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Wastewater Reuse Policy in Lebanon:

The role of actors in policy implementation for agriculture

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I. Introduction

The Middle East and North Africa (MENA) is the most arid region on Earth. Due to water scarcity, combined with overpopulation, climate change, and mass migration of humans from various regional conflicts, recycling wastewater has become a necessity for many. Furthermore, with this growing population comes the increase in food demand; the region does not have the natural water resources to withstand this phenomenon and needs to be proactive in its environmental and agricultural policy. Improper use of wastewater, including using raw wastewater for farming and irrigation, has many serious health risks, thus emphasizing the need to properly treat wastewater and monitor its quality. Due to these potential threats, the governments need to be actively involved in the treatment and reuse of wastewater, treating it as a top priority within the nation's water sector.

The World Bank estimates that the average global water availability is 7,000 cubic meters per person per year; however MENA has about 1,200 cubic meters per person per year with a projected increase of 200 million people within the next 10 years¹. In a regional context (MENA), Lebanon is the most water-rich nation, leading many experts to suggest that it export water sources to less privileged neighbors.² However, this does not imply that the water-resources are endless, and the people of Lebanon will need to be more proactive with their water sector and environmental policy.

Lebanon has had many reforms within the past few decades in its water sector. These reforms have been hampered by domestic violence and a 15-year civil war, destroying many

¹ "Water Use and Rights (Middle East and North Africa)." 2012

² Kaitaniemi, Marja. "Conflicts, Urbanization and Bad Governance: Explaining Lebanon's Water Problems." 2010. Web.

national wastewater treatment plants (WWTPs) and ruining the country's economy. The nation has adjusted its previous laws to accommodate for wastewater reuse, specifically for agricultural irrigation. Wastewater treatment plants can be found along the coast and in rural areas of the country, with many different actors involved in the operation and management of these wastewater resources. However, the nation has yet to implement these guidelines set forth by national water laws. This paper will examine the process of policy implementation of wastewater reuse for agriculture in Lebanon.

The beginning of the paper will provide background information regarding Lebanon's most recent changes in water law, focusing on the past 25 years of water policy. The analysis will be done using the *contextual interaction theory* as the main framework, explained further in the literature review. Using this theory, the paper will first assume that the failure of policy implementation is due to the relationship between actors, influenced by different characteristics (motivation, information and power). Second, this paper will frame Lebanon's wastewater policy in three contexts: case-specific, structural, and wider. Third, the analysis will draw connections between these contexts and the potential influence they may have on actors and their characteristics. Finally, this paper will briefly draw on success in wastewater policy reform and implementation from neighboring countries Israel, Jordan and Tunisia, and suggest a new policy reform for Lebanon, focusing specifically on the involvement of different actors in the water and agricultural sector. A collection of data regarding Lebanon's wastewater capacity and reuse in the past two decades will be used to support the argument that the country has failed at improving and implementing its current wastewater reuse in policy. Finally, the paper will argue that Lebanon will need to reuse wastewater in agriculture in order to fight the population growth and threat of global climate change. The literature review will provide a theoretical framework

focusing on the numerous actors involved in wastewater policy, as well as the greater context these actors find themselves in. The ultimate goal will be to provide policy recommendations to the Lebanese government regarding wastewater reuse implementation, emphasizing the significant effect that different actors have on policy outcome.

Data Gathering/Methodology

This research paper will examine the failure of wastewater reuse policy implementation for agriculture in Lebanon by examining the role of different actors and their characteristics in a regional and structural context. The research will build on qualitative case study research for methodology and will aim at describing and understanding projects under study within the relevant contexts via analyzing and comparing three specific cases embedded in a similar context.³. The next section will compare three Lebanese projects: the USAID/Lebanon Water and Wastewater Sector Program (Case A); the YMCA of Lebanon Sustainable Environmental Practices and Policies program (Case B); and the USAID Small Villages Wastewater Treatment Systems Program (SVWTS). All three projects were implemented in collaboration between the Lebanese government and the United States Agency for International Development (USAID). The data will be collected from various official reports from governmental, non-governmental and transnational organizations, such as: USAID, the United Nation, World Health Organizations, World Bank, UN-Water, Arab Countries Water Utility Association, International Water Management Institute, as well as numerous academic articles.

Finally, the analysis of Lebanon's failure of wastewater implementation in the agricultural sector will be backed by comparing it to Tunisia, Jordan and Israel's wastewater

³ Yin, Robert K. *Case study research: Design and methods*. Vol. 5. Sage, 2009.

reuse policies, arguing that their success is due to the cooperation of different actors and successful allocation of responsibility throughout the various government agencies.

II. Background

Water is scarce in the Middle East. The population is on the rise, with most of the residents living in urban areas. Additionally, global warming and climate change have highlighted the need for all countries to focus their environmental policies on sustainability. The strain on clean drinking water, as well as water for agriculture, has and will continue to effect the poorest population in the world. The decade-long war in Iraq has led to a mass migration of refugees to neighboring nations that are already dealing with scarce water supplies. More recently, the Syrian War has spilled-over Lebanese borders, increasing the country's population by one third within the past 2 years⁴. According to the United Nations High Commissioner for Refugees, there are currently just over 1 million registered Syrian refugees in Lebanon. Water is needed now more than ever.

Legal Framework for Water Sector

National Water Laws

Lebanon's water laws date back as far back as the French colonial period. However, wastewater became a goal of the government beginning in the 70's, and the water sector was reorganized with the aim of supplying the entire nation with water, irrigating the land to increase national

⁴ "Syrian Regional Refugee Response-Lebanon." *UNHCR*. United Nations, 2014. Web.

food security, with tariffs imposed to assist the national economy.⁵ The water sector as a whole has been revised and reformed many times, yet only law 221 pertains to wastewater in particular. Law number 221 dated May 29, 2000, *The Organization of the Water Sector*, marks the most recent change in the water sector, specifically dealing with the allocation responsibility to the Ministry of Hydraulic and Electric Resources (MHER) nation-wide.⁶ The law was revised in August of 2000 via Decree No.241, which was meant to expand on law 221, consolidating the previously decentralized water sector, consisting of 22 different water boards, into 4 regional water establishments (WE): North Lebanon, Beirut/Mt. Lebanon, South Lebanon, and Bekaa⁷. Additionally, all four of these WEs work under the newly developed Ministry of Energy and Water (MEW), replacing the MHER as the nation's main water sector actor. Less than a year later, the law was amended, and Law No. 221/2000 further empowered the WEs, giving them full autonomy and regional water authority to set and collect their own tariffs on water⁸.

Each of these establishments “enjoy legal entity as well as financial and administrative independency” and must “study, execute, exploit, maintain and renew the water projects in order to distribute the potable and irrigation water pursuant to the public directive plan of water or to a prior approval of the Ministry to use the public water resources”.⁹ The objective was to outline the management of the waster sector and was to be implemented immediately after publication, yet Lebanon has not seen full implementation capacity since.

⁵ Catafago S. Restructuring water sector in Lebanon: Litani river authorityfacing the challenges of good water governance. In : Hamdy A. (ed.), Monti R. (ed.). Food security under water scarcity in the Middle East: Problems and solutions. Bari : CIHEAM, 2005. p. 81

⁶ Ibid., p. 83.

⁷ *Lebanon Water Report*. Rep. no. 34. N.p.: Aquastat, 2009. *Food and Agriculture Organization of the United Nations*. Web.

⁸ Ibid

⁹ Lebanon. Establishment of the Waters of Beirut and Mount Lebanon. Office of the Waters of Beirut and Mount Lebanon. *Law Number 221 Organization of Water Sector*. By Selim Hoss. Beirut: E.B.M.L., 2000. Web.

Within this legal framework, 1982, the Government of Lebanon devised a Wastewater Management Plan as a policy instrument to further advance wastewater treatment and reuse within the country, revised in 1994 and again in 2012. The most recent update, *The National Water Sector Strategy* (NWSS), was put forth by the Ministry of Energy and Water (MoEW) and adopted by the Council of Ministers (CoM) in April of 2012, with the goal “to ensure water supply, irrigation and sanitation services throughout Lebanon on a continuous basis and at optimal service levels, with a commitment to environmental, economic and social sustainability”. The 2012 revised strategy also highlights the issues with the current wastewater capacity:

“Along the coast, much of the planned large scale capacity has been constructed, but little of it is operational. Of the twelve large treatment plants planned on the coast to service 65% of the population, seven are completed (Tripoli, Chekka, Batroun, Jbeil, Ghadir, Nabi Younes and Saida), one is under construction (Sour), three are under preparation (Aabde, Kesrwane, and Bourj Hammoud), and one require funding (Sarafand). However, to date only two plants (Ghadir and Saida) are operational based on preliminary treatment only and five completed plants lack collection networks (Tripoli, Chekka, Batroun, Jbeil, and Nabi Younes)... about two thirds of the population are connected to wastewater collection networks but only 8% of wastewater reaches the four operational plants (Saida, Ghadir, Baalbeck and Yammouneh) and is treated. Wastewater collection networks have been conceived and executed piecemeal, leading to a major mismatch between collection and treatment capacity”¹⁰

¹⁰ Lebanon. *The National Strategy for the Wastewater Sector - 2012*

The CDR reports to its higher authority, the Council of Ministers (CoM). The CDR, in cooperation with the Ministry of Environment (MOE) and the Ministry of Energy & Hydraulic Resources (MEHR) plan the Wastewater Policies. The Ministry of Environment is responsible for developing environment protection policies regarding treated wastewater for irrigation and agriculture by setting national standards¹¹, however cooperation between the three actors has not been present. The *Environment for Development of the Mediterranean De-pollution Initiative* by the European Union argues that municipal wastewater management is an environmental priority of Lebanese water authorities, with policies planned in cooperation with the CDR, MOE, and MEHR. However, institutional management has thus far been ineffective.¹² The lack of implementation is due to the complication of recognizing clear authority and responsibility among the country's different actors in the water sector. The report argues that future successful policy implementation will require the MOE to add to the previous legal framework with specific outlining of national water standards for drinking and irrigation.

Lebanon Wastewater Capacity & Reuse

There are currently 35 wastewater treatment plants WWTPs that are either under construction or in the planning process: 7 of which are under construction, 18 are being prepared or financed, and 10 with no funding secured to date¹³. Annual wastewater estimates vary from source to source, however the Food and Agriculture Organization of the United Nations (FAO) estimates

¹¹ *Support to DG Environment for Development of the Mediterranean De-pollution Initiative "HORIZON 2020"*. Rep. no. 070201/2006/436133/MAR/E3. N.p.: n.p., n.d. Web. <http://ec.europa.eu/environment/enlarg/med/pdf/lebanon_en.pdf>.

¹² *Support to DG Environment for Development of the Mediterranean De-pollution Initiative "HORIZON 2020"*

¹³ *Lebanese State of the Environment Report*. 2001.

that Lebanon generates roughly 310 Mm³ wastewater per year. Out of the 310 Mm³, only 4 Mm³ is treated and reused, half of which is specifically reused in agriculture¹⁴. The rest of the untreated wastewater is dumped into the Mediterranean Sea, or is filtered into groundwater aquifers, both of which have detrimentally impacted the environment¹⁵. Before the Syrian crisis, wastewater networks were connected to roughly 60% of the population, yet only 8% of the wastewater was actually treated.¹⁶ This proves that Lebanon has the capacity for wastewater treatment and reuse, yet implementation is lacking.

For the purpose of this paper, *wastewater* refers to water that has been used for flushing, washing, or manufacturing. *Treated wastewater* is wastewater that has been processed through a treatment plant, subjected to one or more physical, chemical, and biological processes to lower the risk of contamination¹⁷. Wastewater reuse in agriculture can benefit the farmers of Lebanon as well as the consumers of agriculture. Lebanon is in a unique position to become a key regional player in the area of environmental policy. Regional water shortages affect food security¹⁸, thus magnifying the need for more efficient wastewater reuse policies. This, coupled with the increasing number of refugees from neighboring countries, global warming, and political instability all magnify the severity of Lebanon's situation. The goal of this paper is to analyze the implementation process of Lebanon's wastewater policy through the role of various actors involved in the environmental policy sector and to understand: *why has Lebanon been*

¹⁴ Karam, Fadi, Abdul Halim Mouneimne, Fatima El-Ali, Georgette Mordovanaki, and Youssef Roupheal. "Wastewater Management and Reuse in Lebanon." 2013. Pages 2868-879.

¹⁵ Ibid

¹⁶ "INTER-AGENCY Water, Sanitation, and Hygiene (WASH) Working Group-Lebanon." Feb. 2014.

¹⁷ Liebe, Jen, and Reza Ardakanian. *Safe Use of Wastewater in Agriculture*. Rep. UN-Water Decade Programme on Capacity Development (UNW-DPC), Aug. 2013. Web.

¹⁸ Abumoghli, Iyad. "Tag Archives: Water Scarcity in Arab World." *EcoMENA*. EcoMena, 24 Mar. 2013. Web. 07 Apr. 2014.

unsuccessful at implementing wastewater reuse policy and what roles do actors play in the implementation process? The analysis will then lead to a new policy recommendations, focusing on better allocation of responsibilities to the different actors involved in the water sector as well as drawing from successful implementation of wastewater reuse from neighboring countries.

Wastewater in Agriculture

According to a World Bank *Policy Note on Irrigation Sector Sustainability*, irrigation accounts for 2/3 of Lebanon's annual water use. Yet, there are many obstacles that the country has faced in implementing new water management, most importantly a lack of cooperation between numerous *actors* and agencies involved in water resource management, namely: the Ministry of Energy and Water (MOEW), the Litani River Authority (LRA), the Water Authorities (WAs), the Regional Water Authorities (RWAs) and the Local Water Communities (LWC).¹⁹ This paper will further explain the role of actors in the wastewater sector.

Literature Review

Since Lebanon's wastewater policy is a multi-actor process, with different contexts affecting the implementation process, the *contextual interaction theory* was chosen to provide a framework for explaining the nation's lack of implementation. Technological advances and new information on the environmental risks involved in using *untreated wastewater* have highlighted the severity of using clean and properly treated wastewater for irrigation and agriculture. The Arab Water Council Journal conducted a survey gaging farmers' acceptance of wastewater use in agriculture in Jordan and Tunisia and found three main reasons for rejection or hesitation: the

¹⁹ *Republic of Lebanon-Policy Note on Irrigation Sector Sustainability*. World Bank, 2003.

availability of freshwater, distrust in water quality, and concerns over public willingness to purchase crops that have been irrigated with *treated wastewater*.²⁰ Although the farmers have shown reluctance in fully transitioning over to wastewater reuse, the number of farmers accepting of wastewater reuse for agriculture has increased over the past ten years²¹. This highlights the need and significance of strong wastewater reuse policies as well as strong wastewater monitoring and sanitation standards.

Contextual Interaction Theory: Actors and Characteristics

The study of policy implementation focuses on the interaction between actors involved in a policy process. The theory itself has evolved over the past three decades, with three distinct generations of study. The first generation, pioneered by Pressman and Wildavsky, is known as *classical implementation theory*. In this view, policy implementation was viewed in a linear manner, top-down approach,²² arguing that successful implementation is the result of influences from government and other authoritative officials. Pressman and Wildavsky argue that successful policy implementation depends on “consistent execution of choices made by political leaders”.²³ This top-down approach may work in situations in which authority is clearly defined, however wastewater policy in Lebanon is a multi-layered process with many different actors, with no clear definition of hierarchy.

²⁰ Al-Saed, Rashed. *Arab Water Council Journal* I.III 2008

²¹ Ibid.

²² De Boer, Cheryl. *Contextual Water Management: A Study of Governance and Implementation Processes in Local Stream Restoration Projects*. Diss. U of Twente, 2012. Enschede: U of Twente, 2012: 13.

²³ O'toole, Laurence J. "The Theory-Practice Issue in Policy Implementation Research." *Public Administration* 82.2 (2004): 314.

The second generation of policy implementation focuses on a bottom-up approach, with Benny Hjern being the most influential theorist of the generation. The bottom-up approach focused more on the action of policy implementation, specifically actors on the ground charged with policy implementation,²⁴ “such as nongovernmental actors, far from the oversight of political principals”.²⁵ However, due to the vast nature of actors on the ground in Lebanon, and the differences in motivations for implementing policy implementation, this generation would not be useful in the study of the nation’s water sector.

This analysis of Lebanon’s policy implementation of wastewater will be framed within the third generation of policy implementation theory: contextual interaction theory (CIT),²⁶ focusing on the main actors involved in the wastewater reuse sector and highlighting their characteristics (motives, cognitions, and resources). Although CIT has been applied in the social sciences for decades, Hans Bressers’s most recent addition to the theory will be used as the main theoretical framework. Valentina Dinica and Bressers define the intricate web of policy implementation as “the whole of all activities and interactions that are connected to the employment of a preconceived set of policy measures”.²⁷ Whereas other policy implementation theories focus on the relationship between actors from either a ‘top-down’ or ‘bottom-up’ approach, CIT theory recognizes “the back and forth relationship between implementers and

²⁴ De Boer, Cheryl. *Contextual Water Management: A Study of Governance and Implementation Processes in Local Stream Restoration Projects*, 2012: 15.

²⁵ O'toole, Laurence J. "The Theory-Practice Issue in Policy Implementation Research." *Public Administration* 82.2 (2004): 314.

²⁶ Bressers, Hans. "From public administration to policy networks: Contextual interaction analysis." 2009. Pages 123-142.

²⁷ Dinica, Valentina, and Hans Bressers. "The Implementation of Renewable Energy Policies: Theoretical Consideration and Experiences from Spain, The Netherlands and The United Kingdom." (2003). Page.2.

policy makers gives way to a more dynamic interaction process”.²⁸ This will highlight the specific interactions between the actors within each wastewater reuse case, reflecting the characteristics of each actor and the influence those characteristics have on the implementation process.

This paper builds on Owens’s assertion that policy is a project that can either be implemented, or cannot be implemented²⁹. CIT theory divides actors into two categories: implementers and target group³⁰. The implementers being the actors involved in promoting and implementing the policy, and the target group being the actors needed in order to complete the process. The theory argues that implementation is a multi-actor process, with both government agencies as well as international stakeholders influencing the outcome and policy implementation.³¹ Additionally, the focus is “given to actors and their interaction processes within the implementation problematic”.³² In this case, the process is the successful treatment of wastewater for the purpose of agriculture and irrigation, as well as utilizing and improving the already existing wastewater treatment plants located along the country’s coast.

CIT theory was chosen because Lebanon is known for its sectarian tension, with multiple religions and groups coexisting. Different actors have different motivations and different beliefs

²⁸ De Boer, Cheryl. *Contextual Water Management: A Study of Governance and Implementation Processes in Local Stream Restoration Projects*: 2012: 13

²⁹ Owens, K. 2008. Understanding How Actors Influence Policy Implementation: A Comparative Study of Wetland Restorations in New Jersey, Oregon, The Netherlands and Finland. Doctoral Dissertation, University of Twente, Enschede.

³⁰ Bressers, Hans, and K. R. D. Lulofs. *Governance and Complexity in Water Management: Creating Cooperation through Boundary Spanning Strategies*. Cheltenham: Edward Elgar, 2010. Print.

³¹ Bressers, Hans TA. "10. Implementing sustainable development: how to know what works, where, when and how." *Governance for sustainable development: The challenge of adapting form to function* (2004): 284.

³² De Boer, Cheryl. *Contextual Water Management: A Study of Governance and Implementation Processes in Local Stream Restoration Projects*: 2012: 18

that are directly or indirectly affected by many different contexts.³³ The essence of the theoretical focus is on the interactions between those actors involved, placing those relationships at the center of the theory.³⁴ Furthermore, this paper will adopt Kai Spratt's adaption of CIT in providing an "implementation barriers analysis"³⁵, focusing specifically on the actors and relationships preventing implementation from being successful.

Motivations

This study adopts the CIT view of motivation as being external pressure an actor may face, whether it be social, political, or economic. In the case of assessing wastewater policy, motivation was measured by analyzing "the motivation of government agencies to work together"³⁶, the motivation of different actors to successfully implement water policy, as well as maintain the standards set forth by the NWSS. For example; private contractors involved in the creation and management of wastewater treatment plants are motivated due to their financial contract and legal obligation managed by USAID. Motivations are important to understand because they can directly influence the interaction process needed to successfully implement agricultural wastewater policy. If two actors have conflicting motivations, yet are working on the same project, the likelihood of that project being implemented diminishes. Furthermore,

³³ Bressers, Hans. "Contextual Interaction Theory and the Issue of Boundary Definition: Governance and the Motivation, Cognitions and Resources of Actors." Institute for Governance Studies, 29 Jan. 2007. Web.

³⁴ O'toole, L. J. (2004), The Theory–Practice Issue in Policy Implementation Research. *Public Administration*, 82: 309–329. doi: 10.1111/j.0033-3298.2004.00396.x

³⁵ Spratt, Kai. 2009. Policy Implementation Barriers Analysis: Conceptual Framework and Pilot Test in Three Countries. Washington, DC: Futures Group, Health Policy Initiative, Task Order 1.

³⁶ Spratt, Kai. 2009. Policy Implementation Barriers Analysis: Conceptual Framework and Pilot Test in Three Countries. Washington, DC: Futures Group, Health Policy Initiative, Task Order 1.

motivations are viewed as being ‘positive’ for policy implementation, or ‘negative’³⁷, which will help in the overall analysis of actors and their characteristics. Additionally, external pressures can be a motivating force, potentially leading an actor to believe that motivational influences alter their ‘self-effectiveness’; external forces may have a “de-motivational effect...[where] an actor perceives its preferred behavior is beyond its capacity”.³⁸ In her USAID | *Policy Implementation Barriers Analysis*, Kai Spratt points out that an actor’s negative motivations may lead to ignoring a particular policy in order to delay implementation, or even issue a ‘symbolic policy’, lacking serious commitment.³⁹ Additionally, since CIT theory does not focus on actors’ motivations from a top-down, or bottom-up approach, it is assumed that implementation is a multi-level process, in which all actors involved (including external actors) have different motivations. All stakeholders involved should understand these motivations in order to gain perspectives of motivations, and thus should be involved in the early process of implementation.⁴⁰ An actor’s personal goal will affect the amount of effort and cooperation in working with other actors in the policy process. Additionally, Bressers claims that external forces, such as demands from higher institutions, can also be considered motivations.

³⁷ Hans Bressers. "Chapter 6: From Public Administration to Policy Networks: Contextual Interaction Analysis." *Rediscovering Public Law and Public Administration in Comparative Policy Analysis: A Tribute to Peter Knoepfel*. Lausanne: Presses Polytechniques Et Universitaires Romandes, 2009. N. Page 131 Print.

³⁸ De Boer, Cheryl. *Contextual Water Management: A Study of Governance and Implementation Processes in Local Stream Restoration Projects*: 2012: 25

³⁹ Spratt, Kai. 2009. *Policy Implementation Barriers Analysis: Conceptual Framework and Pilot Test in Three Countries*. Washington, DC: Futures Group, Health Policy Initiative, Task Order 1.

⁴⁰ Ibid.

Cognition

Cognitions or information perceived by an actor can range from transfer of knowledge between actors as well as transparency of such knowledge and accessibility⁴¹. According to Bressers, an actor's own personal experience will influence their cognitions and what they hold to be true.⁴² In a country that is separated by religious and political beliefs, such experiences are bound to have a great affect on policy implementation. Spratt argues that successful policy implementation requires each actor involved to have extensive knowledge on the policy/project at hand, including technical knowledge, as well as awareness of the interaction between actors involved.⁴³ This understanding of communication patterns is also essential to holding actors accountable and assessing, which actors are not cooperating with others, and thus is an integral part of the implementation process.

Power

Power, refers to the resources an actor may possess that can assist, or halt, the implementation process.⁴⁴ The evaluation of the actors and their characteristics will be done in layers of context, from structural to case-specific. Each of these characteristics will be considered to be variables. The variables will have either a positive (+ 1), negative effect (-1) or no effect (0) on the end result, in this case successful policy implementation. The goal of this will be to assess how the actor's affect policy implementation, and where specific improvements can be made.

⁴¹ Bressers & De Boer (2013). 3 Contextual Interaction Theory for assessing water governance, policy and knowledge transfer. P. 36.

⁴² Hans Bressers. "Chapter 6: From Public Administration to Policy Networks: Contextual Interaction Analysis." 2009. Page 131

⁴³ Spratt, Kai. 2009.

⁴⁴ Owens, K. 2008.

When wastewater reuse is not monitored effectively, the results can be damaging, negatively impacting the economy, public perception, government legitimacy and the environment. Although Lebanon already has wastewater treatment plants established, the government does not see wastewater as a political priority. The ACWUA report on *Wastewater Reuse in Arab Countries* argues that “governments require support for the development of cost-recovering water tariff systems ...[and] investments in wastewater treatment facilities are only sustainable if they are accompanied by institutional support and capacity development”⁴⁵. Political cooperation among governments and various international organizations (IOs) and non-governmental organizations (NGOs) is essential in successful wastewater policy implementation and reuse.

Multi-Level Context

Since wastewater policy implementation in Lebanon is divided into many different actors, with many overlapping characteristics, it is essential to place the policy process within the multiple contexts in which it exists. The three contexts that are outline by the Contextual Interaction Theory are: *case-specific context*, *structural (institutional) context*, and *the wider context*. The case specific context will include issues such as previous Lebanese wastewater laws pertaining to agriculture and irrigation, as well as any policy reforms and specific circumstances. Unlike the *case-specific context*, the *structural context* is uniform for all actors, highlighting levels and scales of governance, different networks and actors, different goal ambitions and perspectives, and allocation of responsibilities and resources of water policy implementation⁴⁶. Due to the

⁴⁵ Rothenberger, Spilke. *Wastewater Reuse in Arab Countries*. 2010.

⁴⁶ Hans Bressers. "Chapter 6: From Public Administration to Policy Networks: Contextual Interaction Analysis". 2009.

nation having the infrastructure required for treating wastewater and a preliminary wastewater policy,

Critical Analysis

Context

The CIT theory emphasizes the significance of context in relation to the process of policy implementation and the influence that context has on actors and their motivations. In order to be able to effectively compare the 3 USAID wastewater cases in Lebanon, it is essential that they be embedded within the same context for a more efficient analysis. The *wider context* in this case focuses on regional issues in the Middle East, namely the Syrian refugee crisis and the Arab-Spring. Since the past 10 years has seen an increase in global climate change discourse, the Lebanon's water sector must also be viewed in the context of global warming and rising temperatures, specifically focusing on those issues in the Middle East.

Structural context is significant in identifying the different levels of government institutions, specifically those playing an active role in the water sector. However, many of the issues and allocation of responsibilities in Lebanon's water sector overlap, making it difficult to examine institutional structure. At the national level, Lebanon has faced many obstacles just within the past 10 years, slowing the process of water policy implementation. The YMCA of Lebanon has labeled 3 major dilemmas at the national level that need to be addressed in order to understand the structural context influence this may have on actors' motivations. The first of these was the municipal elections of 2004, in which newly elected municipal officials did not

consider previous laws or reforms and thus changed any preceding agreements⁴⁷. Second, the assassination of Prime Minister Hariri on February 14, 2005, paralyzed the entire nation, including government and non-government agencies working with implementing water management policy. Finally, once the chaos surrounding Hariri's assassination subsided, Israel attacked Lebanon the following year, again leading to a complete national paralysis⁴⁸.

Global climate change and rising temperatures mean less annual rainfall in an already arid region. According to the United Nations Water organization, the availability of water is expected to decrease globally, yet the use of water for agricultural purposes is expected to rise 19% by 2050. UN Water estimates that per day, the average person requires 2-4 liters of drinking water and 2,000 – 5,000 liter of water for food production⁴⁹. This emphasizes the need for creative water recycling, especially for agricultural purposes. Some nations in MENA have already begun implementing wastewater management and operation into their national water policies, under the guidance of international agencies such as the United Nations and World Health Organizations and various and international standards for wastewater reuse.

Though the country currently has the most water in MENA, local experts claim that when considering the sudden influx in population and effects of climate change, the nation will run out of water by 2015⁵⁰. Because of this there is a lack of priority within the Lebanese government to push wastewater reuse on the national agenda⁵¹. Additionally, the nation already has the capacity to reuse wastewater with multiple WWTPs lined up along the coast for urban use.

⁴⁷ McCornack, Andrew. "Strengthening Local Governance Through Effective Waste Management: The "Sustainable Environmental Practices and Policies" Program in South Lebanon and the Bekaa Valley." 188-99. Web.

⁴⁸ Ibid.

⁴⁹ Mateo-Sagasta, Javier, Kate Medlicott, Manzoor Qadir, Liqa Raschid-Sally, Pay Drechsel, and Jens Liebe. *Safe Use of Wastewater in Agriculture*. 2013.

⁵⁰ Amsheet. "Lebanon to Run Out of Water by 2015." 2014.

⁵¹ Rothenberger, Spilke. *Wastewater Reuse in Arab Countries*. 2010.

Water sustainability is mentioned in the national water policy, however it does not specifically address wastewater for agricultural purposes.

Although there are many actors involved in Lebanon's water sector, both governmental and non-governmental, for the purpose of this paper, those involved only in wastewater reuse and more specifically, those involved in the 3 Wastewater cases, were examined. Focusing on these specific actors within each case will enable the research to highlight the processes between each actor in a controlled study, as opposed to simply researching every NGO involved in the water sector. Furthermore, the term 'actors' does not refer to one specific individual, but more to specific agencies that act as main actors in the process of implementing waster policy in agriculture.

Case-specific context

As mentioned previously, the National Water Sector Strategy, implemented by the MOEW and adopted by the Council of Ministries is the main instrument within the national water sector to with a specific focus on wastewater reuse. The NWSS is aimed at improving sustainable and affordable water through the development of equipment and more WWTPs, the transformation of the WEs into more independently run, autonomous institutions—with an emphasis on financial and operational strengthening, and an increase in the management of private capital.⁵² In terms of irrigation for agriculture, the NWSS pays specific attention to improving irrigation infrastructure, overall improvement of performance and sustainability of irrigation sector, and potential expansion of land that can be irrigated for agriculture.⁵³

⁵² *Lebanon Country Water Sector Assistance Strategy*. Publication no. 68313-LB: World Bank, 2012. *World Bank*.

⁵³ *Ibid*.

Structural Context

The Government of Lebanon, an actor implementer, has various motivations for successful implementation of wastewater reuse policy. First and foremost is for the sake of national security and being able to supply water to the whole population. This is proven in the various reforms to the country's water Laws within the past 10 years, reorganizing the entire water sector⁵⁴. The main actors that will have the most influence in Lebanon's water sector are the Ministry of Energy and Water (MOEW), the Ministry of Environment, the Council for Development & Reconstruction (CDR), the Central Administration of Statistics (CAS), the 4 Waste Water Establishments (WWE), and the United States Agency for International Development (USAID). The Litani River Association (LRA) will be responsible water monitoring and distribution.⁵⁵ The MOEW is the main governmental actor involved in the water sector, and thus is held to a certain level of accountability. Institutional legitimacy is a major factor in pushing the use of wastewater in agriculture by assuring policy implementation, however the MOEW has had weak institutional capacity in water resource planning thus far, and little has been done to "anticipate the effect of climate change on water supply and irrigation".⁵⁶ Improvement in the wastewater sector is still needed, as "wastewater plants have been built without the associated sewer systems and...all of Beirut's wastewaters are dumped into the sea".⁵⁷ More needs to be done by government agencies to monitor the treatment of wastewater as

⁵⁴ *Lebanon Water Report*. FAO, 2009.

⁵⁵ *Lebanon Country Water Sector Assistance Strategy*. Publication no. 68313-LB. N.p.: World Bank, 2012. *World Bank*. Web.

⁵⁶ *Lebanon Country Water Sector Assistance Strategy*. World Bank, 2012.

⁵⁷ Luomi, Mari. "Managing Blue Gold." 2010

well as monitoring and punish the illegal discharge of untreated wastewater, because of environmental hazards.

One of the major setbacks of the current institutional framework is the fact that the Ministry of Agriculture is an entirely separate entity from the government, effectively working as a private agency as opposed to working with the other government agencies in the water and wastewater sector.

Wider Context

According to the World Bank, the Middle East is the world's most water-scarce region, particularly vulnerable to climate change, with a high-dependency on climate-sensitive agriculture.⁵⁸ This rapid increase in climate, in addition to the region's pre-existing overpopulation crisis further emphasizes the need for more innovative ways to irrigate the land and agriculture. As mentioned previously, Lebanon is home to over one million *registered* Syrian refugees, in addition to the Iraqi and Palestinian refugees that were already residing in the country before the outbreak of the Syrian War. Furthermore, the nation shares its borders with Israel, a neighboring country that has engaged Lebanon in war and conflict for decades. This dilemma inhibits Lebanon from relying on Israel for water security, emphasizing the need for self-sustainability in the water sector.

⁵⁸ Cervigni, Raffaello, and Saliha Dobardzic. "Adaptation to Climate Change in the Middle East and North Africa Region." *Middle East and North Africa*. World Bank. Web.

Analysis:

CASE 1: USAID/Lebanon's Water and Wastewater Sector Support Program

After Lebanon's 15-year civil war destroyed the country's water sector, USAID/Lebanon implemented the *Lebanon Water and Wastewater Sector Program* (LWWSS) in an effort to improve access to a public water supply network. USAID/Lebanon contracted Development Alternatives Inc. (DAI) with \$34.4 million to work with the four WWE in North Lebanon, Bekaa Valley, South Lebanon, and Mount Lebanon (Beirut).⁵⁹ The contract was to run from September 30, 2009 to April 30, 2015 and the ultimate goals were to strengthen the WWE's managerial capabilities, increase productivity of project management, and implement small-medium water and wastewater projects⁶⁰, in addition to overall financial and technical support.

The LWWSS program found success in improving water services, however not in the wastewater sector. The WWE were willing to work with USAID, however the DAI realized that wastewater implementation did not seem to be a top priority of the Lebanese Government. The following section will highlight the role of the actors: USAID, the private contractor Development Alternatives Inc. (DAI), the private contractor Camp, Dresser, McKee and Wilbur Smith (CDM Smith), the Bekaa Water Establishment (BWE), the Beirut-Mount Lebanon Water Establishment (BMLWE), and the MOEW, emphasizing the influence their characteristics had on the overall implementation of this specific program as well as the interactions between the actors.

⁵⁹ Trujillo, Catherine. *Audit of USAID/Lebanon's Water and Wastewater Sector Support Program*. Pages 1-12

⁶⁰Ibid.

CASE 1: ACTOR CHARACTERISTICS^{61*}

ACTORS	MOTIVATIONS	COGNITIONS	POWER	INFLE UNCE (-1, 0, +1)
USAID (offices in Lebanon and Egypt)	<p>-Obligated \$20.6 million for program (December 2012), purpose to improve water and wastewater services</p> <ul style="list-style-type: none"> • Support all 4 WE that MOEW oversees • Funds them towards financial, operational sustainability <p>-USAID/Egypt financial office examined vouchers for fiscal reports summarizing fees and total costs in all aspects of program</p>	<p>-Improving wastewater is not a priority of the Lebanese government</p> <p>-U.S. Foreign Policy restricts USAID/Lebanon to engage directly with Lebanese central government</p> <p>-Discrepancies in costs between USAID/Egypt office and DAI</p> <p>-Egypt office did not believe reviewing all supporting documentation regarding vouchers was their responsibility, only fiscal reports</p>	<p>-Dispersed \$11.6 Million</p> <p>-Completed audit of program from September 20, 2009 to December 3, 2012</p>	+1
Beka'a Water Establishment (BWE)	<p>-Legally responsible for operating WWTP</p> <p>-Written commitment agreeing to operate and maintain systems that USAID provided/funded</p>	<p>-Understood that USAID and Gov. of Lebanon were not communicating due to US foreign policy</p>	<p>-Director general did not have enough operators to regulate chlorination systems</p> <p>-Inability to hire competent long-term staff</p>	0
Beirut Mount-Lebanon Water Establishment (BMLWE)	<p>-Written commitment agreeing to operate and maintain systems that USAID provided/funded</p>	<p>-Understood that USAID and Gov. of Lebanon were not communicating due to US foreign policy</p>	<p>-Staff:</p> <ul style="list-style-type: none"> • Needed training • Reluctant to take on additional responsibilities • Old employees were less likely/willing to adjust to new 	-1

⁶¹ Ibid Trujillo, Catherine. *Audit of USAID/Lebanon's Water and Wastewater Sector Support Program*. Pages 1-12

			technologies -Inability to hire competent long-term staff	
Ministry of Energy and Water (MOEW)	-Funded and regulated each water establishment	-U.S. government policy forbids USAID from direct contact to MOEW	-could not work directly with USAID due to US foreign policy	0
Development Alternatives Inc. (DAI)	-Signed \$34.4 million contract (September 2009-April, 2015) with the tasks of: <ul style="list-style-type: none"> Initial assessment of tasks, equipment and infrastructure of WE & MOEW Strengthen WE managerial, technical, operational capacity Increase capacity of WE employees of managing finances Provide equipment for WE Implement small-medium WW projects Improve customer service -Subcontract with BWE & BMLWE installing software systems and provided technical support for \$651,000	-Realized program was not a priority of the Lebanese government -Directors were pleased with assistance provided by DAI, felt program met their needs -USAID should adjust budget because annual program costs change -Believed BWE director general would not commit to activities due to his temporary appointment -In 2009, U.S. Embassy forbade DAI to work with Lebanese ministries <ul style="list-style-type: none"> DAI officials claim that policy was not implemented until 2009 	-Increased capacity of WE by training 106 employees in 2011 & 144 employees in 2012 on Operation and Management -Provided oversight of quality of infrastructure -Implemented previous water policy program from '02-'07, had familiarity with different agencies -Exceeded authorized budgets <ul style="list-style-type: none"> Subcontracted budget for \$5 million, DAI provided list of 18 subcontracts worth \$12.1 million -Submitted inaccurate invoices to USAID (Egypt office) regarding budgets -Contract requirements not met, fined fee of \$58,510 <ul style="list-style-type: none"> No evaluation of initial assessment 	
Gov. of Lebanon (GoL)	-Audit progress of WE via USAID -Disbursement of funding to MOEW	-U.S. Foreign Policy restricts USAID/Lebanon to engage directly with Lebanese central government	-Was not hiring employees, had no initiative to do so, resulting in WE outsourcing of O&M of equipment	-1
Contracting Officer's representative	-Work with USAID/Egypt office to monitor/adjust/disburse	-Did not feel it was their responsibility to verify DAI invoices	-Did not review development of targets according to contract standards	

ve (COR)	payments to contractor DAI -Under contract, required to accept/approve DAI deliverables prior to payment	-Believed examining all DAI vouchers was a responsibility of the financial management officials in the USAID/Egypt office. -Misunderstood contract and as a result, did not approve deliverables		-1
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**Data for analysis was taken from the official USAID final audit cited below*

Discussion:

One of the biggest programs that the program faced was DAI’s lack of proper data collection, reporting and monitoring. The DAI failed to keep accurate records, resulting in budgetary inaccuracies in excess of \$7 million.⁶² Additionally, the data from the target group benefiting from the WWTP and Program as a whole was not collected according to USAID standards, skewing the final assessment. The final audit administered by USAID claimed that although the WE officials held wastewater as a priority, DAI officials “did not focus on wastewater because...they realized...in reality...[it] was not a priority for the Lebanese Government”, ultimately shifting its focus on potable water, and away from wastewater and irrigation. This change of motivation and goal led to the unsuccessful implementation of the LWWSS program, which was originally intended to assist and improve the treatment and reuse of wastewater.

⁶² Trujillo, Catherine. *Audit of USAID/Lebanon's Water and Wastewater Sector Support Program.*

CASE 2: USAID/YMCA of Lebanon Sustainable Environmental Practices and Policies Program (SEPP)

The SEPP program, administered by the YMCA of Lebanon and USAID, was tasked with “improving environmental practices and policies for the management of both solid waste and waste water in rural Lebanon”⁶³ The program was separated into two parts: the first being the creation of 9 WWTP that treated wastewater from 10 villages, from Bekaa valley to South Lebanon⁶⁴, and the second was the environmental educational and waste management initiative, aimed at educating local communities--specifically women and students. SEPP recognizes the significant influence educating a target group and local community in the implementation process. The main government actors interacting with each other in the SEPP program were: all 8 municipalities assigned to each WWTP, the MoE, Ministry of Education, Ministry of Public Works (MPW), MOEW, Ministry of Public Health (MPH), Ministry of Environment (MoEnv) and the Ministry of Labor. Additionally, the program worked with ECODIT, an American environmental assessment company in Lebanon that had previously dealt with policy dialogue in the wastewater sector at the highest level.⁶⁵

CASE 2: ACTOR CHARACTERISTICS⁶⁶

ACTORS	MOTIVATIONS	COGNITIONS	POWER	INFLUENCE (-1, 0, +1)
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⁶³ YMCA. "Sustainable Environmental Practices and Policies (SEPP)." *USAID*. Usaid.gov, 2009. Web. p. 5.

⁶⁴ The program also focused on establishing one solid waste treatment plant, however for the sake of this paper, the focus will only be on the wastewater treatment portion of the program.

⁶⁵ YMCA. "Sustainable Environmental Practices and Policies (SEPP)." 2009. Page 11.

⁶⁶ YMCA. "Sustainable Environmental Practices and Policies (SEPP)." 2009. Pages 1-46.

YMCA of LEBANON	<p>-Contract with YMCA/USA & USAID</p> <p>-Collaborated with ECODIT to improve current environmental management</p>	<p>-Local communities will benefit from proper wastewater management</p> <p>-Public Awareness of benefits of proper wastewater treatment is essential for implementation</p> <p>-Communicated with ECODIT and formulated standards for WWTP in rural communities</p> <ul style="list-style-type: none"> Held roundtable discussion with all stakeholders to draft guiding policy of program and to initiate dialogue between actors <p>-Communicated with all stakeholders via word-of-mouth during Awareness Campaigns</p>	<p>-Assumed all costs associated with WWTP & accessories</p> <p>-Trained Plant operators</p> <p>-Developed draft Memorandum of Understanding (MOU), to be used as key instrument in SEPP guidelines</p>	+1
Wadi Jezzine Municipality Council (WJMC)	<p>-Contract with YMCA of Lebanon (signed 2003), to build/install WWTP and sewer network</p> <p>-Agreed to pay all sewer network installation costs</p>	<p>-Held public awareness sessions</p> <p>-Potential population growth of target group in Wadi Jezzine village was taken into consideration when building WWTP</p>	<p>-Assume costs with sewer network installation</p> <p>-When no public land was available, negotiated/secured land owned by Litani Association</p>	+1
Haytoura Municipality Council (HMC)	<p>-Contract with YMCA/Lebanon (signed June 2005) to build WWTP and add 400 m connector sewer line</p>	<p>-Population shifts during 2006 War with Israel led to influx of internally displaced persons (IDPs)</p>	<p>-Secured land needed for plant</p> <p>-Assumed costs of building road to plant & connector sewer between original discharge point & new WWTP</p> <p>-Influx of IDPs made overloaded WWTP's ability to treat influent, paralyzing operations until end of war</p>	+1
Snayyah Municipality Council (SMC)	<p>-Contract with YMCA (September 2003) to build WWTP and install 2,400 m sewer network</p>	<p>-YMCA subcontracted American company International Business Consultants (IBC) to consult general WWTP layout</p> <p>-Public workshop held to educate community target group</p>	<p>-Secured land needed for WWTP</p> <p>-Assumed all costs of road and sewer network construction</p>	+1

		-Large population shifts due to 2006 War with Israel	-IDPs did not effect plant's ability to operate	
Aychiyyeh Municipality Council (AMC)	-Contract with YMCA of Lebanon (signed September 2003) to build WWTP & install 4,416 m of sewage networks -Signed Contract with IBC and YMCA (March, 2004) to build, equip, and plan plant.	-Public workshop for community, recognizing importance of educating locals on WWTP -Mayor of Aychiyyeh village collaborated with government agency Council of the South, specializing in development works	-Assumed cost for building new road to WWTP and sewer network installation -Mayor of Aychiyyeh worked with Council of the South and raised money	+1
Benwati Municipality Council (BMC)	-Signed Contract with YMCA of Lebanon (November, 2006) to build WWTP & Install 5,500 m of sewer network	-Previous sewage network was discharging untreated wastewater into Ghobabatich forest, BMC understood this to be environmental hazard -Sought funding from USAID due to government budget cuts -Harriri Foundation for Rural Development, in honor of assassinated President Harriri, funded the sewage network	-Negotiated contract with MEW to fund 5,500 m sewage network -Secured land in village of Ghobabatich -Plant has been operational since March 2007.	+1
MOEW	-Signed contract with BMC to fund new sewage network	-YMCA delayed signing contract with community subcontractor IBC due to budget cuts • Could not fund sewage network due to GoL not approving annual budget	-2005 Ministry budget cuts and allocation delays led to postponed funding of Ghobabatich sewage network	-1
MoEnv	-Provide stable/continuous electricity to WWTP	-Expressed desire in assisting municipalities with financial support	-Provided effluence assessment tests on WWTPs to make sure each complied with MoEnv Standards	+1
Rachaya Municipality Council (RMC)	-Signed contract (September 2004) with YMCA for installation of 13,452 m of sewage networks and WWTP	-Assessment of Plant submitted by MoEnv -Political tensions between Syrians and Lebanese citizens -Tensions were high between Lebanese army and Palestinian troops -Held public awareness workshops	-Lack of labor due to Syrian works leaving Lebanon -Had to halt operations during withdrawal of Syrian troops • At times workers did	+1

			not show up	
Hosh Community Center (HOMC)	-Signed contract with YMCA (October 2004) to build WWTP & install 4, 098 m sewage network	-MoEnv would provide environmental assessment -MPW had sewage network tied into annual budgets of 2005 & 2007 -YMCA negotiated with Local community to share costs -Mayor did not want to depend on MEW for network-lack of reliability -Held Public workshop informing community on plant operations/goals	-Funded all costs for plant construction and roads -Plant was not operational due to MPW/GoL budget cuts	+1
Beka'a Municipality Council (BAMC)	-Signed 1 st contract with YMCA (September 2003) to build WWTP & install 4,370 m sewage <ul style="list-style-type: none"> Assumed costs with access road, sewage network installation -Signed 2 nd contract with YMCA (August 2004) for WWTP construction and 2,000 m sewage installation	-IBC subcontractor was responsible for building, equipping, and consulting plant layout. -MoEnv provided environmental assessment -Held two public awareness workshops, one for each WWTP, providing information on sustainability & proper operation <ul style="list-style-type: none"> Target group were key stakeholders -Held 9 training sessions targeting 14 key workers	-Secured land -Completed 9 awareness sessions targeting 433 local representatives	+1

* Data for analysis was taken from official YMCA/USAID Final Narrative Report cited below

Discussion:

The YMCA of Lebanon was the leading actor in initiating dialogue between the other agencies, and it did so with the assistance of ECODIT. The American company offered its assistance and expertise in environmental policy dialogue in drafting the Memorandum of Understanding (MOU)⁶⁷, which served as the main instrument of policy implementation throughout the SEPP.

⁶⁷ YMCA. "Sustainable Environmental Practices and Policies (SEPP)." 2009. Page 12.

One obstacle that slightly hampered policy implementation was the lack of information given to villages regarding fear of bad odors from the WWTP, as well as the lack of trust between villages and the fear of one taking advantage of another.⁶⁸

The SEPP program faced a few political barriers that were impossible to predict prior to the implementation of the program, including the Israel/Lebanon conflict in 2006 as well as Lebanon's internal conflict between Hezbollah and the central government in 2008, virtually paralyzing the entire political structure for nearly a year and a half. Both of these conflicts proved to be detrimental to the progress of the policy implementation process. Regardless, the YMCA successfully built all 9 WWTPs, while building relationships between each Municipality and its respective community. The most successful example of this cooperation was in AMC WWTP, where the local mayor raised funds by collaborating with the Council of the South when the government budgets were frozen and construction could not continue.⁶⁹

Case 3: USAID Small Villages Wastewater Treatment Systems Program (SVWTS)

The SVWTS project, in conjunction with USAID /Lebanon and the Government of Lebanon, was designed for the purpose of reducing the "direct discharge of sewage into the Litani River...using low-cost, low-maintenance, natural based sewage treatment technologies".⁷⁰ The program was separated into two parts: Phase I (October 2004-November 2005) was to locate land and design 7 WWTPs in the Upper Litani River Basin, with 101,000 people as beneficiaries to the new construction, Phase II (November 2005-August 2012) was aimed at building the WWTPs in 16 municipalities, given the approval and cooperation of the local communities

⁶⁸ YMCA. "Sustainable Environmental Practices and Policies (SEPP)." 2009. Page 13.

⁶⁹ YMCA. "Sustainable Environmental Practices and Policies (SEPP)." 2009. Page 32.

⁷⁰ USAID. "Small Village Wastewater Treatment System Program: Final External Evaluation." 2013.

affected. Since the Litani River Basin (LRB) provides drinking water for more than 350,000 people and is the main component of Bekaa Valley's agricultural sector⁷¹, the SVWTS project needed to focus its agenda on monitoring environmental standards for dumping wastewater at the base of the Litani River.

The main actors involved in the implementation process are: USAID/Lebanon, the government of Lebanon, CDM Smith contractor all municipalities involved, contracting officer's representative (COR), as well as the MOEW and the MoEnv.

CASE 3: ACTOR CHARACTERISTICS⁷²

ACTORS	MOTIVATIONS	COGNITIONS	POWER	INFLUENCE (+1, 0, -1)
Gov. of Lebanon	<p>-Negative motivation due to external forces, such as US foreign policy restricting communication with central government.</p> <p>-Signed Memoranda of Understanding as legal framework certifying government's willingness via MoIM, Union and Municipalities</p>	<p>-Incentive for SVWTS program was to protect Litani River</p> <ul style="list-style-type: none"> • Basin provides drinking water to more than 350.000 people • Main component of Bekaa Valley's agricultural sector 	<p>-Budget freeze</p> <p>-Lack of clear allocation of financial ways and means through memoranda of understanding</p>	0
CDM SMITH	<p>-Awarded contract by USAID:</p> <ul style="list-style-type: none"> • Fully responsible for construction of 3 WWTPs (October 2005) <p>-Technically responsible for construction of 3 WWTP</p>	<p>-Limited awareness and engagement of beneficiaries—lead to limited citizen reaction to incidents that negatively affected projects implementation</p>	<p>-Provided trained WWTP operators</p>	0

⁷¹ USAID. "Small Village Wastewater Treatment System Program: Final External Evaluation." *Social Impact*. 2013. Page 8.

⁷² USAID. "Small Village Wastewater Treatment System Program: Final External Evaluation." *Social Impact*. 2013.

		-Did not report proper O&M budgets to operate Ablah WWTP		
Beka'a Water Establishment (BWE)	-Under NWSS, domestic wastewater in region to be owned and operated by BWE	-Interview with general director established WE unwillingness to manage 3 WWTP	-Inability to establish WWTP due to lack of funds and staff -Tariffs do not offset financial burden of WWTP -Did not provide adequate training to staff	-1
Litani River Authority (LRA)	-Responsible for surface and groundwater resources under signed contract with USAID, including management of irrigation and electricity generation projects -Monitors water quality in Litani River Basin	-Lack of proper coordination by the MOEW or CDR subcontractor	-Pollution was still an issue, even after WWTP had been established. LRA could not reduce pollution of river basin, nor afford using generator for electricity	0
Ministry of Energy and Water (MoEW)	-Responsible for wastewater via the National Strategy for Wastewater Sector	-WE lack autonomy -Was not a party of Memoranda of Understanding	- Imposed wastewater treatment tariffs to be collected with water fees	0
USAID/ Lebanon	-Full funding of SVWTS project -Identify locations for and design WWTPs (Phase I) -Build WWTP in communities of Upper LRB	-Facility construction was prioritized by community population -Interviewed direct partners and Mayors of communities to discuss overall satisfaction of project -Limited awareness was raised regarding the later stages of the project's executions	-Limited communication with central government hampered direct communication, forced USAID to use 3 rd parties, such as CDM smith, to relay information	-1
Ministry of Interior & Municip-	-Signed MOU with USAID to fund O&M costs	-WEs found that despite lack of funding promised by MOIM, municipality was still committed and	-Did not follow through with MOU commitments for O&M costs.	-1

Localities (MOIM)		willing to operate WWTP		
Municipality of Ablah	-Trained by CDM operators to run WWTP under USAID contract	-No communication with CDM on O&M budget -Mayor of Ablah expressed concern for more money	-Heavy reliance on generators was too costly due to the use of diesel -Government freeze forced WWTP to hire and pay workers daily -Did not provide adequate training to staff	0
Municipality of Farzoul	-Trained by CDM operators to run WWTP under USAID contract	-Community groups took place to inform and consult with local people about SVWTS projects	-Heavy reliance on generators was too costly due to the use of diesel -Government freeze forced WWTP to hire and pay workers daily -Did not provide adequate training to staff	0

**Data for Analysis was taken directly from USAID official Financial External Evaluation cited below⁷³*

Discussion:

Overall, the SVWTS can be described as a failure. The project's initial goals were unrealistic, resulting in only 3 WWTPs constructed, as opposed to the 7 initially planned.⁷⁴ The majority of the issues and negative characteristics stemming from the unsatisfactory results of the SVWTS project stem from USAID's unrealistic goals and lack of capacity in dealing with the country's electrical issues. In this regard, the external factor of the nation's weak electrical system and high dependency on generators lead to more difficulties in implementation than previously anticipated.

⁷³ USAID. "Small Village Wastewater Treatment System Program: Final External Evaluation." *Social Impact*. 2013.

⁷⁴ USAID. "Small Village Wastewater Treatment System Program: Final External Evaluation." *Social Impact*. 2013. 25

Additionally, the Memoranda of Understanding highlighted the responsibilities of each municipality, including providing land for the facilities, initial site clearing, monitoring effluent quality, as well as identifying staff.⁷⁵ However, with the government freeze and lack of USAID and CDM's proper training of staff, the WWTPs found themselves to be understaffed and underfunded. Communication between CDM and the municipalities was lacking, resulting in the local community mayors relaying information to the citizens.

Policy Recommendations/Conclusion

Public participation and education on wastewater use in agriculture is needed for not only support of policies but also for ensuring accountability. This can be achieved through awareness campaigns to raise support for the local communities⁷⁶. If the public knows of the benefits of wastewater reuse and the treatment process and economic benefits, they will become more involved in policy and thus, policy implementation. Lebanon has all the more incentive to improve and implement wastewater reuse. Improving current wastewater treatment plants for the goal of increasing agricultural productivity “make wastewater irrigation an attractive solution, especially when environmental benefits are considered (reduced contamination of receiving waters, secondary recharge of groundwater)”⁷⁷. Public awareness of economic benefits will further assist the process of revising water reuse policy and implementation in Lebanon. Additionally, the government will receive legitimacy from the nation in its ability to organize

⁷⁵ USAID. "Small Village Wastewater Treatment System Program: Final External Evaluation." *Social Impact*. 2013. Annex, Page 1.

⁷⁶ Maher Salman and Carlos Garces, *Symposium Proceedings on : "Irrigation Modernization: Constraints and Solutions"*, 2006. p. 15.

⁷⁷ Khouri, Nadim, John M. Kalbermatten, and Carl R. Bartone. *Reuse of wastewater in agriculture*, 1994.

data, address the region's water crisis, and come together when necessary. Implementing wastewater reuse tariffs is essential in sustainable operation and management of the WWTP. Additionally, strict fines must be enforced to those who are not using wastewater properly, as this can lead to severe health risks and a future epidemic given the overpopulation in the country.

Since some of the main issues cited in all of the cases were lack of operations knowledge, incorrect wastewater treatment plant monitoring and data collection/recording, the Lebanese government needs to train and educate local citizens via workshops in order to assist with the maintaining of WWTPs and the monitoring of wastewater reuse practices. The reality is that water used for irrigation should come at a cost, and users of this wastewater will need to pay a fee in order for Lebanon to maintain agricultural sustainability. Stealing wastewater is not only detrimental to any economic gain in the agricultural sector, but it is also a health hazard and should be treated as a threat to national security. This is true now more than ever with the influx of Syrian refugees and the increased demand for food and water. Most importantly, the government needs to enforce fines against those target groups—farmers, communities, etc.—who do not comply with national standards of wastewater reuse. Wastewater reuse needs to be addressed as an issue of national security, with more proactive measures in implementing sustainable agriculture before it is too late.

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