / clause of the 6-1)

> *"The Fund shall, subject to the availability of resources, approve projects and programmes and provide, either wholly or partially, financial and technical*

assistance to community groups with development goals, and local government organizations, for the execution of such projects or programmes which will serve to provide basic services to the most severely affected groups in the country."

5.2.9 Exploratory findings

The BWS - CCWD WOP is the first Water Operator Partnership between a North American and Central American water utility. The case study provided opportunities to explore diverse perceptions of the values associated by stakeholders in the management of water resources. This particular WOP was identified by GWOPA as "successful", thus there is value in examining the perception of actors involved in the WOP in order to critically assess how success in a WOP is defined.

Content analysis of semi-structured interviews and documentation examined revealed a persistent theme voiced by the actors interviewed. This is consistent with the Dublin Statement on Water and Sustainable (ICW 1992) ,which states that water has an economic value through its competing uses and should be recognized as an economic good. Values associated with water uses were often described in monetary terms and thus are only reflected in values based on market rationality.

5.2.10 Classification of stakeholders

Table 8, presents the analysis of the four data sources collected to uncover the values and uses assigned to water by various stakeholders as part of the Belize – Contra Costa Case Study. We classify the stakeholders' findings according to four geographical scales; global, regional, national and local. At the Global level, the findings of three stakeholders are summarized; UNSGAB, UN-Habitat and GWOPA. The Regional summarizes the LAC WOP and IADB stakeholder perspectives. The National level examines three stakeholders; Contra Costa Water District, Belize Water Service, and the Belize Rural Development Department. The local level is examined at the Village Water board and end-users. As described in the archival document titled:

The first phase of BWS – CCWD water operator partnerships was documented in the "Action Plan and Results Report", published in 2012.

Scale	Stakeholders	Stakeholders' main perception of Value of Water	Stakeholders' main focus	Stakeholders' Policy Tool
Global	(UNSGAB)	Human right, both social, economic development. Although water is "free" a cost or monetary value must be attributed to water.	Advocate creation of international association of public water operators to ensure increase access to WWS.	MDG's 7C Hashimoto Action Plan.
	UN- Habitat	Sustainable human settlements development., advocating partnerships as a means of improving livelihoods of human settlements.	Water and sanitation services, poverty reduction & promote sustainable development.	Multinational Agreements MDG's 7C Hashimoto Action Plan.
	GWOPA	Public water, local social and cultural value of water. Water users define water values.	Public Water Collaborative water partnerships. Capacity development of Water Operators.	Memorandum of Understanding Code of conduct.
Regional	LAC WOP	Commercialization of public water. Improve capacity & performance of water utilities focusing on ROI, NRW indicators.	Collaborative water partnerships. Capacity development of LAC Water Operators.	Memorandum of Understanding.
	IADB	Economic development & Technical cooperation.	Provide financial and technical support to improve WSS in LAC.	Memorandum of Understanding. Technical Notes and discussion papers.
National	California: Contra Costa Water District	Commercialization of public water. Water viewed as an industry.	Treated water for Households, industrial, agricultural uses. Non-treated water for industrial uses.	California Water Appropriation rights California Assembly Bill 685.
	Belize: Belize Water Service	Commercialization of public water.	Water & sanitation services household, industrial and agricultural user.	Water Industry Act, Public Utilities, Commission Act. Chapter 223; revised
	Belize: Rural Development Department	Public water, water is an input to industry.	Water and sanitation services rural population.	The Village Councils Act, Chapter 88, Revised Edition 2003 Social Investment Fund.
Local	Belize Village Water Boards	Public, common pool, economic value.	Rudimentary village water systems.	The Village Councils Act, Chapter 88, Revised Edition 2003 Social Investment Fund.

Table 8: Values and uses assigned to water by stakeholders; BWS - CCWD case study

BWS – CCWD completed a one-year WOP program to enhance the operational capacity of BWS. In the BWS – CCWD partnership, CCWD was the mentor and provided training in areas jointly identified by BWS and CCWD representatives. A key element identified at the start of the WOP process was BWS senior managements' desire to change the safety culture of the BWS organization. BWS Utility employees' safety became the top priority and was identified as a short-term objective. Senior management stated that this was a result of several serious safety incidents, which occurred on construction work sites. The establishment of a certification program for BWS operators similar to those required in the United States was also identified as a long-term objective. Improved customer service was developed as the third objective of the WOP process. It was seen by BWS that a key element in supporting the WSS operations was the use of technologies to ensure reduction in Non-Revenue Water and improve data collection.

After the initial training started, BWS – CCWD management teams added elements to the training objectives. Following a visit to BWS locations, gaps in the training were identified by CCWD. Adjustments were then made to the training program. As the mentee, BWS senior management identified what elements were necessary to be included in WOP capacity development program. CCWD senior management representatives visited BWS to understand the local business units operation and operating environment. A CCWD employee was tasked with developing a training program to address goals identified by BWS management team to enhance WWS capacity. A detailed work plan was developed to ensure opportunities for the BWS participants to interface with CCWD employees with expertise in the identified areas. The identified areas included staff from operations (meter reading, water treatment and health and safety), technical services, customer and financial services. CCWD employees who participated in the WOP were provided a template to be used as a guideline in preparing for the training sessions with BWS participants. As part of the CCWD action plan, a Curriculum Development Team (CDT) was established. The CDT was comprised of representatives from each of the departments identified as key

to implementing the WOP process. A feedback mechanism to be used by BWS participants was developed to provide flexibility and mechanisms to revise the program based on BWS participants' needs.

CCWD senior management provided high visibility to the WOP process by inviting the BWS-WOP participants to CCWD Board of Directors meeting and ensuring local media coverage. Participants of phase one stated in personal communications that the WOP process motivated employees in their respective work assignments and highlighted the importance of delivery of WSS in developing countries. The desire to participate in phase two of the WOP can be attributed in part to the high personal value that was associated with participating in phase one by selected CCWD employees.

In California, a total of 21 semi-structured interviews were conducted integrating key questions from the BEWOP analytical framework into the interview protocol. The BEWOP framework for analyzing water operators' partnership provided a useful analytical tool to examine the WOP process within a traditional mentor –mentee partnership that operates in an urban context. Given that the BWS – CCWD case study included the rural water sector in Belize additional questions were developed to reflect rural needs for WSS. The second phase of the BWS – CCWD was held March 2nd to March 15th 2014. A total of 3 former CCWD employees were interviewed. The three employees were very positive about their experience in the WOP process. They further indicated that they valued the GWOPA commitment to assisting water operators in developing countries. It was identified that the work culture at CCWD supported the WOP process. BWS and CCWD management attended a workshop organized by IADB on Non – Revenue Water in the Caribbean. At this meeting, there were initial discussions on the possibility of entering into a WOP partnership. CCWD was interested in developing capacity to address disaster recovery, while BWS focused on non-revenue water issues. UN-Habitat was exploring potential WOP partnerships between North and South American water utilities and had a discussion in this regard with the former General Manager of CCWD. The

former General Manager was at the time Board member of the American Water Work Association (AWWA).

The following were the North American water utilities identified in the early stage of AWWA initiative to promote WOPs:

i. Contra Costa Water District
ii. Denver Water
iii. Las Vegas Valley Water District
iv. Nashville Metro Water Services
v. San Diego Water Authority
vi. Seattle Public Utilities

In personal conversations with the former General Manager of CCWD regarding the funding of WOPS, he indicated that funds were available to support new WOP initiatives. The former General Manager of CCWD referred to the American 'Paul Simon Water for Poor Act" as a possible funding strategy for water operators in developing countries. The Act provides funding mechanisms for American water utilities to assist in increasing access to water and sanitation services in developing countries. The funding covers indirect costs of US mentoring utilities; staff time and training materials. It was expected that direct costs would be covered by a funding agency (i.e. World Bank, IADB, UN-Habitat, USAID, Millennium Challenge Corporation). The current General Manager at CCWD stated that the expertise of CCWD and transfer of knowledge regarding capacity development of the mentee should occur at the water utility level.

"Other agencies have more expertise in dealing with water and sanitation service for poorer segments of the population such as the Bill Gates Foundation."

He further suggested that:

"CCWD had no expertise or experience in this area and so WOPS should focus on developing capacity at a water utility level."

This implies that developing country mentors need to focus on enhancing the managerial and operational expertise of the mentee (developing country). During the research interviews, several CCWD participants stated that they considered water

access to be a human right. In their opinion, assigning an economic value to water did not compromise the human right aspect. The participants stated: “Water is not free, charging a fee to end-user provides a source of revenue for the maintenance of water facilities”.

A total of 15 CCWD employees participating in phase one of the BWS –CCWD WOP were interviewed and spoke positively of the WOP process. Several CCWD employees stated that participating in the WOP process was beneficial and increased their motivation to perform their work assignments. CCWD participants frequently mentioned the financial aspects of WOPs. They stated that the WOP process should not add additional costs to the CCWD operation.

> *“The local rate payers should not cover the cost of the WOP ” (Pers. Comm. CCWD representative).*

Several CCWD participants cited that the funding approval process is a negative aspect of the WOP process. The length of time required for approval and lack of information on the status of funding a WOP proposal was cited as a concern. The issue of having a third party (i.e. the funding agency acting as the WOP champion) was raised in several discussions with CCWD participants with most CCWD participants suggesting that the funding agency should act as the WOP coordinator. The conversations at the wrap-up sessions engaged, both BWS and CCWD employee’s participants in a fashion that supported all opinions and concerns. A cross section of BWS participants from operations, laboratory and information technology departments participated in the job shadowing sessions at the Bollman Water treatment plant, which is adjacent to the Mallard Reservoir in Concord California. This facility provides filtered and disinfected water to the general public for drinking and other uses in the Contra Costa water district. Of particular interest to the BWS participants were the methods and technologies utilized by CCWD to monitor and control the chemical processes. BWS is in the process of developing a business plan to obtain operators certification for its employees. BWS participants were concerned on how to best introduce new methods and technologies without impacting their current

operations. BWS and CCWD participants engaged in a technical discussion on the changes to the CCWD disinfection process. BWS as part of the operator certification business plan was in the process of modernizing its existing treatment plants and laboratory facilities. The following section introduces two important results emerging from the job shadowing sessions.

The first job-shadowing finding relates to the CCWD safety protocol at the Bollman facility. Upon entering the Bollman plant facility BWS participants (as part of the safety protocol) were shown a safety video and instructed to sign log sheets registering their presence at the facility. BWS participants indicated that the safety video provided them with a standardized approach for informing visitors about the CCWD safety protocol. After viewing the video and a discussion on its merits, BWS participants stated that they would suggest implementing a similar process at the BWS eight locations across Belize.

The second element of the job shadowing at the Bollman plant was the "flavor –odor" quality profile testing procedure. CCWD performed a daily test in an effort to address flavor and odor concerns raised by customers each participant was provided with four blind samples of water. The samples included distilled water, processed water, water from the delta and a blind sample. The CCWD lab technician asked each participant to select the first item and record the odor of the sample on the log sheet. Once each participant had completed the testing and recorded their results a general discussion followed. The initial discussions focused on similar issues BWS had with customers complaining of water odors and flavor. BWS participants stated that many Belize customers claimed that they did not drink BWS water due to the heavy chlorine smell and taste. CCWD expressed they also had a large portion of the population who complained about the odor and taste of the water. CCWD testing at the source was able to quickly detect odor problems and adjust the purification process at the CCWD plants. CCWD stated this testing procedure had reduced flavor and odor customer complaints. This initial testing conversation triggered a broader reflection by all participants on establishing testing procedures that not only

addressed standards that were imposed by governments but also in addressing consumer perceptions. The participants identified that although the quality of water may meet the required standards, the presence of unpleasant odors would cause water users to question the quality of the water. BWS participants were surprised that CCWD had similar issues to BWS given their high level of equipment and monitoring devices. It was identified that resolving customer issues did not always require the use of highly technical equipment: " The Keep It Simple approach worked in both countries". They also agreed that the "flavor –odor" exercise did not replace a scientific approach to testing the water quality.

A third key component of the job shadowing process with the Bollman plant employees was to examine the possibility of implementing a Supervisory Control and Data Acquisition (SCADA) system at BWS. SCADA is a centralized computer system for gathering and analyzing real time data. The system includes remote units that measure the pressure in pipes and report the readings to a central control center. The BWS monitoring approach employs a straightforward SCADA system, which monitors a single water treatment facility. Of particular interest to understanding the social learning process of WOP collaboration was the open dialogue observed between the BWS and CCWD participants in the Bollman plant job shadowing sessions. Since the dialogue occurred in a not for profit context, the focus of the discussions remained on technical aspects of the SCADA system and not on procurement of equipment. The inclusion of the information technology component such as SCADA in the WOP expanded the discussions beyond water treatment. As described by the network administrator at BWS:

" I'm a computer techie not a water treatment expert."

He stated that his inclusion in the job shadowing exercises at the CCWD facilities provided him with a much broader understanding of water treatment operations. He was impressed by the very open communication of the CCWD participants and their willingness to share information. As a result of his participation in the job shadowing exercise he stated that BWS was in the process of modifying certain components of

their SCADA process. He indicated that participating in the WOP process had motivated him to integrate technological concepts gained from the CCWD employees in the Belizean facilities.

The BWS – CCWD WOP has facilitated capacity development at BWS. The interactions of the participants were grounded on trust and mutual understanding. BWS employees who participated in phase one of the WOP stated they were able to identify changes in their work assignments as a result of participating in the WOP. In the next section the findings related to the WOP health and safety and water quality objectives will be reviewed.

5.2.11 Capacity development

In the first phase of the BWS –CCWD capacity development, utility worker safety was identified as a one of the objectives for the BWS. One of the examples of the successes of the BWS – CCWD WOP process is the change in the safety culture at BWS. As described in the BWS – CCWD WOP action plan and results report, BWS management earmarked $350,000 for safety gear. A safety officer was hired and a safety committee was formed and modeled on the safety committee at CCWD. Based on CCWD's Confined Space Training Module, BWS has developed a similar training module for its employees. As part of the follow – up visit to the first phase of the WOP, a CCWD assessment team identified improved use of safety gear and increased focus by BWS employees regarding safety issues. The safety aspect of the WOP has facilitated a long-term relationship between BWS and CCWD through best practice sharing between the organizations. Many of the participants interviewed identified this lesson sharing as an evolution of the WOP partnership beyond merely technical expertise being exchanged; Figure 11, illustrates a component of the new safety protocol for construction crews at the BWS.

Figure 11: Example of BWS safety protocol

Previously BWS construction workers involved in road disruption would not take precautionary measures. Subsequent to the BWS – CCWD WOP, a new safety protocol was implemented requiring all construction sites to be identified with clear signage and that all employees wear highly visible clothing. The legitimacy of BWS participating in the WOP process is captured in BWS Operation Manger statement:

> *"Our health and safety protocols resulted in changes at Belize Electricity Limited and telecommunication utilities Belize Telemedia. Their work crews now wear safety gear."*

A key theme emerging from phase two of the BWS- WOP plan was to expand the water quality-monitoring program and obtain lab accreditation. The findings in this section are a result of observations and interviews with BWS laboratory staff. The BWS laboratory facility is located at the Double Run treatment facility plant 17 miles north of Belize City. Historically, the laboratory facility was part of a general storage area in the treatment plant with very little space and limited equipment being designated for lab work. The lab personnel indicated water testing had been contracted to external private labs. As indicated by the participants interviewed, the success of phase one of the BWS – CCWD WOP facilitated the development of long-term goals. An element of this long-term action plan was to develop a standardized

water quality testing procedure and a formalized quality control process to be utilized by BWS employees.

In 2014 new laboratory equipment was purchased and lab facility renovations were completed. Although the BWS lab staff had not participated in the first phase of WOP, BWS laboratory staff later established contact with the laboratory staff at CCWD as a result of comments made by participants in the first phase. The participants indicated that CCWD staff was helpful in acting as mentors even though no formal WOP existed pertaining to the lab renovation. CCWD was consulted and provided assistance in purchasing new equipment, and plans were developed for the lab supervisor to participate in the job shadowing exercise of phase two. Prior to the second phase of the WOP, staff at CCWD engaged in sharing their corporate knowledge and offering their network contacts to permit access to new equipment. This information sharing resulted as a consequence of the success of the first phase of the WOP. The trusting relationships developed had stimulated non-participant BWS managers to seek assistance from CCWD counterparts. This further highlights the potential interdisciplinary aspects of WOPs.

BWS employees participating in phase one of the WOP process stated that they called CCWD employees for assistance in their work assignments, and that CCWD employees were available and helpful. The lab supervisor who participated in the job shadowing exercise of the BWS – CCWD WOP stated that the early conversations with CCWD lab staff:

" Gave her a road map to follow with real examples".

The participation in the job shadowing exercise permitted the supervisor to observe the CCWD lab processes and view the physical layout of the CCWD laboratory. The achievements of the first phase of the WOP translated into both direct and indirect results for BWS. In an interview, the laboratory supervisor mentioned that participants in phase one had developed open and long term relationships with CCWD employees. This has encouraged other BWS employees to contact CCWD employees for further information on their job assignments. The WOP participants

were therefore able to find common ground in different operating environments. For example, the procedure for water sample collection and storage were changed at BWS with an increased attention to safeguarding water samples collected to reduce contamination. The laboratory supervisor mentioned that the government of Belize has been attempting to put together a water quality initiative for several years. The Belize Government is planning to expand BWS services to a series of nearby rural villages as part of the Belize River Valley Water Project. The knowledge gained as part of the WOP process will thus facilitate expansion of the BWS water quality-monitoring program.

5.2.12 Village Water Boards (VWBs)

In an effort to analyze the potential role WOPs could play in developing knowledge and capacity development at the local or rural level, a cross section of Village Water Boards were examined. The results of these visits and interviews are captured in three examples, the Bullet Tree Falls Village and San Antonio Village in the Cayo District of Belize and the Placencia Village Water Board. The Village Board members of Bullet Tree Falls Village and San Antonio Village indicated that there are opportunities for BWS to act as a mentor in WOPs at the rural or village level. However, members of the Placencia Village Board viewed the transition to BWS as a negative experience. BWS management stated that currently BWS is often called upon to assist VWBs that are experiencing problems. From BWS perspective, a formalized capacity development process aimed at the local or village level would enhance the availability of water services to local inhabitants. VWB representatives responsible for the rural water sector also expressed interest in this type of WOP process.

Historically the VWB had not functioned adequately, as it lacked financial expertise. The transition to a new water board was in part a response to local farmers wanting to expand their crops and sell these in markets across Belize. The village water board chairperson mentioned that currently no mechanisms existed to assist village water board members lacking technical or financial skills. This is consistent

with the existing literature that examined small-scale independent providers (SSIP) of water service(Rusca and Schwartz 2012). They cited that although SSIP plays a key role in service provisions to local inhabitants, they are often left out of any formal arrangements and therefore ignored by international lending agencies.

The following section examines the findings resulting from interviews with village water board members. The three villages: Bullet Tree Falls and San Antonio in the Cayo district and Placencia in the Stann Creek District are representative of the rural challenges and opportunities experienced by many village water board members in Belize.

5.2.12.1 Bullet Tree Falls Village

Bullet Tree Falls (17°10'20"North, 89°6'46" West) is a village located approximately 5km from San Ignacio in Cayo District. The village is divided by the Mopan River and connected by the single-lane Salvador Fernandez Bridge. There are approximately 3000 people who live in the village, mostly Spanish-speaking Mestizos. A majority of Bullet Tree Falls Village residents work in San Ignacio and Belmopan either for the government or for the local tourist related industry.

The Bullet Tree Falls village has a rudimentary water treatment system that provides potable water to most of the villagers. Water is pumped from Mopan River during the day; many houses have a cistern for storing water. Water services are paid for at a flat rate of US$25 per month (US$300 per year). Of the 400-metered homes only 75 meters are in working order. VWB meetings are held twice per month in the office of the water board. The Village Water Board has amended the water bylaws for extended families and charges a flat rate. Two trips to the Bullet Tree village were made; a preliminary visit was conducted without representatives from RDD to ensure an informal opportunity for villagers to discuss the water and sanitation situation in their village. This also provided this researcher the opportunity to discuss with BWS representatives their perspective on developing WOPS that focus on the village rural water boards. The second visit facilitated a formal but open dialogue with the village water board chairperson when the members from the RDD were present. At the time

of the visit the village water system had not been functioning for close to a month and water had to be trucked in on a daily basis.

The VWB chairperson was recently replaced as well as several water board members. The village water board members who had recently assumed their positions on the village water board expressed that they lacked both technical and financial skills in water management. Historically, the village water board was known for poor governance and often lacked accountability to villagers. The village water board was in a deficit financial situation given the recent misappropriation of village water boards funds. By charging extended families a flat rate for water consumption, less revenue for the water board was attained to maintain the pumps and water meters. The current village chairperson had been reluctant to assume the position given the continued lack of funds to repair or replace the non-functional water pump. He also cited that there existed no formal training available to water board members on technical or financial matters. A request had been placed with RDD to replace the pump, and in the interim, water was trucked to village on a daily basis. The RDD representative indicated that several villages lacked technical and financial expertise in administrating VWBs. BWS was called upon to support these village water boards although no formal mechanism existed to develop the capacity to support them. Currently these types of requests are often seen as a drain on BWS resources given that there is no provision in the RDD or BWS business plan for these services. In conversation with the BWS representative, it was mentioned that the development of a BWS – Village Water Board WOP would allow for a formal relationship to be established with village water board members. BWS staff saw advantages to a WOP process similar to what exists between BWS and CCWD at a national level but instead channeled down to the village level. In this model, BWS would mentor the Village Water Board members. In this way, BWS expressed that they would be able to assist the village water board in the daily operations of its water system.

5.2.12.2 San Antonio Village

San Antonio (17°4'43"North, 89°1'25" West) is the second largest village in Cayo district with a population of about 2,500 Mopan Maya villagers and 180 households. It is one of the most developed villages in Southern Belize with a central water system servicing village household for water needs, no centralized sewage system exist in the village. The predominant languages are Spanish, Mayan and English, with the younger generations speaking all three. San Antonio was named after the Spanish priest, St. Anthony of Padua In the early 1960s, Roman Catholicism was the only religion in the Village, but the majority of the population has now converted to Pentecostal Christianity and seven different churches have been organized in the village. As of 2010 approximately 80% of the villagers are literate. The village is experiencing development of new houses constructed of steel and concrete materials. The main industry is farming, and income is derived from peanuts, vegetables, maize, plantains and watermelon, among other crops. San Antonio is the largest producer of peanuts in Belize. The VWB refers to the water system, as a public water system. The local villagers replaced the village well that no longer supplied sufficient water and built the existing water system in early 2012.

The local water board initiated a funding request to the RDD and funding was obtained from the Social Investment Fund to install 6000 pipes for a distance of 6 miles. The water is piped from a nearby source in the Mountain Pine Ridge to a reservoir that is often overflowing with water. Given the abundance of the water supply, the village board is prepared to supply water to surrounding villages for a fee. Although the village households have water meters, a flat rate is charged to villagers. The elected Chairman or President governs the community with six councilors for a period of three years, elected through ballots from voters. Party politics is a volatile aspect of community life in the village. A strong local institutional and governance framework resulted in the San Antonio Village board, playing an instrumental role in coordinating the development of the central water system. The VWB established a process whereby each village family contributes time or money in the building and

maintenance of the central village water system. Each family donated (or paid) for 20 feet of piping; the villagers could also make an in kind contribution by assisting in the construction of the water system.

5.2.12.3 Placencia Village Water Board

The Placencia Peninsula is located between 16_300 and 16_400 N latitude and 88_150 and 88_250 W longitude. The Placencia Peninsula is located within the Stann Creek District of Belize. The eastern shore of the peninsula is formed by a central segment of the Mesoamerican Barrier Reef System, the second largest barrier reef in the world and a UNESCO World Heritage Site. Several small villages are located on the northern end of the Peninsula with the Placencia Village located at the southern tip of the peninsula with a population of approximately 800 permanent residents.

It is roughly 24 km long and varies in width from 50 km to 4.5 km at its widest transect. Ecologically, it is the largest sand spit within the coastline of Belize (Ariola, 2003; Meerman and Boomsma, 2010). The Placencia Village has experienced dramatic growth in the tourism industry since 2001(Wells et al. 2014). Historically the local fishing industry and ecosystem service have been negatively impacted by inadequate domestic and tourist accommodations septic systems (Ariola, 2003). The recently approved of the anchorage for cruise ships, and the associated social – economic pressures of increased tourism is raising concerns of local residents (The Guardian-Belize, 2014).

Accommodating these cruise ships requires the development of a centralized wastewater management system on the Placencia Peninsula. The Inter-American Development Bank (IADB) has advanced $10 million to the Belize government to develop the central WSS facility (Wells et al. 2014). This centralized WSS will be managed by BWS, resulting in the removal of the local water boards of the villages located on the Peninsula. Previously, individual villages on the peninsula have managed local water and sanitation issues through Village Water Boards as described in section 5.12 of this thesis. The majority of the Belizean families who reside in the

various villages on the peninsula settled in the region in the late 1800s. Local resident relied on a thriving marine resource industry, which supported local residents into the late 1990s. The over-exploitation of these marine resources in the late 1990s led to the decline of the marine industry in the region (Wells et al. 2014).

Since the mid 1990s a large influx of foreign-born immigrants have settled in the region and have influenced the economic imperative towards increased tourism as a source of economic growth. This demographic shift along with changing values and views about water and wastewater in response to increased tourism development has renewed many residents' worries about water quality and availability. Further, the recent dissolution of the local village water boards and a shift to a new centralized sewage system proposed by BWS has resulted in contentious conversations about the possibilities and promises of new technologies (Wells et al. 2014). The following quotations illustrates the controversy posed development of a new centralize water and sanitation system and the dissolution of the village water board emerged from interviews with members of the now defunct Placencia Village Water Board:

> *"We will not benefit from this project. We had one of the most profitable VWBs in the country, and everything was going well. Yet BWS will take over the VWB and manage the WSS in Placencia. The government had promised that this would happen." (Pers. Comm.* Placencia Village Water Board*)*
>
> *"Although I was against what is happening, we have no choice so we decided to be part of the change…better to be part of it or else we will not have any say in what will happen." (Pers .Comm.* Placencia Village Water Board*)*
>
> *"It is not just the Placencia VWB that is opposed to the cruise ships, the Placencia Tourism Board is also against the development." (Pers. Comm.* Placencia Village Water Board*)*

Since the dissolution of VWB boards, members expressed their lost of empowerment in local decision making.

> *"We have no choice in what is going to happen, so we may as well be a part of the development and try and influence what is going to happen." (Pers. Comm.* Placencia Village Water Board*)*

We found that there was quite a diversity of opinion on the potential environmental impact of the Placencia Lagoon and surrounding coastline with the development of cruise ship anchorage. One individual interviewed from the community of Placencia stated:

> *"We do not have any formal training on environmental issues, but we see the small changes that are occurring and know that it is not right." (Pers. Comm.* Placencia Village Water Board*)*

Local residents and VWB members interviewed expressed concerns as to who would benefit from the changes, and saw the new wastewater system as an imposition by the Belize Government. The power differentials between the Government, IADB, developers and local organizations such as the VWB and the Placencia tourism board should be considered in designing WSS for local residents.

> *"The dredging is causing problems here. They need to make the channels deeper and that will not be good for the local fishing industry. We are a small community; we cannot handle all those tourists that those ships will bring. It is too much at one time. It will also destroy our local tourist trade."* (*Pers. Comm.* Placencia Resident)

Finally, there is general uncertainty about the resiliency of the new system if the region experiences a hurricane or significant storm surge. Along with growing questions about the new system, financial interests of utilities, commercial industries, foreign developers, and environmental services complicate the future of water and energy systems on the peninsula. Thus, power, culture and history are key variables that structure the values associated to WSS.

Capacity development within WOPs needs to allow for historical and political discourse on the introduction of new technologies and contextualize it with assessments of local environmental perceptions and practices. Capacity development within WOPs needs to allow for examining the economic advantages and disadvantages of the introduction of new WSS systems and the experience by

different sectors of the community. These improvements within WOPs also requires allowing for a diversity of voices to be heard by creating a diversity of ways stakeholders legitimately participate in decision making process while taking into account the possibility of contrasting perspectives.

5.3 Perspectives from Intermediary organizations

The Inter-American Development Bank (IADB) is the largest source of financing for the Latin American and Caribbean region and has actively supported the WOP process since the launch of the Latin America and Caribbean WOP platform (WOP-LAC) in 2007. IADB describes the WOP-LAC objectives as bringing together water utilities to share their respective knowledge in areas such as energy efficiency, commercial management, corporate governance, and non-revenue water. UN-Habitat and IADB worked in collaboration on the WOP-LAC Secretariat, which also comprised 8 water operators from the region. WOP-LAC at its inception targeted the establishment of 10 water operators' partnerships per year. To achieve this objective, a series of workshops were jointly conducted by UN-Habitat and the IADB. A key objective of these workshops was for operators to share and exchange experiences relating to critical aspects of water and sanitation services. A second objective was to connect suitable mentoring and recipient water operators to partner with each other through matchmaking initiatives.

The coordinated efforts by UN-Habitat and financial support from IADB resulted in considerable achievements by WOP LAC. WOPs and training workshops were financed from IDB's non -reimbursable Technical Cooperation operations and administrative funds. Recognizing the specific needs of Caribbean water operators the CariWOP regional platform was established. The regional platform included IADB, Caribbean Development Bank (CDB), the Caribbean Water and Wastewater Association (CWWA), IWA and the following water operators; Anguilla, Antigua, Bahamas, Barbados, Belize, Dominica, Grenada, Haiti, Jamaica, Montserrat, St. Kitts, Saint Vincent & Grenadines and Trinidad & Tobago.

In conversation with members of the Reclaiming Public Water Network Organization, members stated that development banks such as IADB were mainly funding training for water utilities for which they had investment credits and loans. They argued that development banks supported neoliberal water sector reforms, using WOPs as a mechanism for seeking commercial activity and introducing private sector stakeholders in the management of water and sanitation services in LAC.
In 2012, Philipp Terhorst published a paper: A critique of the Water Operators Partnerships in Latin America and the Caribbean (WOP-LAC). This paper posits that a serious problem of WOP – LAC was that WOP projects were commercially oriented and driven by private sector operators to advance future commercial projects

6 Discussion

6.1 Identification of problems in the WOP process

The basis of water governance in California rests upon the Prior Appropriation Doctrine and is highly relevant for examining WOPs in terms of how values and uses of the mentors (e.g. CCWD) are expressed within the realm of capacity development of the mentees (e.g BWS). Prior appropriation water rights are the legal doctrines claiming that the first person to take a quantity of water from a water source for "beneficial use"—agricultural, industrial or household has the right to continue to use that quantity of water for that single purpose (Schutz 2012). Subsequent users can take the remaining water for their own beneficial use provided that they do not impinge on the rights of previous users. The right to water is allotted to those who are “first in time of use”(Gopalakrishnan 1973). Developed in the western states of the United States, during the California Gold Rush of 1849, this doctrine was meant to protect local settlers from excessive water extraction by miners. Water in the Western United States has historically been limited and allocated based on the productivity of its use for humans. The Prior Appropriation Doctrine is based on a unitary homogenous value approach reflecting a water ethic that separates humans

from nature rather than being appropriate for socio-ecological systems.

Presently California is experiencing a severe drought. The challenges that Californians are currently facing reflect potential future conditions affecting water on a global scale in the context of uncertainty due to climate change. The current drought magnifies a condition that historically has existed in all of the western United States, the water demand of household, agriculture and industrial uses being greater than the water supply available (Gopalakrishnan 1973).

Representatives of CCWD and San Francisco Bay Area, emphasize in personal interviews:

"California is not running out of water, just cheap water".

" If we need more water we will just pump it from Oregon".

As described in the BWS – CCWD case study water and illustrated in Table 8,both BWS and CCWD view water as an input for economic production. Representatives of CCWD claim that while no cost is associated to water, the processing and delivery of water to ratepayers requires an associated cost recovery policy. This cost recovery policy advances the commodification of water resources and results in service delivery problems for poorer segments of society in both developed and developing countries while neglecting the roles of natural ecosystem in maintain the hydrological cycle (McDonald and Pape 2002). Although the availability or access to water is often described in terms of public or private management of water utilities, the reality is often that there is very little distinction between the outcomes of either management approach. If policy mechanisms focus on the economic valuation of water and cost recovery become the measure of successful performance for the utility, the delivery price of WSS becomes a regulating instrument for the demand and supply nexus (Swyngedouw 2005). As stated in the CCWD example, the imposition of constraints on water uses due to the drought jeopardize the ability of CCWS management to recover the cost of operations. Accordingly, the viability of CCWD operations can only be maintained by productivity increases or price increase of WSS services. However,

productivity increases are generally capital and technology intensive and almost always lead to the need to seek new sources of capital while reducing the workforce (Swyngedouw 2005).

Policy mechanisms that focus on the economic valuation of water can be argued to be equally critical in the delivery of WSS. The discourse of the 'virtuous cycle' of water services is advocated by members of the GWOPA steering committee as a means by which WOPs result in expanding WSS to poorer segments of society. CCWD advocates fees or metering for water usage to provide incentives for water conservation and cost recovery, which in turn is earmarked for maintaining and expanding, required infrastructures to enlarge WSS networks. By defining water as a commodity alone, alternative expressions of values that society places on the uses of water become sidelined and institutional mechanisms then fail to respond to these values. Taking solely an instrumental approach to water valuation, does not recognize the plural values societies attach to water and its uses. Instead it relegates cultural, social aesthetic and environmental values to a subordinate position within a society that views water simply as a commodity.

The reliance of the CCWD on market mechanisms and technological solutions for addressing water allocation issues results in a technocentric value system for resolving water distributive issues. A technocentric value system masks the power asymmetries that arise from advancing market and objective solutions over more socially deliberated paths of development. As described by Swyngedouw (2005), "the water problem is not merely a question of management and technology, but rather, and perhaps in the first instance, a question of distributive power". Identifying asymmetric power relations between actors and the discursive power in characterizing WSS delivery requires greater legitimization in light of diverse sets of values that actors may place on water. This requires understanding: " who gets access to it and on what terms" (Linton 2010).

WOPs took their roots after World War II with the establishment of twinning arrangements between public-public water utilities based on technical needs. They

were developed as peer-to- peer partnerships focused on capacity development, within a mentor – mentee partnership framework. Although the mentor – mentee WOPS framework offers the outward impression of inclusion of the partners in the capacity development process (Wehn de Montalvo, Mvulirwenande, and Alaerts 2013). However, the technocentric approach adopted by the CCWD serves to reinforce a hierarchical structure. CCWD has acquired the expert knowledge defining its role as the mentor and BWS is the mentee, while at the same time importing their technological and market oriented solutions to address WSS issues in Belize. Thus, rather than engaging in a two way exchange of knowledge systems, the BWS –CCWD WOP framework has operated more in the way of a monocentric value approach, that relies on market hegemony rather than the co-development of ideas and solutions based on local needs and practices(Wehn de Montalvo, Mvulirwenande, and Alaerts 2013). It is not suggested here that technical or market solutions should *not* play a role in the delivery of WWS, but rather technical or market solutions should take into account the complexities of implementing WSS solutions that account for multiple values and goals associated with the delivery of WSS to local communities.

The analysis of the GWOPA database identified that Globally Non – Revenue Water (NRW) management was the principle theme underpinning the participation of water operators in WOPs. Funding organizations such as the World Bank, IADB, and PPIAF cited that one of the major issues affecting water utilities in developing world is NRW; the difference between the amount of water put into the distribution system and the amount billed. As stated by Gesner Oliveira World Bank NRW expert on the World Bank website: (http://www.worldbank.org/en/news/feature/2013/09/03/latin-america-water-loss-energy-efficiency)

> *" Reducing water loses is the most effective way for utilities to generate higher income and increase their supply of potable water."*

IADB plays a significant role in promoting and establishing WOPs in the LAC region. IADB was key a member of the WOP LAC secretariat and a funder of the WOP partnerships in the LAC region (*Per. Comm*. IADB representative). As a member of the LAC secretariat, IADB invited water operators from developing and developed countries to attend NRW workshops. The workshops were funded by the IADB who would moderate a series of exercises where water operators categorized their strengths and weakness with the goal of identifying potential partners as part of the WOP process. As identified in the BWS – CCWD case study, the pre selection of water operators by IADB focused on performance indicators such as NRW may have resulted in the exclusion of water utilities that did not support introducing market mechanisms such as metering to reduce NRW or to countries that did not rely on funding from IADB (Terhorst 2012).

Moreover, there has been very little public or civil society participation in the BWS – CCWD WOP process. The exception would be the Placencia Village Board, which also revealed an alternative role of IADB in Belize. Prior to being dissolved by the RDD, the Placencia Village Water board was described by one representative of the BWS and RRD, as one of the most efficient and profitable Village Water Boards.

> *"The Placencia Village Water board is very well run, it's the best water board in Belize." (Pers. Comm.* Representative BWS and RDD Representative*)*

The Placencia Village Water board highlights the limited role or power of local actors in the management of water and sanitation services. As described in section 5.12.1, the recent approval by the Belize Government for the development of the Placencia Peninsula as an anchorage for cruise ships has resulted in concerns being raised by stakeholders (*Pers. Comm,* Placencia VWB). These concerns were further fueled by the dissolution of the Placencia VWB as a result of the IADB USD $10 million loan to the Belize government to develop a central water and sanitation service operated by BWS to accommodate the arrival of the cruise ship tourist trade (Wells et al. 2014).

In this case, the IADB directed both the WOP process by funding the BWS – CCWD WOP and provided the government a loan guarantee. In addition, the IADB was a central actor in the Waste Water development program coordinated through the Belize government. This dual role enabled IADB to establish a strategic orientation in the decision making process of the proposed wastewater treatment facility. Specifically, the IADB coordinated with the Belize Government to not only fund the treatment plan, but also its daily operation through a WOP underpinned by the values and return on investment objectives of the IADB. As described by (Wells et al. 2014), local actors have limited control of the type of tourist development, and even less information for creating interventions to guide tourist behavior and mitigate adverse impacts(Wells et al. 2014). Local community members interviewed identified the cruise ship tourists as directly competing with the smaller-scale local tourist trade, on which their livelihoods depend on.

The integration of the IADB at both the political (e.g. funding government WSS) and operational levels (e.g. funding BWS – CCWD WOP) resonates with the tensions identified by Swyngedouw (2005) in which he argues: "The state is, in other words, a central actor in establishing and maintaining, "market principles." Privileges one model for managing water while excluding alternative modes of organization" (Swyngedouw 2005).

Similarly, BWS and IADB are identified by local residents as private external institutions intervening in the autonomy of the community's village-level decision making to respond and manage socio-economic affairs and associated impacts on water resources. With the dissolution of the Placencia Village Water board, there was a transfer of control and delivery of the water system from local actors to BWS, which was viewed as illegitimate by ex-village board representatives. This transfer in the dynamics of social and political power instigated by external actors (e.g. BWS via the IADB) exemplifies the loss of power of local citizens (Swyngedouw 2005).

IADB development of the Placencia wastewater treatment facility reconfigures the autonomy of water management by the village, which has played a central role in

maintaining the livelihood of Placencia villagers, into a capital asset generating a return on investment for IADB, and influx of foreign currency for the Belize government. Futhermore, local villagers are turned into rate payers who pay for the delivery of improved water and sanitation service, as described by CCWD, rather than citizens entitled to water which has traditionally belonged to their cultural heritage(Swyngedouw 2009)

The dual role of IADB in funding the BWS – CCWD WOP and the water and sanitation project redefines the WOP process into a hierarchical partnership focused on capacity subsitution rather than capacity development. As described earlier, capacity development requires more than the acquisition of resources or knowledge from CCWD, it more importantly requires the strengthening of the capacity of BWS and local actors to act and develop solution unique to the local environment and socio-cultural context. The BWS – CCWD WOP requires re-structuring allowing for a polycentric governance framing that recognizes the plural values that different actors ascribe to water resources. A polycentric WOP framework recognizes that capacity development is an endogenous process recognizing local social norms. External actors such as IADB and CCWD would support local actors such as BWS and VWBs to share and build on an existing knowledge base rather than paving a the way to a singular approach to problem resolution (Wehn de Montalvo and Alaerts 2013). Expanding the WOP process to include a multi- tiered process, broadens the role of mentors from the mechanical process of transferring external knowledge as defined in the North – South partnerships to one in which South – South partnership can be included in the structuring of WOPs (Wehn de Montalvo et al. 2013). The Placencia VWB highlights a salient example on the importance of recognizing the political dimension in WOP structure, especially power relations and how local tensions and conflicts can be mobilized to provide direction to the WOP partnership to ensure capacity development that addresses local needs.

6.2 The need for a Polycentric governance approach for WOPs

The framework of polycentric governance provides a useful tool on how to achieve this ambitious goal of the second principle of the Dublin Statement. As identified in the BWS –CCWD case, a major challenge for capacity development of collaborative water partnerships such as WOP is how to connect the multiple and diverse spatial scales of institutions and networks at the international, regional and national scale with practices than can more effectively and equitability promote action at the local level in the delivery of water and sanitation services (Medd and Marvin, 2008).

A polycentric governance structure has multiple decision makers and decision structures, which are assigned limited and relatively autonomous prerogatives to "determine, enforce and alter legal relationships", in which no one institutional scale has an ultimate monopoly over decision and power. Decision makers are constrained and limited by agreed-upon rules and directives (Ostrom 2012). A crucial feature of polycentric structure is the inclusion of a self-correction mechanism that operates at different scales. This facilitates local stakeholders and their officials to innovate and to intervene so as to correct uneven distributions of power (Ostrom 2010b)

Aligica (2012) using, Karl Polanyi, understanding of self correction and self organization in polycentric governance structure defines this mechanism of self-correction as self-generating or self-organizing as patterns where individuals acting at different levels within the polycentric structure have incentives to create or institute appropriate patterns of ordered relationships (Aligica and Tarko 2012).

As described by Aligica (2012), "Polycentric structures are complex systems of power, incentives, rules, values, and individual attitudes combined in a complex system of relationships at different levels" (Aligica and Tarko, 2012: p247). These structures recognize the plural values of water and what the critical issues of the local population are in the management of water. It is important to recognize the role of polycentric structures to address collective action problems in influencing WOPs. WOPs in themselves represent polycentric systems because they encompass multiple

institutional structures emerging between and among stakeholders at different scales. At the same time, the current WOP structure suggests is potentially one "center" of governance in a polycentric system therefore undermining the whole concept of polycentrism (Lubell 2015). Within the current WOP structure, as exemplified in the CCWD-BWS case study, the mentor is the connection point between the different polycentric or monocentric center(s). GWOPA is the connection point of these two "centers". In the case study, CCWD is the monocentric ' outsider' who is an agent that is not subjected to the same system of rules as "insiders" (BWS) are in relation to water management within a particular political or geographic jurisdiction (e.g. Belize). CCWD has a clear functional role to act as a mentor in partnerships as per the GWOPA mandate.

Within a polycentric system, a particular set of stakeholders might be seen as an outsider to a given scale of institutional structures but could be an insider at another scale. This shifting of positions across scales can occur in different circumstances and at different moments in time. For example, in the case of CCWD-BWS, at the international scale, BWS could be seen as an insider within the WOP framework linking international water operators with national ones, while BWS could simultaneously be seen as an outsider at the local village water board level. As the Bullet Tree Village water board representative explained, there are limited channels of communication between the village water board and any representation from BWS. Moreover, BWS imposed metering on the village, which became illegitimate because the villagers were not collecting the imposed tariffs associated with the installed meters. It is therefore possible to identify the connection points between different polycentric systems based on the identification of insiders and outsiders within any given set of institutional structures. The identification of outsiders versus insiders is assessed according to the different rights that each group possesses in different capacities. In the case study, CCWD is the outsider for the Belize water management context- operating under a different set of rules and historical governance structures based on California's Prior Appropriation Doctrine.

6.3 A multi-tiered WOP framework

The current WOP framework does not apply a polycentric approach to governance in addressing capacity development of water operators. Within the WOP process, monocentric governance refers to a unidirectional role of the mentor or funding agency in the exertion of control over the partnership that emerges. In the case of the BWS – CCWD WOP, the IADB influences the procedural aspects of the WOP and its eventual outcomes. They do this by setting the agenda and deciding the goals and means to address WSS of water operators, which can be described as a top – down process, increasing the risk of capacity substitution as opposed to capacity development.

The multitiered WOP framework proposed in this research (henceforth MTF) identifies the need to consider several levels of intervention while recognizing their interdependence in order to ensure a sustainable and equitable delivery of water and sanitation services in both the urban and rural sectors in Belize. The principle focus of the MTF is to enlarge the role and capacity of the public utility (e.g. BWS) to encompass the inclusion of multiple values and uses of water by various stakeholders. The MTF through a top-down and bottom-up interaction will achieve the necessary expansion of WOP process to include political, technical or financial support while recognizing the associated values of water by local households.

The multitiered WOP recognizes that capacity development is the acquisition of knowledge and skills, which *builds on and harnesses rather than replacing endogenous capacity* to address local concerns. Within this context, capacity development allows those responsible for water and sanitation services to identify their own needs, and design and implement the best suitable WSS strategies within a given local context. The process to develop capacity for improved resiliency of socio-ecological systems through the use of a multitiered WOP requires a balance between prioritizing the needs of local communities (bottom-up) with the biophysical realities of finite water resources at the national and global scales (top-down) (Berkes 2007).

Figure 12, illustrates the structure of the proposed multitiered WOP. At Tier 1, (International (Mentor) – National (Mentee) level), capacity development refers to the acquisition and imparting of knowledge as developed for example in the BWS – CCWD WOP partnership (phase 1 and 2). The developed country water utility participants assume the role of the mentors.

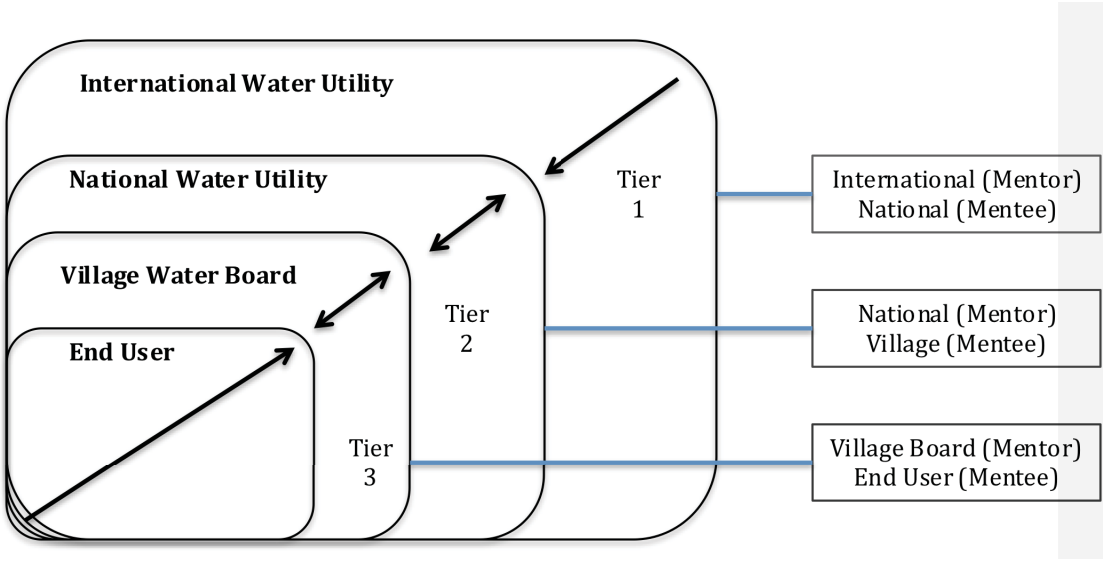

Figure 12: Proposed multitiered WOP framework
(Adapting (Bolger 2000) model on capacity development.)

An example of capacity development of the BWS – CCWD WOP process is the change in the safety culture at BWS. BWS representatives adapted the CCWD safety protocol to meet local needs. A second example was the construction of a designated laboratory facility to perform tests on water quality. Here, the focus was not on equipment or materials, but rather on how lab staff could adapt the standard operating practices to meet local needs and expectations. At this level the mentee seeks to enhance understanding of policies as well as apply technologies used by the mentor. As described by BWS representatives in the interviews, the aim would be to establish the certification of water operators to meet international or national standards or improving links between vocational training institutions and academic

educational institutions. However, representatives of CCWD indicated that the capacity development of the BWS – CCWD WOP was to enhance the capacity of water operators in Belize to deliver centralized water and sanitation services to ratepayers. Although this research was able to identify capacity development at the BWS facility as a result of the BWS – CCWD WOP, the lack of involvement of community or political actors in the WOP process resulted in only singular values being associated to water uses and beliefs. In this way, the WOP follows a monocentric approach with the mentor and funder setting the agenda and deciding the goals and means to address WSS of water operators.

A fundamental difference between Tier 1 and Tier 2 is the role of the mentor. Tier 2 focuses on facilitating the interaction between the multiple local users and values of water in the mentee water sector. Within Tier 2, (National (mentor) – Village Water Board (mentee)), capacity development would occur within the context of local societal institutions. Establishment of the Tier 2 in the MTF WOP would enable different narratives to emerge in expressing the plural values associated to water uses. Within Tier 2, the WOP would focus on building and strengthening existing capacities by developing national expertise focused on protecting social and cultural capital. The importance of this level is the principle that activities geared towards capacity development within a local context do not adopt a "one size fits all" approach.

While the first two tiers are centered on the organizational level of capacity development, Tier 3 (Village Water Board (mentor) – End User (mentee)) is within the context of rural village water boards (VWBs) and the role they play in the management of a decentralized water and sanitation system. Tier 3 focuses on the capacity development of the VWB members and their direct interactions with end-users. An example would be development of collaborative labor to construct the San Antonio Village water system. The leaders of the VWB, in consultation with local villagers, designed the water system and then established a work process that met local needs. Members who could afford to pay the costs associated with the new

water system did so, while those who could not afford to pay made a payment in-kind by supplying their labor to assist in the construction of the water system.

The establishment of an MTF WOP would permit this type of knowledge to be shared with other villages such as Bullet Tree Falls Village, which has experienced numerous set backs in its attempts to manage the local water supply. Currently BWS is called upon to assist Bullet Tree Falls Village, but as described by representatives of BWS, the current WOP process lacks the authority to assist with the capacity development of villages. The MTF WOP allows for the development of a participatory diagnostics process by villagers relying not only experts such as BWS representatives, but equally by end users of other village who may have experienced similar issues. This would additionally avoid capacity development focused on a North – South transfer of technical or expert knowledge so as to substitute the capacity of local knowledge systems, as the current WOP process advances. As described by representatives of BWS, there currently exists an overreliance on filling a technical gap instead of developing sustainable capacity partnerships (Vincent-Lancrin 2009). The expansion of the current WOP process to an MTF, however, changes the focus of the WOP from an input driven process to one that depends on endogenous capacity and local knowledge to function. The objective of the MTF is thus to change the focus of capacity development from the current process of transferring expert know-how entirely from the mentor to one that facilitates South - South interactions among local end users who have similar experiences (Vincent-Lancrin 2009).

A multi level WOP approach offers a potential framework to recognize plural values and multiple uses of water at diverse levels of intervention while understanding their interdependence for a sustainable and equitable delivery of water and sanitation services in developing countries. The MTF could offer GWOPA a WOP framework that advances the UNDP definition of Capacity development:

> *["Capacity is the ability of individuals, organization and societies to perform functions, solve problems, set and achieve goals.* Capacity development entails the sustainable creation and retention of capacity in order to reduce poverty,

enhance self-reliance, and improve people's lives. (…). Capacity development builds on and harnesses rather than replaces indigenous capacity. It is about promoting learning, boosting empowerment building social capital, creating enabling environment, integrating cultures, and orienting personal and social behavior" (www.capacity.undp.org)]

Table2, identifies the typology of four main public - public water partnerships across different organizational scales and provides a starting point for examining the contextual factors of how a Multi-leveled WOP emulates polycentric governance to incorporate the values and beliefs associated with water in rural and poorer communities (Meinzen-Dick 2007). The complex nature of water requires WOPs to recognize the essential role of water in most social and economic activities. Successful WOPs should continuously deliberate and reflect on the needs and concerns of all stakeholders. This requires WOPs to view water as complex socio-ecological systems, and recognizes the multiple or plural values associated with water held by the State, private or civil society actors. Currently the design of PUP, including WOPs, focus on water operators or user groups that are connected to a central WSS delivery system. The BWS – CCWD case study identified that large segments of rural villages are serviced by stand-alone rudimentary water systems[3]. There are 123 village water boards that services 159 villages and are geographically, dispersed across Belize. The needs of the local population within both urban and rural sectors are also varied. A WOP process based on a more polycentric approach would stimulate the deliberation of plural values both between and within local, State and international scales and seek to integrate the values and associated needs of WSS of various end users in both urban and rural sectors(Hukka and Vinnari 2007).

[3] In Belize, rural water systems are called rudimentary water systems and are generally located in villages with a population greater that 250.They usually consist of a well with an electric submersible pump, discharging to an elevated tank to a piped distribution network. Only some of these systems disinfect the water.

As expressed by representatives of CCWD, there is a lack of expertise or capacity to assist BWS in expanding the network to households not serviced by a central WSS system. In overcoming this problem, the MTF WOP process would focus on developing the capacity of representatives of both BWS and VWB members. Building partnerships between the local and state jurisdictions would aid in addressing the needs and interests of nearly 40 % of Belize water users.

The necessary expansion of the WSS service in Belize will require the involvement of political and financial actors that should not be entirely associated with expectations of economic development to be coherent with the values of local citizen. The integration of funding agencies such as IADB in both the WOP process and economic development of the region highlights the power asymmetry associated with a singular economic logic that has been linked to the capacity development within the current WOP framework. As was suggested by a representative of the CCWD, funding sources such as the

"Bill and Melinda Gates Foundation "…are oriented to rural or users not connected to a centralized WSS system."

This indicates that other potential funding sources are available to harness local capacities from a "bottom-up" perspective and are better suited to address equitable access to WSS in rural communities. Within the current WOP process, actors not directly associated with the water utility or funding agency do not receive service or benefit from the partnership. Within the BWS - CCWD case identified, uneven power relations and differences in wealth within local communities were also present. A polycentric MTF WOP would serve to explicitly identify these power asymmetries by focusing on knowledge sharing and exchange of needs from the water system to non-state, non commercial actors and other local actors in the decision making process

To address the interconnected nature of the hydrological cycle and individual use of water requires the coordination of institutions and stakeholders involved in the management of water within the WOP process (Meinzen-Dick 2007).

7 Conclusions

Historically the management of water has evolved from a State's centered focus, to private or market-oriented institutions, and to the recent iteration based on the incorporation of private sector interests into the public domain by way of collaborative partnerships. This evolutionary process has been observed within developed countries and has been identified as a requirement in the transition to more sustainable water frameworks. However, this latest iteration in the evolution of water management has failed to recognize the variability and uniqueness of local populations and environments resulting in outcomes that fall short of the expectations of local populations. Furthermore, this institutional framework relies on a top down approach or capacity substitution narrative to address WSS issues, similar to the one found in the BWS – CCWD WOP, rather than a more decentralized capacity development objective.

The search for panaceas in WSS management has drawn on research or policy narratives that are generated to promote a particular institutional approach (Meinzen-Dick 2007) as in the BWS – CCWD case study. This focus on a single governance framework, whether public, private, or reconfigured public- private institutions "has too often ignored the need for a polycentric articulation between and among various institutions" (Meinzen-Dick 2007).

As world leader negotiate Post 2015 Development Agenda, and the transition to the SDGs, critics have highlighted the "one size fits all" approach of the MDGs need to be reformulated to include multi-layer approaches. Partnerships such as WOP that were developed to increase access to water and sanitation services in developing countries will need to operate at multiple levels of water governance, not only recognizing the biophysical and socioeconomic process, but also connecting the Global stakeholders to local stakeholders(Young et al. 2014).

The MLF WOP is founded on the inclusion of stakeholders from the Global to local and their associated values and uses of water. Capacity development within the

MLF WOP will focus on not only the individual water operators and end user connected to a central WSS, but be enlarged to include rural organizations and end users. The inclusion of multiple actors within a polycentric framework provides an adaptive and integrative process that focuses on a bottom up, self organizing approach, set to articulate multiple values and beliefs of water recognizing local needs within a complex and global context.

A MLF WOP operating within a polycentric framework results in multiple independent power centers and provides for locally appropriated organization such as VWB to monitor the goals of WOP funding institutions. As identified in the BWS – CCWD case study the current WOP structure promotes a high level of integration of funding organizations in directing the orientation and results of WOPs. As a consequence, the commodification of water is being advanced.

A potential caveat of this study is that only one WOP partnership was examined raising several limitations on drawing conclusions about the need and applicability of an alternative WOP framework. Moreover, the global mapping of WOPs from the GWOPA database is subject to limitations. The low participation rate of water operators in populating the database resulted in limited statistical interpretation of Global trends of WOP partnerships. GWOPA secretariat was made aware of this situation during the first phase of this research and as a resulted allocated considerable resource to address the low participation rate.

The selection of the first and only WOP partnership in North America presented both unique opportunities and limitations in terms of this research. The CCWD mentor location in Northern California provided the opportunity to examine a public water utility that operates in a water sector including both public and private water operators. Water operators in California places a high priority on market mechanism to regulate water allocation issues this may not be representative of WOPs in other jurisdiction.

Belize is the only English speaking county in Central America with strong linkages to North America and parts of Europe, Belize has a particularly strong

colonial past, gives BWS a unique context in both Central and South American setting and therefore may not be representative of other water utilities. Also in both South and Central America civil society and local populations historically have been major actors in developing the water and sanitation narrative, whereas in Belize the public or civil society voice was not present.

Introducing polycentric frameworks in the of developing collaborative partnerships such as WOPs requires further research in examining and understanding the overlapping levels of power and how these interplay with the required capacity development among a diverse groups of actors involved in the allocation of water as a resource. The current framework for water partnerships views water either as a public or a private good, but not a s a *common good* that invariably requires both bottom – up and top – down guidance to resolve local water problems within a context of broader practices for sustainable water management. Future research should seek to critically assess further WOP arrangements to examine to which extent that polycentric governance approaches are being promoted or discourage. There is growing consensus that Climate Change will act as multiplier intensifying existing challenges and sources of tension in the delivery of water and sanitation service. Recognizing the power relationship of all stakeholders involved in WOPs is essential in guiding choices amongst; funders, water operator partners and end-users to ensure that capacity development results in a fair and sustainable development of water and sanitation services for all segments of society.

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9 Appendix

Interview Protocol:
Collaborative Water Partnerships for sustainability and social justice
Short description of research and interview process.
The following introduction will be reviewed with participants at the start of interview.
Hello my name is Patrick Quinn; feel free to call me by my first name Patrick.
I appreciate the opportunity to meet with you today to discuss water services in Belize / Contra Costa Region. Currently I am completing a master degree at McGill University in Montreal, Quebec Canada. I am a member of Professor Kosoy research team, we are doing this project as a result of an invitation and funding from UN-Habitat – Global Water Operator Partnership Association.
As part of the research project I will be meeting with various individuals who have taken part in the Water Operator Partnership process or whom the Water Operator
Your participation is entirely voluntary and you can choose to decline to answer any questions or even withdrawal any point from the interview.
Confidentially: Anything you say will only be attributed to you with your permission; otherwise the information will be reported in such a way as to make direct association with you impossible. My pledge to confidentially also means that no other person or organization will have access to the interview material, which will be coded and stored in such a way to make it impossible to identify them directly with any individual. I will not be using any electronic device to record the interview. I will be asking you a few questions and taking some notes during the meeting, which will not take longer than one hour. Before we begin the interview let me review with you the process. I will ask you to read and a sign consent form
I will then ask a series of questions that should not take longer than 1hr.
If you have any questions feel free to ask them at any time.
(Review consent form with participant allowing time for participant to read the form and then ask for signature.) After the participant has signed the form: Ask the participant if they are comfortable with process and if they have any questions, or need anything before we start the interview process.
Interview questions.
After reviewing the short description of the research and interview, I will proceed to ask the questions designed for the specific group.
Below are the questions that will be used to used:

General questions:
How long have you worked at Belize Water Service?
What are your main functions / responsibilities at: Belize Water Service?
What role does Belize Water Services play in the daily life of citizens in Belize?
Water delivery ab. Sanitation ac. Recreation ad: Environment
Are there other ways / methods to obtain water without using the services of Belize water Services?
Who are the main users of water in Belize?
Can you describe some of the main challenges that Belize Water Services is facing in terms of water and sanitation services in Belize?
Examining participant's role and structure of partnership:
I am interested in knowing how did you become aware of the Global Water Operator Partnerships Association?
Can you describe the structure of the Belize Water Service & Contra Costa Water District partnership?
How long did you participate in the Belize - Contra Costa Water Operator Partnerships?
What was your role in the Belize – Contra Costa Water Operator Process?
How were individual(s) selected? How many?
How were roles assigned?
Were there formal meeting, agendas, and minutes of the meetings?
How did the partnership function.
How were decisions made in regards to the Belize / Contra Costa Water Operator Partnerships?
How would you describe the Belize - Contra Costa Water Operator Partnerships relationships?
What recommendation(s) would you suggest concerning the Water Operator Partnerships partnership structure? Motivation for partnership: What was the main reason(s) for the entering into the partnership with Belize Water Service - Contra Costa Water District?
What was the specific goal of the partnership?
What were the key indicators of success and how did the group decide on these indicators?
Can you describe if the goals of the partnership were achieved?
Evaluate partnership: Why do you think water partnerships such as Water Operator Partnerships are important?
For water operators? For customers? For the environment? For society?
Other reason?
How important is it that Water Operator Partnerships are structured within a not – for profit- environment. What would be different if Water Operator Partnerships exist in a for profit context?
What would you want to change in the Belize - Contra Costa partnership?

Other collaborative water partnerships.
Have / are you participating in any other water operator partnerships?
How does that partnership differ from the Belize - Contra Coast Water Operator Partnerships?
Can you describe examples of how the Belize - Contra Costa Water Operator Partnerships shared knowledge and good practices.
With whom did you share this information?
Which key lesson(s) learnt in the Belize Water Services - Contra Costa water partnership would you like to share with other water operators?
How would you share the lessons learnt as part of the Belize Water Services - Contra Costa water partnership?
What are the top five pieces of advice you would give to a colleague:
Global Water Operator partnership:
What role has the Global Water Operator Partnership Association group played in the management of Water in Belize / Contra Costa?
What role do you see Global Water Operator Partnerships Association playing in Belize Water Services - Contra Costa water partnership in the future?
In what fashion are you utilizing the Global Water Operator Partnership website?
Are you utilizing other websites in regards to your water partnership?
Ecological Flows
In this section I am interested in examining how you balance the water needs of other species.
Can you describe the importance you placed on the water requirements of other species?
Can you describe what measures are in place to meet the water requirements for other species?
How do you monitor the success of these measures?
Closing comments:
In closing do you have any comments that you would like to share concerning the Belize- Contra Costa Water Operator Partnership? Do you have any questions?
Thank you for sharing your experiences on the Belize – Contra Costa Water partnership with me today, I appreciate the time and the candor of your comments. Your comments will be helpful in my research.

Note time the interview ended:

Notes on the interview:

Government of Belize participants interviews questions.

After reviewing the short description of the research and interview process, I will proceed to ask the questions designed for the specific group.

Today I would like to discuss with you the governance and management of water resources in Belize.

General questions: Can you describe the water governance model or framework in Belize?

What is the Belize government's approach to water management and sustainability?

Who has the government identified as key stakeholders?

What role does the government sees these stakeholders playing in the management of water resources in Belize? (May need to probe to examine the participatory aspect of water management in Belize and that all stakeholders have been identified)

Institution and legal framework:

To understand the government's role in water management in Belize it is important to understand the interests and mandates of the departments involved in the water resource management.

How many government agency or departments are involved in the resource management of water.

Can you describe the institution and legal framework to govern and manage water resources in Belize?

What are the mandates and interests of these various departments?

Sources of water and main users of water in Belize:

What is the most common source of water supply in Belize?

In the rural regions In the urban regions In the tourist regions

Is water availability a problem in these regions? Is water quality a problem in these regions?

Differentiate water and sanitation services. Can you describe what measures the government has put in place to ensure availability to the various users of water and sanitation service?

How are the services financed in the regions? How is usage monitored in regions?

How are ecological concerns identified in the various regions?

Users of water and sanitation services

Domestic households Industrial / business Agricultural sector Tourist sectors

Challenges: Belize is often described as a country that is endowed with substantial surface and groundwater resources What are the main challenges the Belize government faces in the management of water? What are the challenges that domestic households / individuals are facing in terms of water and sanitation services in Belize?

How can the water institutional framework be improved to meet these challenges?

What are some of the environmental issues that currently exist in Belize?

In this section I am interested in examining how the government balances the water needs of other species. Can you describe the importance the government places on the water requirements of other species? Can you describe what measures are in

place to guarantee meeting the water requirements for other species? How do you monitor the success of these measures?
Government's policies:
What are the top three long-term policy initiatives the government is currently working on?
What are the top three short-term policy initiatives the government is currently working on?
Introduce Belize Water Service:
I am interested in learning what role does Belize Water Services play in the daily life of citizens in Belize?
Water delivery ab. Sanitation ac. Recreation ad: Environment
Who are main users / customers of Belize Water Service?
Can you describe how water and sanitation services changed in Belize since water and sanitation service are administered by Belize Water Services?
Introduce concept of Water Operator Partnerships:

(Examining knowledge of collaborative water partnerships in Belize)
The United Nations Secretary General Advisory Board developed Water Operators Partnerships (WOPS) in 2006. Water Operators Partnerships are peer support arrangements between two or more water and sanitation operators, carried out on a not-for-profit basis.
I am interested in knowing have you heard of Global Water Operator Partnerships Association (GWOPA)?
Are you aware that Belize Water Service has entered in a collaborative a water partnership with the GWOPA framework?
What role do you see collaborative water partnership such as Global Water Partnerships assume in Belize?
An objective of the Global Water Partnership is to facilitate achieving the Millennium Development Goals in relationship provide universal access to water and sanitation services.
Can you describe what measures the Belizean government has take to achieve the Millennium Development Goals in relationship to providing universal access to safe drinking water and sanitation services.
Climate Change: How has climate change the management of water resources in Belize?
How should freshwater governance and management change to ensure long-term sustainable water usage in Belize?

Note time the interview ended:

Notes on the interview: