INTERDEPENDENT WASTEWATER MANAGEMENT BETWEEN ISRAEL AND PALESTINE:
The Case of the Tulkarem - Emek Hefer Region

A thesis

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ABSTRACT

This thesis considers prospects for wastewater management between Israel and Palestine in regions which are in close proximity to one another. This work uses the Tulkarem / Emek Hefer region to examine attitudes and preferences of wastewater managers towards cooperation in the management of wastewater. I conducted interviews with wastewater managers in the region and analyzed the interviews using a thematic approach. I also did key informant interviews with Israeli and Palestinian policy makers involved in water, wastewater and in some cases also cooperation. I also assessed the attitudes and preferences of the policy makers towards a series of scenarios for transboundary cooperation. Interviewees' nuanced perspectives on wastewater management policy after an independent Palestinian state is established proved the scenarios presented in chapter four short coming. I conclude by addressing the six themes; why cooperation? the role of national institutions, classification of cooperation, between national and local, communication and finally obstacles for cooperation. Each of these themes includes policy guidelines.

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ACKNOWLEDGEMENTS

First and foremost, I would like to thank my advisors, Professor Justin Hollander and Dr. Annette Huber-Lee, for their continued support and valued guidance throughout this research process. I am honored to have had the opportunity to work on this project with them. I am also grateful to the Tufts faculty, whose assistance and support was vital, including Laurie Goldman, my academic adviser, Rusty Russel, who helped me shape the direction of this thesis and UEP librarian Regina Raboin. Additionally, I offer many thanks to Mareike Stanitzke from Tufts ARC, for all her valuable input.

I am forever thankful to my fiancée Laura Robbins for her love, to my brother Yossi, to my grandmother Yolanda Kintzer and to my soon to be parents-in-law Peter and Deborah Robbins. Without their support, this dissertation would not have been completed.

This thesis is dedicated to the day when peace with justice between Israel and Palestine prevails, the day where Palestine is a state with recognized borders and Israel is a neighbor that coexists in peace and security achieved by a political agreement.

LIST OF ABREVIATIONS

FoEME	Friends of the Earth Middle East
IWA	Israeli Water Authority
JWC	Joint Water Committee
MCM	Million Cubic Meters
NWC	National Water Carrier (Israel)
PWA	Palestinian Water Authority
USAID	United States Agency for International Development
WB	World Bank
NGI	Non-Government Institutions (Includes NGO's, Inter governmental Agencies, Think Tanks and other non-governmental bodies)
NWC [Israeli] National Water Carrier	[Israeli] National Water Carrier
Mountain Aquifer	See Appendix B
Coastal Aquifer	See Appendix B

TERMS

In this section I present some of the important terms and historical events that are relevant to this work.

Key Palestinian environmental NGOs active in the field of water and wastewater treatment and reuse are: the Palestinian Agricultural Relief Committees (PARC), MA'AN Development Center (MA'AN), the Palestinian Hydrology Group (PHG), The Applied Research Institute Jerusalem (ARIJ) and the Water and Environmental Development Organization (WEDO). These organizations work both as traditional advocacy groups and as sub-contractors to international donors.

Key Israeli environmental NGOs active in the field of water and wastewater are as follows: Zalul Environmental Association is an environmental not-for-profit organization committed to protecting and maintaining clean, clear water along Israel's rivers and shorelines. The Heschel Center is dedicated to building a sustainable future for Israel. The Arava Institute for Environmental Studies (AIES) is environmental teaching and research program. Adam Teva V'Din is the environmental power house who has championed many wastewater and river restoration challenges.

There are many terms that may seem to signal the same geographic and political entity. Yet, the use of each of these terms will be carefully chosen.

- **Palestine**- Refers to the future Palestinian state. Palestine is referred to as a "country" both for convenience and out of respect for Palestinian colleagues
- **oPT** [of Palestine]- Refers to the occupied territories of the west bank including all the territory controlled by Jordan till 1967.
- **Palestinian Authority** is the political entity established by the Oslo accords.
- The **"Green Line**" and the 1949 Armistice Line - refering to Israel's border till from 1949 to 1967

Peace Agreements: The agreements between Israel and the Palestine Liberation Organization (PLO) known as the 'Declaration of Principles', singed 13 September 1993, cover a range of water issues. In the treaty both sides agreed to cooperate in managing the water resources (Tal 2002). In the 'Agreement on the Gaza Strip and Jericho Area'

from 1994, the Palestinians pledged to prevent uncontrolled discharge of sewage to water sources in their areas and to promote proper wastewater treatment (Annex II, and Paragraph B). The Oslo B Accords (the Israeli– Palestinian interim agreement signed in 1995) devoted a whole article to water and sewage issues (Annex III, Appendix 1, Article 40) and established several institutions to coordinate water, wastewater and environmental management (Schalimtzek and Fischhendler 2009).

Article 40 part of the Interim Agreement 1995 also referred to as the Oslo B Accords also established the Palestinian Water Authority (PWA) and the Joint Water Committee (JWC) to coordinate management and protection of water resources and to resolve water and sewage related disputes. The agreement recognized a water shortage for both sides and the need to develop and create additional water sources, principally from the eastern aquifer, but also from recycling of sewage effluent and desalination. Part of the agreement is "Treating, reusing or properly disposing of all domestic, urban, industrial, and agricultural sewage" (Article 40, Article 3 Paragraph f). The JWC was established to oversee the operation of joint supervision and enforcement teams (JSETs). A Joint Technical Subcommittee (JTC) and a Joint Sewage Subcommittee (JSS) were established under the JWC (Tal 2002).The JWC was also given the authority to address issues of "mutual interest in the sphere of water and sewage" (Article 40, Paragraph J). The environmental agreement (Article 12 of Oslo B) also addresses wastewater, through a commitment by both Israel and Palestine to properly discharge wastewater (Schalimtzek and Fischhendler 2009).

The Barrier: - Referred to also as; the wall, separation wall, security fence, apartheid wall, separation barrier, annexation wall and more. The barrier along the Green Line and within the West Bank was approximately 650km long in 2008, and its extension is still under construction today. Part of the barrier is composed of fence and other parts concrete walls. For a map of the existing structure and proposed route, please visit the B'tselem website. A thorough report can be found on the article "A safety measure or a land grab?" in the October 9th edition of the Economist.

CHAPTER ONE INTRODUCTION:

In the upcoming decade Israeli and Palestinian policy makers will need to set policy regarding wastewater management in regions with proximity to each other's border. A decision on the proper course of action for trans-boundary cooperation, when it can occur because of geographic proximity or a shared resource such as a stream or a wastewater treatment plant, will be crucial for a long lasting sustainable peace, for the prosperity of the region and for environmental sustainability. In their decision making, Israeli and Palestinian policy makers will need to decide the extent and form of the cooperation they will pursue with their counterparts.

Wastewater reclamation for agriculture is significantly important due to water scarcity in the region. The marginal cost of wastewater treatment, including collection and secondary treatment of urban sewage, is significant but well below the cost of additional fresh water (Arlosoroff 2007; Brooks and Trottier 2010). How we use and reuse water is the key to successfully meeting the increasing water demands of a rapidly growing urban population, expanding agriculture to feed people and sustaining livelihoods and ecosystems. Reclaimed water also means increases in economic welfare that can translate into higher gains from agriculture with potential significant impact on the regional level. Managing wastewater is intrinsically linked to management of the entire water chain. The lack of proper treatment not only hampers agriculture growth

and the livelihoods of families reliant on farming, but creates a health risk for the community and for the aquifer below it. Smart and sustained investment in wastewater management generates multiple dividends in society, the economy and the environment.

Israel over the past 25 years has developed a modern wastewater treatment system with reclamation of about 70% of municipal wastewater. In comparison only 6-7% of Palestinian WW is fully treated (Tal & Abed Rabbo 2010). At present, the OPT has eight large urban wastewater treatment plants (WWTPs) and almost 300 primary onsite treatment plants. Yet, the re-use of this water for agriculture is marginal (Al-Sa'ed 2010). Some Palestinian wastewater, originating in the West Bank, is treated in Israeli plants within Israel, with no benefits to Palestine. At the same time Palestine is required to pay for the treatment according to the Polluter Pays Principle (Schalimtzek and Fischhendler 2009). This created tensions on both sides of the green line, which is why having a good framework for agreed cooperation at this moment will have a long and lasting impact on both peoples.

My work focuses on the Tul-Karem – Emek Heffer region in the watershed known to Israelis as the Alexander watershed and to Palestinians as Wadi Zomar. This region has been involved in cooperation activities in the past decade, although cooperation was limited to a local level agreement between the municipalities reached in 1996. With

funding from the German government, primary treatment was established in Tul-Karem and effluent levels are then upgraded at Yad Hana plant inside Israel.

Emek Hefer is a Regional Council in the northern coastal plain of Israel where Israel is at its narrowest. Tulkarem is a Palestinian municipality in the West Bank. These communities share a common border – the Greenline. Both Tulkarem and Emek Hefer share a severely polluted basin. Runoff from Palestinian neighboring towns and villages and nearby Jewish settlements flowed untreated till 1996.

The rationale behind focusing on the limited area of Tulkarem and Emek-Hefer is twofold. First, it allows me to focus on an area that has explored transboundary collaboration on wastewater management and therefore, it allows for learning from a real life experience. Second, by building on cooperation experience, my work bases itself on concrete experience, which allows for an assessment of current forms of cooperation followed by the investigation of future cooperation mechanisms.

This thesis has three main parts: background, discussion and conclusion. The background includes relevant social-political context and a literature review. In the second part, I present the results of the interviews with wastewater managers in the Tulkarem – Emek Hefer region. These interviews were designed to collect the attitudes and perspectives of wastewater managers towards cooperation after a Palestinian state

is established. Interviewees were invited to express their vision as for future wastewater management in the region, and to rank and rate a series of three possible future wastewater management scenarios. I also collected their perspectives on obstacles in the implementation process of the possible scenarios. In the final part of the thesis, I summarize the interviews and the literature. I also present a proposed vision of future wastewater management between Israel and Palestine.

My thesis guiding question is "what is the preferred political structure for managing wastewater in transboundary regions between Israel and Palestine among local wastewater managers with an emphasis on the Tulkarem –Emek Hefer region?"

"Wastewater managers" refers to policy makers and planners directly involved in setting wastewater policy in Israel and Palestine. Approaching this question led me to explore the attitudes of wastewater managers towards the Joint Water Committee (JWC). I was also then intrigued to investigate if wastewater managers preferred wastewater policy be set on the national level or on the local level. I also wanted to understand what shape and form of cooperation is preferred among wastewater managers.

Following the introduction, chapter two is the literature review which provides the basis for the empirical contribution of this work. This chapter is divided into four

sections of interest and relevant background, such as the political history, background of wastewater management, local government in Israel and Palestine and a description of the Tulkarem and Emek Hefer region. The first part of the literature review discusses transboundary cooperation and resource sharing. Then I present the literature regarding wastewater management in the Tulkarem – Emek Hefer region. The third part discusses the Joint Water Committee (JWC) in regards to wastewater management in the region. The last part discusses cooperation in the region, where I draw from the water and aquifer joint management literature and discuss the tensions between setting wastewater policy on the national and on the local level with regards to cooperation. The purpose of this section is to have a good background towards conducting the interviews a prerequisite for "elite interviews" (Kvale 2008).

In chapter three, I describe the methodology, the interview guide and the questionnaire. I interviewed six specialists on the matter of wastewater management who have been directly involved with the Tulkarem - Emek Hefer regional cooperation; three Israeli interviewees and three Palestinian interviewees. I designed the interviews to collect the interviewees' attitudes and perceptions about wastewater management cooperation, based on their professional experience. The interviewees, regarded as "local wastewater managers," were chosen through web searches and referrals. The interviewees are a range of actors directly involved in wastewater management in the

region of Tulkarem and Emek Hefer. The interviewees represent environmental agencies, regional and municipal bodies and environmental departments, wastewater treatment facilities and non-governmental organizations.

In chapter four, I developed three scenarios for wastewater management in the region. The first scenario involves the least cooperation between Palestinian and Israeli actors. It is a duplicate infrastructure scenario which in policy terms translates to scaling back on cooperation and seeking to independently manage wastewater. Then I present the status quo scenario; this scenario leaves wastewater management without a determined policy. The third involves a union of Palestinian and Israeli cities involved in joint water management efforts that can take different forms and shapes. The focus of the scenarios is primarily to highlight the structural features of the current Palestinian and Israeli local governments related to the wastewater management. In the last section, chapters five through eight, I report on my interview findings, conduct the "meaning interview" analysis, discuss my findings, draw conclusions and finally suggest further prospects for research. In my discussion chapter, I discuss implementation strategies and frame the wastewater management issue publicly in order to best facilitate sustainable cooperation.

A note on the power dynamics and cooperation

Understanding the power dynamics is important not only to understand the impediments for implementation of projects, but to understand the disadvantages the Palestinian society is emerged in. I suggest that power dynamics should be considered during all wastewater and water related agreements and frameworks. Efforts to reverse the impacts of the occupation years are vital to any cooperation initiative that seeks a better future for Palestinians and Israelis.

Though I choose the Tulkarem and Emek-Hefer cooperation as a focus, it is not a show case of intermunicipal cooperation across boundaries. Israel began occupying the West Bank, previously held by Jordan in 1967. The West Bank is controlled under military law. Israel did not annex the West Bank, nor did it grant citizen rights to the residents of that territory. This created a reality in which the two sides of the "Green Line," have different environmental regulations, enforcement and investments in infrastructure. This policy has had and still has a negative effect on the health and the human rights of the Palestinian residents of the West Bank. This military regime is especially notable in water resources. Israeli administrative control over the water means that the drilling of any well in the West Bank requires a permit from the military commander in the area.

The Oslo agreement divided the West Bank into three areas: Area "A" under Palestinian control, area "B" under Israeli security control and Palestinian civil control, and area "C" under the Israeli control. Areas "A" and "B" combined form around 40% of the total area of West Bank. Area "C" is composed of Israeli Settlements and Outposts and most of Palestinian arable land. Due to this governance hierarchy, Palestinians have found it nearly impossible to implement a nationwide water and wastewater policy. The impact of the JWC on the Palestinian water sector has therefore been limited.

Palestinians are restricted from developing independent wastewater treatment plants that could potentially contain the environmental catastrophe occurring in the West Bank. In many cases donor money has been lost due to the barriers imposed on Palestinians by the military occupation. An example often cited of this power dynamic is the Israeli requirement for Palestinians to deploy high tech wastewater treatment plants that go far beyond the standards set by the WHO. This requirement runs up the costs for any potential project and might not suit the current development stage. Other examples include Israel's approval of WWTP in Palestine only with the agreement of Palestinians to connect the WWTP to the nearby Israeli settlements. This consent is highly problematic as it might suggest that Palestinians agree to Israeli settlements in

the West Bank (Mayor of Salfit, while talking to a group of Israeli Human Rights and Environmental activist in 2007).

When approaching the topic of cooperation, it is necessary to consider the political circumstances created by more than 40 years of military occupation of the West Bank by Israel. What might be perceived by one actor as cooperation might be perceived by another as domination or as an impediment on sovereignty. My work is dedicated to the day when Palestine is a recognized state with recognized borders and Israel is a neighbor that coexists in peace and security achieved by a political agreement. In order to focus on understanding future options for wastewater cooperation between Israel and Palestine, the nature of the political agreement is not discussed, although the scenarios examined exist in a future where Palestine is an independent state alongside Israel. In my survey I asked wastewater managers to envision the independent Palestinian state, in terms of wastewater management.

Planning for peace is planning for the day after a political agreement is reached between Israel and Palestine. Ultimately, the method of trans-boundary cooperation regarding wastewater is shaped by the agreement and depends on a range of issues. In the following work I searched for approaches in which future wastewater management can be best managed cooperatively based on interviews with wastewater managers who are directly involved in current cooperation projects.

CHAPTER TWO - LITERATURE REVIEW

The following chapter provides necessary background information on a number of topics directly related to wastewater collaboration between Israel and Palestine. This chapter is meant to familiarize the reader with the literature on this topic. Additionally, throughout the literature review I looked for gaps in the literature that might be filled either by the interviews I conducted with wastewater managers or by their analysis. I also compared and contrasted the different literary sources on the topics presented in the following chapter. The second part of this literature review pertains to the region I am studying; it's meant to shed light on the particular circumstances in the Emek-Hefer – Tulkarem Region.

The current paradigm for water management has been criticized by Brooks and Trottier in their 2010 article in the *Journal of Hydrology* "Confronting water in an Israeli–Palestinian peace agreement". In this article, Brooks and Trottier suggest an alternative structure for joint management of shared water sources. While this article suggests a structure for joint water management, it does not address the acute issue of wastewater management. Their critique of current joint water management can be extended to wastewater management. Yet, the solution for wastewater management depends a great deal on local governments in Israel and in Palestine and the existence of an agreed structure for managing this resource.

The current water cooperation framework between Israel and Palestine has also been criticized Selby in his 2003 and 2007 articles: *Joint Mismanagement: Reappraising the Oslo Water Regime* (Selby 2007) and *Dressing up domination as 'cooperation': the case of Israeli-Palestinian water relations* (Selby 2003). A strong critique on current cooperation and provides an interesting outline for cooperation comes from a leading Palestinian academic, Marwan Haddad, in his article *Politics and Water Management*: A Palestinian Perspective (Haddad 2007).

Cooperation – an Imperative

Shared Waters: Conflict and Cooperation, by Aaron Wolf, focuses on conflict and cooperation from several perspectives. Wolf argues that water cannot be managed for a single purpose or be managed based on conflicting interests. Of particular interest is Wolf's statement regarding the detrimental role wastewater plays in boundary conflict, in environmental segregation and human security. Wolf's research indicates that, in general, cooperation over shared water resources has occurred more frequently than conflict over water resources; he argues that conflicts overshadow the numerous benefits resolve by cooperation.

His research also shows that the politics and communicated stances of people on both sides of the issue are often harsh compared to the actions taken. Wolfs research found that, despite the lack of violence, water acts both an irritant and a unifier (Wolf

2007). Wolf also says that water needs are more useful criteria for water allocation, and cooperation amongst parties or outside intervention might help reduce needs and therefore reduce the quantities needed. Wolf then suggests that "a productive approach to the development of transboundary waters has been to move past rights and needs entirely and to examine the benefits in the basin from a regional approach" (Wolf 2007).Similarly, Fisher et al. proposed that disputes over water should be examined from their social and economic value and then shared in ways that maximize social welfare. The gains of cooperation greatly exceed the cost of the dispute (Fisher, Huber-Lee, and Amir 2005).

Wolf's and Fisher's ideas about the diminishing importance of water rights and the growing importance of benefits or needs is applicable to wastewater management related costs and benefits related to wastewater treatment in the Tulkarem and Emke Hefer region. By cooperating towards reducing the damages caused by pollution both parties will enjoy more water for agriculture a clean aquifer and healthy rivers.

The book *Governing the Commons: The Evolution of Institutions for Collective Action*, by E. Ostrom 1990, contains a framework for managing common pool resources (CPR). She discusses CPRs by using several case studies involving resources such as pasture land, coastal fishing spots, and water basins. One of the most profound concepts to come from her book is a list of eight points that she called "Design principles illustrated by

long-enduring CPR institutions" (Ostrom 1990). Among the eight principles that shape a successful CPR, the following are the most pertinent to the wastewater crisis between Israel and Palestine: "Clearly defined boundaries": identifying the members of the CPR, their rights and the physical boundaries of the CPR. "Congruence between appropriation and provision rules and local conditions": this rule requires agreement between the parties on the characteristics of the resource and its management. "Monitoring": by whom and how accountability is demanded. "Gradual sanctions": for violation of the operational rule, and conflict-resolution mechanisms designed in an easy to deploy manner.

The CPR basins that Ostrom studied had issues similar to the Israeli-Palestinian shared water resources, particularly the pollution by wastewater of the shared aquifers that has a detrimental impact on this shared resource. An encouraging point from Ostrom's work is her belief that individuals are willing to adopt new restrictions to secure the CPR. These restrictions are likely to be accepted if there are clear indicators of resource degradation, the threat to the resource is perceived to be an accurate predictor of future harm, or when leaders are able to convince their constituency that a crisis is impending. These restrictions would translate in our case to a tariff levied on municipalities or on users or even harder, an impediment on sovereignty of either Israel or Palestine. This price would be paid in order to protect the joint water resources such

as the aquifer. The pollution of the joint aquifer is perceived by both Israel and Palestine as a problem that requires cooperation to prevent the loss of this important resource(Tal and Abed Rabbo 2010; Feitelson and Haddad 1998; Haddad 2004; ZKTBG Tagar 2007).

Cooperation dynamics

Feitelson and Haddad 1998 explored options for joint management and identified two acceptable models for cooperation. The first model is a jointly managed water system based on an agreed level of cooperation such as a national or institutional level. The second model is based on a jointly agreed level of comprehensiveness. These models would eventually lead to the institutionalization of cooperation. However, these models require decision makers to discuss abstract terms, such as the organizational structure of local government. Feitelson and Hadad propose that the agreement for joint management should be driven by initial goals rather than by the above models. After goals are agreed upon by negotiators, the cooperating bodies may establish definitive structures to address these goals. These structures should be devised by technocrats who have expertise in addressing these goals, such as water specialists and authorities in governance structures, excluding issues of sovereignty which due to their political importance should be negotiated and agreed upon by politicians. Furthermore Feitelson and Haddad state that initial cooperation should not be based around contentious

subjects, rather on building trust, as well as a coherent agreement (Feitelson and Haddad 1998).

Sa'ed 2010, devotes his recent paper to investigating the barriers to sustainable wastewater management in Palestine. He suggests there can be Israeli-Palestinian bi-national wastewater facilities. He also advocates for a cooperation framework that would reduce conflict and help bring social, economic and environmental benefits. He argues for a cooperation based on a bi-national cooperation with mutual trust and most importantly, cooperation that improves the life of all residents in the region. He advocates for financial help from Israel for creating partnerships with its neighbor.

In general, most critics of current cooperation call for a reassessment of the way cooperation is managed and conducted. The critiques address the imbalance of power in the process of cooperation and the outcomes of this process. Yet there is consensus in the literature that in order to improve the quality of life of Israelis and Palestinians, cooperation is needed. Furthermore, there is a shared belief amongst Israeli and Palestinian academics that cooperation and mutual engagement is necessary for environmental sustainability in the region.

In the literature surveyed, all the authors agree that cooperation is necessary, but only propose prescribed methods for cooperation. The objective of my interviews is

therefore to gather perspectives on current and future cooperation in order to suggest t management and cooperation methods based on interviews with wastewater managers who have experience.

Wastewater management in the Tulkarem and Emek Hefer region

The Interim agreement of 1995 presented Israel with the opportunity to reduce contamination from the upstream sources in the West Bank streams to the main rivers in Israel by rehabilitating existing wastewater treatment plants which Israel established in the West Bank in the 1970s following the 1967 occupation (Fischhendler, Itay; Dinar Shlomi; Katz 2011). In 1996, following the Oslo Accords, the neighboring municipalities of Palestinian Tulkarem and Israeli regional council of Emek Hefer, reached a local level agreement concerning the Zomar/Alexander watershed. A letter of intent (Fig. 1) written by the mayors of both municipalities outlines the sewerage treatment agreement and explains their mutual interests.

Letter of Intent

The District of Tul-Karem, the Tul-Karem Municipality, and Emek-Hefer Regional Council recognize the acute necessity to promote and protect the environment, for the protection of the water we drink and the soil we cultivate, for the benefit of the inhabitants of Tul-Karem and environs, the Hefer Valley and environs.

It was therefore decided to establish a steering and planning committee that will be entrusted with supplying mutual expert solutions to resolve the problems in the short and immediate range and in the long range.

Those who stand at the helm will jointly work to obtain funding and consent from international bodies, in an effort to realize the plans and to implement them.

Figure 1 (Benveniśtî 2002) the 1996 agreement translated by Benveniśtî

Unfortunately, the letter of intent is ambiguous, and does not specify the commitments of each party to the plan nor does it outline implementation procedures. Ambiguity is not unique to this agreement and has been identified as an impasse for deepening cooperation (Fischhendler, Itay; Dinar Shlomi; Katz 2011). Fischhendler et al. also found that the agreements are also missing conflict resolution tools, joint institutions, enforcement and funding mechanisms as can be seen (Fig. 2). An agreement of this nature is doomed to trouble, if judging according to Ostrom's principles (presented above).

	Agreements signed (and year)				
Mechanisms available	*Jerusalem-Bethlehem and Beit Jala (1991)*	*Oslo Accords (1995)*	*Emek Hefer-Tulkarm (1996)*	*Kalkilya-Nir Eliahu (1997)*	*Water supply protocol (1998)*
Conflict resolution	−	−	−	−	−
Joint institution	−	+	−	−	+
Ambiguity	+	+	+	+	−
Escape clauses	−	−	−	−	−
Tariff updating	+	+	−	−	+
Enforcement mechanism	−	+(offset mechanism)	−	−	−
Funding mechanism	−	−	−	−	−

"+" marks a mechanism included in an agreement
"-" marks a mechanism not included in an agreement

Figure 2 Adaptation Mechanisms to Address Variability in Agreements Pertaining to Transboundary Wastewater and Water (Fischhendler, Itay; Dinar Shlomi; Katz 2011)

The report by Optimization for Sustainable Water Resources Management, titled "a case study of the Alexander - Zeimer Basin", analyzes and synthesizes a three-year study of the "Good Water Neighbors" (GWN) project. The report concludes that water quality, from the project's inception to 2005, was substantially improved; access to the river for recreation and tourism was significantly increased (OPTIMA 2006). GWN is an

EcoPeace/FoEME project, founded in 2001, aimed at fostering people-to-people dialogue and cooperation on the protection, equitable and sustainable use of water and environment resources in Jordan, Palestine and Israel (FoEME). The GWN has been instrumental in the Tulkarem – Emek Hefer region in fostering cooperation across the border.

According to the 2009 World Bank report, the Tulkarem Regional WWTP project experienced delays over 10 years. Due to setbacks in the development of the Tulkarem WWTP, the project was broken up in to two phases. Phase one consisted of the construction of a trunk line, collection system, and pretreatment (The World Bank 2009). This pretreatment was completed in 2005. Since 2005, after pretreatment in Tulkarem the partially treated wastewater is transferred to the Yad Hanna wastewater treatment plant. Phase two will be reevaluated in 2013 (The World Bank 2009). The Btselem Foul Play report, which addresses the prolonged neglect of wastewater treatment in the West Bank, stated that the Tulkarem WWTP has been halted due to disagreement on the location of the wastewater treatment plant (Hareuveni 2009). In an Email conversation with the Foul Play report author, he clarified that he referred to phase two, were a full treatment plant would be established in Tulkarem to serve Palestinian wastewater needs.

Description of current cooperation

Sa'ed (2010) in an effort to propose a framework for transboundary cooperation, sketches the current cooperation in the Tulkarem – Emek Hefer region. What we see in this sketch is the Tulkarem pre-treatment plant in orange, built by the German cooperation, regarded as "phase one" by the World Bank report 2009. This plant is a pretreatment plant, its effluent then is transferred for upgrade to the Yad Hana WWTP in Emek Hefer, Israel in blue. In pink we see that "end of pipe" solution described by Fischhendler el al.

The last piece of the sketch is the return of Palestinian water for agriculture in Palestine once treated in Yad Hana and brought to meet the quality measures, this is not yet functioning. Currently, the water continues its flow downstream after secondary treatment at Yad Hanna. In the case of the Hebron WWTP effluent is returned to Palestine after reaching tertiary levels in an Israeli plant (Fischhendler, Itay; Dinar Shlomi; Katz 2011).

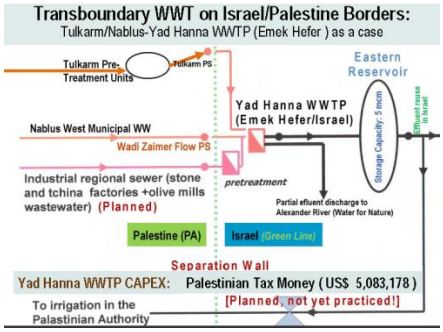

Figure 3 Transboundary WWT on Israel/Palestine Border (Al-Sa`ed 2010)

In an e-mail message with a senior Israeli policy maker, the process of wastewater treatment in the region is revealed "There is 4.5 – 5.5 million m^3 of wastewater coming from the Palestinian Authority treated/year from the wastewater plant built by Germany. This water from the plant that flows down the Alexander river is presently cleaned at a low level and needs to be upgraded to a tertiary level in order to prevent the river and coastal aquifer from further damage. Presently the Palestinian Authority pumps fresh water directly from the aquifer and does not reuse the partially cleaned water in any way thus draining the aquifer. The goal (…) is a comprehensive plan to upgrade the plant, polish the water to a tertiary level, return water to the Palestinians, add water to the river as well as add additional water for the reservoirs supporting the agricultural community in Emek Hefer as well as the surrounding communities" (Email communication with senior Israeli policy maker. The email was sent to a colleague after an enquiry about the Emek-Hefer Tulkarem Project in its current status).

This email communication confirms firsthand this sketch by Sa'ed (2010). Unfortunately, in this e-mail we do not see a commitment to encourage Palestinians to treat their own water from within their territory. The modus operatus of the regional council is that Israel treats Palestinian water. But the email does talks of the intention to send the clean effluent back to Palestinian for Palestinian use. Needless to say, the cost is assumed to be covered with Palestinian tax money. From a glance at the list of wastewater treatment plants in Israel, we see that 4.5 to 5.5 MCM fits the category of medium wastewater treatment plants, which at least in Israel are economically feasible (IWA web site lists of WWTP 2008).

The literature regarding the cooperation between the regional council of Emek Hefer and the municipality of Tulkarem describes the infrastructure of a current cooperation

initiative for dealing with wastewater in a cross border region. Yet, there is a gap in the literature regarding the policy that enabled the institution of this infrastructure.

The literature also does not convey how and why both political bodies, the municipalities of Tulkarem and Emek Hefer, engaged in creating and ultimately agreed to institute a wastewater initiative. The roles of the Palestinian Authority and the Israeli government are yet to be clarified. Furthermore, the role of the German cooperation, beyond just development promoting but that of a mediator should also be investigated.

The JWC and wastewater management in the region

Palestinians for the most part see the JWC as a continuation of Israeli domination (Tal and Abed Rabbo 2010; Schalimtzek and Fischhendler 2009). These sentiments are related to the veto power embedded in the Oslo B accords in the form of decision making by consensus: "[All JWC agreements should be] reached by consensus, including the agenda, its procedures, and other matters" (Article 40 paragraph 13). Although mutually agreed, since the treaty was signed, Palestinians have experienced the Israeli veto power on their projects, while Palestinians can't veto Israeli projects in the West Bank (area C) or on the shared resource within Israel (Brooks and Trottier 2010). A report by the PWA describes the JWC as "continuous suffering." The report also notes that even projects that were agreed upon in the JWC were not implemented (2006 Internal PWA report on constraints in the water service, cited by Assaf 2007.

The World Bank in its 2009 report asserted that the JWC has not fulfilled its role of providing a supportive governance framework for joint resource management. J. Selby, an outspoken critic of the Oslo Agreement categorizes the cooperation as 'domination dressed-up as cooperation' (Selby 2003). In a personal conversation with Uri Shamir, former head of Israeli Water Authority he argued that to date, the JWC has been a good example of transboundary cooperation, believing the JWC has brought gains to Palestinians and has managed to overcome difficult moments. Shamir argues that the decision making process is genuinely professional and that cooperation in very difficult times has proven the resiliency of this body.

The main critique of the JWC is that its authorities are limited to Palestinian recourses which have a joint element with Israel (Shuval 2011; Brooks and Trottier 2010). In other words, the joint component of the shared water resource is only for the Palestinian parts. The part within Israel does not "require" joint management. A breakdown of the joint institutions established by the Oslo accords were provided by Schalimtzek and Fischhendler and sown in figure 4.

Institution	Responsibility	Implementation mechanisms
Joint Water Committee	Managing and enforcing the implementation of water articles in the interim agreement	– Joint Supervision and Enforcement Teams – Regular meetings
Joint Technical Subcommittee	Management of water supply issues	– Offset mechanism (payment for water supply)
Joint Sewage Subcommittee	Management of wastewater issues	
Environmental Expert Committee	Advisory expert committee on environmental issues with no enforcement mechanism	Regular meetings

Figure 4 Water Institutions Established by Oslo (Schalimtzek and Fischhendler 2009)

The literature surrounding post Oslo cooperation has thoroughly assessed the JWC and the other institutions involved in cooperation. Yet I haven't encountered research on the perspectives and attitudes of the wastewater managers both in Israel and Palestine on the JWC. The wastewater managers in the Tulkarem and Emek Hefer region in particular were instrumental in clarifying the role of the JWC. As one of the sub-questions, I had interest in was if the Oslo institutions were productive or counterproductive in this cooperation (chapter 5).

Although the focal point of this work is local and regional cooperation, the JWC cannot be overlooked for the following reasons. First, it is the agreed precedent of cooperation between Israel and Palestine and the political framework from which cooperation is managed to date. Also, while the JWC is an example of cooperation on a bi-national level, the officials interviewed refer to the JWC as strength or an impediment for current and/or future cooperation.

The reasons I would deviate from the JWC are its unbalanced nature described by Brooks et al. Yet, I would advocate that any deviation must be to an upgraded cooperation framework rather than less cooperation. It's very easy to dismiss environmental and public health issues as less important than the "acute issues," yet even in conflicts these cannot be postponed. Addressing environmental and public

health concerns both in Israel and Palestine and jointly results in benefits for both Israelis and Palestinians.

Wastewater policy: a national or a local issue?

Wastewater management has three realms: the wastewater policy within Israel, the wastewater policy within Palestine, and the realm of cooperation. The cooperation realm is the realm were Israel and Palestine can choose to cooperate either due to proximity of a shared resource, or when cooperation can lead to benefits such as economies of scale.

In Israel, a regional approach to wastewater has been adopted. This approach has gone through significant transformations through the years. One of the important cornerstones in the process towards a regional approach was a report by the Israel State's Comptroller and Ombudsman' from 1989. This report, delineates responsibilities for the contamination of Israel's water resources (The State Comptroller 1991). This report found very low levels of treatment and pointed out, the waste of the resource (wastewater). This situation was a result of insufficient resources and local authorities that neglected the issue of wastewater and the environment.

The 1990s brought a significant change towards regional advanced water treatment infrastructure (Hophmayer-Tokich and Kliot 2008). Dramatic improvements in the

sanitation sector are attributed to personal responsibility of government officials on environmental and budgetary issues. Additionally, the enforcement of the closed budget for water and wastewater management meant that money collected from residents for water and wastewater fees could only be spent on water and wastewater related expenses (Ben Elia 2009).

Israeli municipalities together with other state and non-state actors have been trying to clean up Israel's streams since the early 1990s (Hophmayer-Tokich and Kliot 2008). Palestinian sewerage coming from the upstream watershed, forced them to treat the pollutions at their expense with no ability to directly benefit from the clean water. This led Israeli border municipalities to pressure the government to institute the "offset mechanism" in 2003 (Fischhendler, Itay; Dinar Shlomi; Katz 2011). The offset mechanism enabled Israel to unilaterally deduct money from Palestinian taxes and customs Israel collects according to the Paris agreement from 1994.

Schalimtzek & Fischhendler argue that while the offset mechanism released the municipalities from the financial burden, it is not environmentally friendly and provides only a cosmetic solution to the sewerage problem. This led them to conclude that the unilaterally deducting funds from PA taxes for wastewater treatment, Israelis found the new "cost sharing mechanism" serving political needs rather than environmental(Fischhendler, Itay; Dinar Shlomi; Katz 2011).

In the Palestinian Authority, there is only one properly functioning treatment plant the El-Bire wastewater treatment plant (WWTP) treating Part of Ramallah's wastewater, and poorly functioning plants in Hebron, Jenin, and Tulkarem. There are also efforts to establish WWTPs in Nablus (West) and the Hebron WWTP. Yet, most Palestinian towns and villages rely on cesspits and septic tank coverage. The wastewater threatens nearby water sources, cisterns, crops etc. and results in net loss of Agriculture water(Palestinian Hydrology Group 2009; Al-Sa`ed 2010; Z Tagar 2007).

There are competing perspectives on how to address the lack of WWTP's in Palestine. While some scholars suggest a centralized approach to wastewater management that is similar to the Israeli regional approach, others scholars suggest that Palestine would benefit more from a local solution because it better suits the locally managed water system (Tal and Abed Rabbo 2010).

Structure of local government in Israel and Palestine

Government's major role is to collect revenues from the citizens and redistribute them through the provision of public goods and services (Massam 1975). In many countries, these responsibilities were delegated to the local authorities as a result of political and fiscal decentralization (Razin 2000; Massam 1975). However, local authorities differ in their abilities to provide services (Massam 1975). As a result, cooperation between two or more local authorities with geographic proximity occurs,

taking many different shapes and forms, usually created on an ad hoc basis, and generally in order to perform one single function (Hertzog 2010; Massam 1975).

Cross municipal cooperation, can be an efficient tool to address problems that extend beyond municipal boundaries and to ensure the efficiency and high level of the provided service (Hertzog 2010). The main advantage of cross municipal cooperation in our case are: economies of scale, balancing disparities between local authorities and reducing spillover effects and most importantly dealing with issues of importance to both municipalities when cooperation is necessary.

The purpose of the following part is to discuss and describe local government aspects of intermunicipal cooperation on wastewater issues. Impediments or facilitators of cooperation might be related to legal statutes and political frameworks related to local government.

Administratively, the West Bank is divided into eleven districts, Tulkarem being one of them. The districts are sub-divided into 89 municipalities, responsible by law for building and maintaining infrastructure such as sanitation, local roads, and sidewalks and providing basic services such as wastewater treatment and construction permitting (EMWATER 2004). In addition, there are local councils that manage all infra- structure

and basic services within the towns and villages. Around 65% of the Palestinian population lives in urban areas.

Unfortunately, Palestinian villages and towns generally do not coordinate their infrastructure building. The Ministry of Local Government is a coordinating body with international donors and has engaged in building the necessary structure to coordinate between local governments and the Palestinian Government (EMWATER 2004). The larger NGOs like ARIJ, WEDO and the PHG coordinate between and or implement projects for donors in the local level.

Since its establishment in 1996, the Palestinian Water Authority(PWA) is the main regulatory body in the Palestinian Authority, for water and wastewater management by law is the PWA (Palestinian National Authority 1996).The PWA approach has been to establish regional utilities for large systems wherever possible (EMWATER 2004). This is a centralized approach similar to the Israeli water institutions. Furthermore, the strategic master plan for wastewater management developed by the PWA demonstrates the national wastewater management approach the PWA has chosen (LDK-ECO 2006; Samhan et al. 2010).In 2002, new policies advocating private sector participation were presented, in part, out of recognition of the weak performance of the regional water authorities. This has led to the adoption of water law 3/2002, which aims to develop and manage the water resources by public sector participation. This law draws a line

between the project implementer and the policy maker tasked with the responsibility of providing services (EMWATER 2004; Assaf 2007; Samhan et al. 2010; Arlosoroff 2007).

Al-Sa'ed and Mubarak conducted a technical, socio-cultural and financial research of the different aspects of onsite sanitation systems in Palestine, and they found a strong preference for centralized system (Al-Sa'ed and Mubarak 2006)

In Israel, the Israeli Water Authority is responsible for setting the regulatory framework of water and wastewater related policy. But for the daily management, control is handled by the Drainage Authority. For the Emek Hefer region its the Hoff Sharon Authority, in cooperation with local authority in this case Emek Hefer regional council.

By 1989 in Israel ninety million cubic meters of sewage were treated a year to a drinking water level. This increased Israel's water supply by 6%. (Tal 2002).In spite of all these efforts in the early 1990, over 20% of the wastewater generated in Israel was dumped untreated into the environment (Hophmayer-Tokich and Kliot 2008). As a result of the success of the 1972-1989 greater Tel Aviv Wastewater Consortium and the proven benefits from economies of scale, the regional approach to wastewater was promoted by the Central Government. The expansion of the wastewater treatment system has reached in 2009 about 70% of the residential water. According to the Istraeli

Water Authority master plan, by 2020 some 20% of total water supply and 50% of irrigation water will come from treated waste water

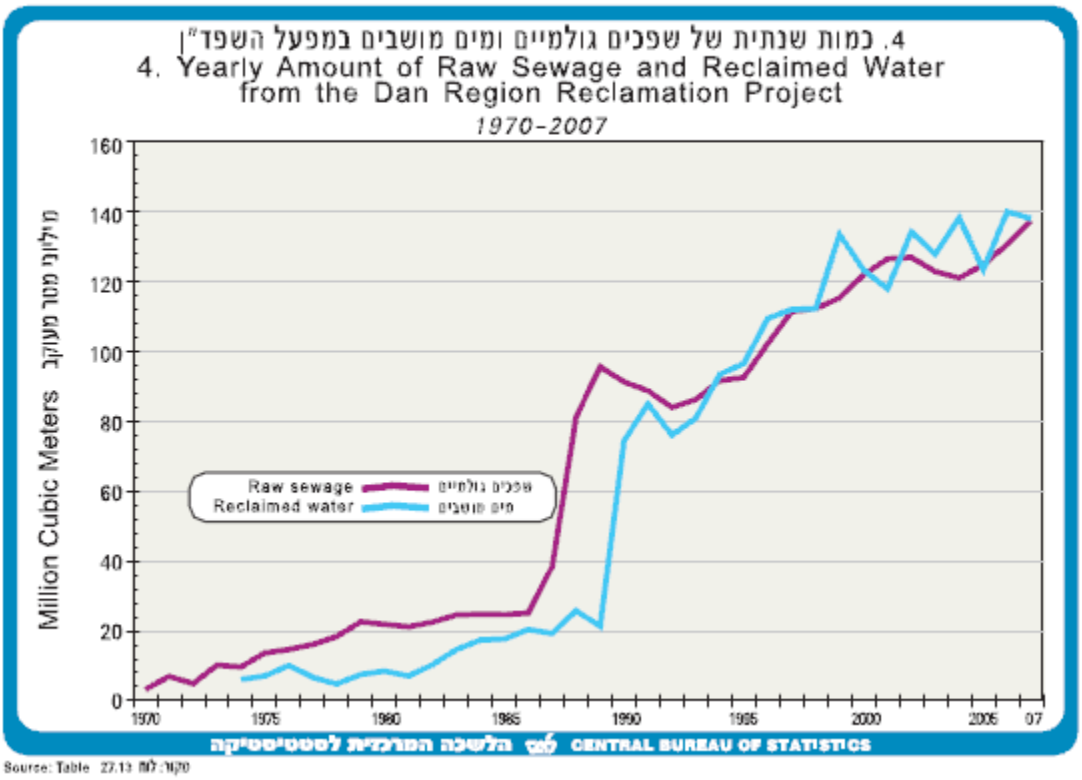

Figure 5 CBS, Statistical Abstract of Israel 2008 (Table 27.13)

In this chapter we see that Israel is strongly entrenched in a regional wastewater management approache. And had invested significant efforts in the past decades and creating a centralized water authority. Yet, when it comes to wastewater there seems to be leeway for original solutions. What is most inspiring is how fast Israel went from little treatment to almost 70% this means that if the wastewater management issue is handled properly Palestine could very fast reach these standards.

Geo-description of the studied region:

Israel and Palestine share five main watersheds, four of which flow from the West Bank into Israel. The Tributaries are; Wadi Mugata' (Jenin district), Wadi Zaimer (Nablus-Tulkarm districts), Wadi Zhor (Qalqilia district), Wadi An-Nar (Hebron district) and Wadi Mahbas (Ramallah district). The watershed of the Nablus and Alexander Streams covers 565 square kilometers and includes 12 tributaries, from the Samaria Mountains in the east, through the Hefer Valley, up to its mouth in the western Mediterranean adjacent to Beit Yannai and Michmoret (See map 1). The Nablus River changes it's name into the Alexander river once it enters Israel (Zalul).

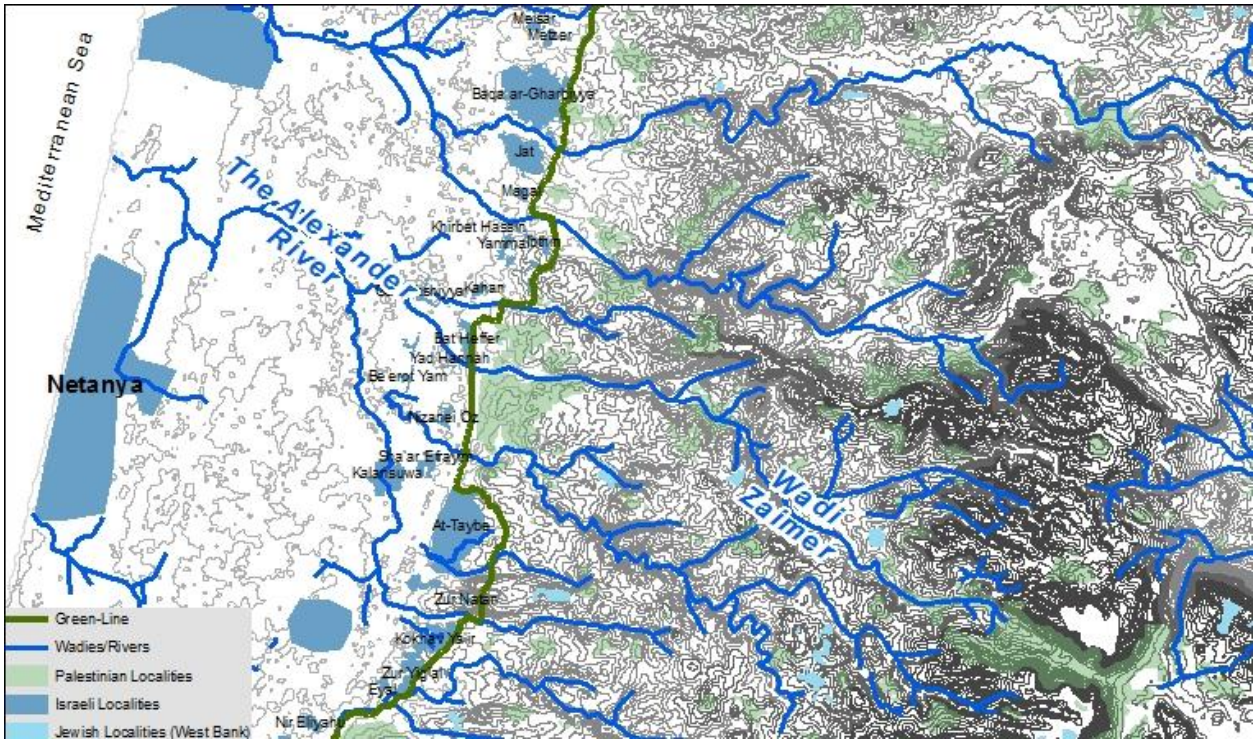

Figure 6 Background, the Tulkarem Emek Hefer Regio with elevation contours in the background

The Emek Hefer regional council starts west from the green line into the Mediterranean Sea. The regional council is north of the Israeli city of Netanya and south from Gedera, and Tulkarem in the East. The regional council has about 55k residents (municipality web site). The city of Tulkarem has about 45,000 residents and the district of Tulkarem has 172,793 residents (Central Bureau of Statistics (PCBS) 2006). The municipality borders to the west with the Separation Wall built by Israel in 2003. The region is a major agriculture hub both for Israel and Palestine. This is due to a large proportion of arable land and due to relatively high rainfall (about 600mm/yr).

CHAPTER THREE – METHODOLOGY

After the introduction and the literature review that set the stage for my work, I proceeded to design scenarios for future wastewater management. I used Kvale's seven step strategy guide for an interview investigation (Kvale 2008). The scenarios are designed to express levels of cooperation in an open form, meaning that I don't present the interviewee with a complete scenario, rather I ask about the characteristics of the scenarios. The interviews therefore, examined these scenarios as a series of policies or ideas presented to the interviewee, rather than as complete scenarios. The advantages of examining open scenarios are that they allow for the examination of a range of ideas for future cooperation and that it allows the interviewee to express the nuances of their opinion. At the end of chapter four I explain the relationships between the scenarios and the interview questions.

The interviews' purpose is to obtain an understanding of how actors in wastewater cooperation between Israel and Palestine in the Tulkarem – Emek-Hefer region perceive current cooperation, and to assess their attitudes towards future cooperation. While interviewing the wastewater managers, I was less concerned with factual aspects of cooperation in its current stage, and more interested in understanding their attitudes towards future cooperation.

The interviews were carried out by phone following a semi-structured interview guide. The guide included open ended questions and fixed answers questions. Out of respect to my interviewees' time, interviews did not take more than 45 minutes,

The people interviewed fall under Kvale's category of "elite interviewees," who are harder to access (Kvale 2008). Therefore, I used internet searches and a "snow ball approach," which involves reaching interviewees through names provided by previous interviews and through my social network. The most important criterion for choosing interviewees was their experience in the cooperation process over water or wastewater issues.

After choosing the interviewees, I contacted them by email to set up a phone interview. In this email, I provided a link to the online questionnaire which listed the questions that I would ask in the phone interview, and enabled the interviewee to answer the questions briefly online before the phone interview. This assisted the interview to in providing thoughtful responses and reduced some of the tensions involved in the phone interview. The online questionnaire also enabled me to track the number of times the questionnaire was open and if entries were unique. Unfortunately, out of twelve unique clicks on the link, I received zero responses through this medium. A colleague of mine has suggested that a cultural barrier was the cause for the lack of responses.

The purpose of the telephone interviews was to understand the attitudes of wastewater managers regarding elements pertaining to wastewater management between Israel and Palestine in its current and future forms. The method of knowledge generation in the interviews was the interaction between me and the interviewee. The survey and interview guide were approved by the Tufts University Institutional Review Board (see appendix D).

Through the results of the interviews, I developed metrics for measuring the the wastewater managers' perceptions and attitudes towards the cooperation scenarios. I relied on the literature and my key informants to formulate the questions. The questionnaire includes two open-ended interview questions, where respondents had the freedom to formulate their answers, and a series of fixed response questions. These gave the interviewees the ability to rank and rate or express attitudes based on a fixed scale. Though the answers are fixed, interviewees expanded on these questions after providing a scaled response.

I began each interview by introducing myself and the purpose of the interview, as well as an overview of my research. I addressed terms of confidentiality by asking for consent to record and use their responses in my research. I proceeded to briefly lay out the format of the interview and its length. I clarified that although some of the questions are scaled, I welcome clarifications on their position after they provided me with a

scaled response. At the end of the interview, I provided my contact information in case the interviewee wanted to clarify any point after the interview. Lastly, I allowed the interviewee to clarify any doubts about the interview.

The interview questionnaire can be found in appendix A. I also asked flexible follow-up questions not included in the questionnaire which depended on the individuals' responses. These questions probed for further examples, clarification, and additional thoughts on information offered by the interview.

The interview questionnaire can be found in appendix A. I also asked flexible follow-up questions not included in the questionnaire which depended on the individuals' responses. These questions probed for further examples, clarification, and additional thoughts on information offered by the interview..

I found it difficult to predict the responses from my interviewees, as I am investigating future scenarios when there is peace in the region, which is a concept difficult to imagine for people in the region. Despite the current cooperation criticism in the literature, Israel and Palestine have been cooperating on water and wastewater projects and my interviewees have been at its core of these initiatives.

On the Palestinian side, I generally expected the Palestinian wastewater managers to support current practices and others to strongly oppose current cooperation. I also

expected that I would hear from some respondents who have lost confidence with cooperation and preferred an independent route to wastewater management, and others who see the benefits from a denationalized approach to wastewater management as long as the economic burden is not on Palestine. I expected the Israeli wastewater managers to be pleased with from the current arrangement, as Emek Hefer has received great benefit from the arrangement. On the other hand, Israeli wastewater managers might see prospects of improved forms of wastewater management, even if the Palestinian side sought to solve the wastewater issue in an independent manner.

The analysis of the interviews was an process that started with the first interview, then continued through the analysis phase. The method used for analyzing the interviews was a "meaning categorization" (Kvale, 2008). I was also prepared to use a combined methods approach. If, for example, respondents focused on narratives, I would t also employ a narrative structuring approach (Kvale, 2008).

The reliability of the interview findings was based on my interview methodology as well as my own awareness of my personal biases. My biases might arise from my belief in the need for cooperation or from difficulties of interviewing across cultural, religious or political boundaries (Kvale, 2008). For this reason, I conducted mock interviews with colleagues who have experience with interviewing across cultures. I also tested all questions for objectivity.

Though responses are on personal attitudes and perception, bias could have occurred from the interviewees' understanding of the question or from the researcher's understanding of the answer. It might also be that the respondents are uncomfortable expressing a certain point of view for different reasons (Bradburn, Sudman, and Wansink 2004). In order to validate and verify interview responses, I started the interviews by promising the interviewee that responses will not be associated with him or his position. I then made sure to ask the questions in an objective manner. Each interviewee was evaluated at the end of each interview by me for openness, frankness and sense of comfortableness of the interviewee in the course of the interview. In addition, I also kept track of all prior communications that might influence the interview responses. These measures allow for higher reliability of the interview process.

The generalizability of my findings might be limited due to my narrow sample size. In the conclusion I dedicate a section to discuss the generalizability of my work. The survey is a 15 item questionnaire composed of 13 multiple option responses, five-point rating scales, and two open-ended questions. The questionnaire addresses the following seven key factors:

1. Current cooperation between Tulkarem and Emek Hefer

2. The Joint Water Committee (JWC) role in the wastewater management in the region?
3. Transboundary cooperation for wastewater management as a potential or a hazard?
4. Wastewater policy a national or a local issue?
5. Decision making power on the local level?
6. Denationalization / decentralization – concerns and aspirations.
7. Obstacles in the implementation process of each of the scenarios

Six specialists on the matter of wastewater management were interviewed; three interviewees from Israel and three from Palestine. Before conducting interviews based on the thesis questionnaire for this thesis, I shared the questionnaire with Israeli and Palestinian friends and colleagues with the aim to discover any and potential causes of confusion, such as misleading questions that could potentially result in invalid responses. This stage appeared to be one of the most valuable as it gave me lots of constructive feedback that helped refine the questions. After incorporating the feedback in the questionnaire, I had colleagues who are not specialist on the topic comment on potential cultural biases or misunderstandings. This last quality control led me to further modifications.

After modifying the questionnaire, and before interviews with wastewater managers, I conducted two pilot interviews in order to test the efficacy of the questionnaire. The purpose of the pilot interviews was to test for the quality of the questions and the length of the interview (Bradburn, Sudman, and Wansink 2004b).. The first was conducted with a Palestinian friend, who also helped me with the translation of the questionnaire. The second pilot interview was with a local wastewater manager who fits the profile of one of the interviewees, yet is in another region, and his responses are regarded as of the key informant interviews

After the questionnaire was ready, the questionnaire was translated to Arabic. The first translation iteration was an online google translate translation, and then a Palestinian friend corrected the Arabic. The second translation phase was sending the translated questionnaire to three friends (One Israeli and two Palestinian graduate students) to look over and comment on the Arabic. The objective of the online questionnaire was to provide interviewees with the possibility to answer the interview in writing and secondly or most importantly to reduce tension prior to the interview and to allow the interviewee to think about the questions and then provide thoughtful responses in the interview.

Since June 2009, when I started preparing for this work, I conducted "key informant" interviews with specialists from both Palestine and Israel in wastewater and

environmental issues. The purpose of these interviews was to strengthen the validity and reliability of the interviews with the wastewater managers and to provide me with necessary background needed for "elite interviews." These interviews consisted of open ended questions.

Building the Questionnaire

As cooperation between Israel and Palestine can be portrayed negatively and in many cases kept from the public I considered the interviews to be "threatening". Bradburn et al. suggests that threatening questions need additional precaution such as increased anonymity (Bradburn, Sudman, and Wansink 2004b). The measures I took to make interviewees comfortable for them to provide me with their opinions were the following. First of all, in the email communication I wrote who referred me to them and included the questionnaire so they could have a look at it. I believed that by them seeing the questionnaire they would feel a sense of openness. At the beginning of the conversation I promised increased anonymity. As suggested by Bradburn et al. I worded questions in a hypothetical manner "would you consider" or "have you ever considered".

As for the fixed answer questions, Bradburn et al. also suggests to ensure that the questions account for all the scenarios, by leaving room for unanticipated responses such as "not applicable" or "don't know". In the probing process, I implemented the

"aided recall" method suggested by Bradburn et al. which helps the interviewee recall a certain event (Bradburn, Sudman, and Wansink 2004b).

According to Kavele, the interview questions can be evaluated with respect to both the thematic and the dynamic dimensions. The Thematic regards the ability of the question to produce knowledge. The dynamic component is evaluated according to the ability of the question to produce a good interaction with the interviewee. Kavel also notes that there is a tension between how structured the interview is and how spontaneous it is. In the latter, the interview might produce lively and less expected answers while in the structured situation it is easier to analyze. In my interviews I started by using structured questions and continued to less structured questions for the probing as specified above.

Interview Analysis

The analysis of the open interview questions followed Kvale's guidelines for a meaning interview analysis. In this analysis I looked for central themes in the responses. The first step of interview analysis was done while writing the interview guide. Then, analysis began while I conducted the interviews. In this preliminary step, I condensed and interpreted the meaning of what the interviewees described. During the interview, I asked probing questions to verify the validity of the interpretation. After the

interview, I listened to the interview recording to ensure I did not miss important points or misinterpreted the interviewees' responses.

In order to compare responses to the open questions between the interviewees, I used the following categorizations.

1. Characterizations
    a. Definitions of collaboration
    b. Relationships
    c. Level of collaboration
2. Applications
    a. Implementing Projects
    b. Justifying Success of Projects
3. Trends
    a. Types of collaborations
    b. Collaboration/Partnerships
    c. Limitations
    d. Opportunities

CHAPTER FOUR – SCENARIOS

As seen in chapter two, special arrangements have to be made for water treatment plants that are located on or very close to the future border between Israel and Palestine and that receive wastewater from across the border. In the following chapter I outline the scenarios and analyze general aspects related to wastewater management across borders. First I explain the scenarios I examined. Then I present an in depth description of each scenario with the pros and cons. Lastly, I explain how the scenarios are evaluated in the interviews.

Duplicate Infrastructure

Duplicate infrastructure is a scenario in which Israel and Palestine take independent routes in managing wastewater. Palestine conducts an independent route to wastewater management, and Israel when confronted with Palestinian pollution takes unilateral measures to confront the hazard (end of pipe solutions). Under the duplicate infrastructure scenario each party sets its own policies, builds its own infrastructure, determines its own quality standards, and secures its own financing. This does not necessarily mean that existing cooperation is halted, yet as we are dealing with to independent countries, Palestine might prefer to cut previous cooperation.

I assume that the polluter's pays principle (PPP) will continue to be the framework from which both Israel and Palestine confront this issue. From the Israeli perspective, we've seen above that "the end of pipe solution" has been promoted in the last couple of years, and therefore this would mean the continuation of the current policy (PPP). As far as Palestinians are concerned, engaging in a state building project might mean looking at Palestinian regions as complete planning units. Meaning that achieving economies of scale might be prioritized within Palestine even if more costly rather than achieving economies of scale with neighboring Israel.

In this scenario, further agreements might be reached; for example around quality of effluent discharge. Yet, the general policy is an independent route for wastewater management. The "offset mechanism," should be discontinued and an economic agreement should be instituted. This agreement should settle the economic components of pollution disputes in an agreed manner.

Status Quo Continued

Status quo continued suggests that Palestine exercises an independent rout to its wastewater management. In this scenario cooperation is a local effort, not a national policy. The Status quo management schema implies that each party manages the infrastructure within its political boundaries but coordinates its actions with the other party. Levels of cooperation achieved unilaterally are reversible by the sovereign

Palestinian government. However, agreed cooperation continues, while there is mutual agreement. Though now it's unilateral, after an agreement this mechanism can be extended in an agreed manner. As in essence the type of political structure is established by the Oslo accords in chapter 40.

This scenario is most likely to be in place after a peace agreement, due to disagreement on details of intermunicipal cooperation, lack of resources or political complications. In this case, it is imperative that the critique of the JCW lead to modifications of this cooperation body. Similarly to my recommendation above, the "offset mechanism" must stop being used, rather than "offset mechanism," an agreement on the economic implications of pollution should be achieved. These steps ought to be part of trust building efforts that might lead to better cooperation on the long run.

Joint Effort

Joint effort scenario suggests that wastewater management is not a national issue and cooperation occurs when it's the appropriate solution. This can happen for example by allowing "union of cities" a mechanism usually managed as a public company that provides specialized services across a number of cities or municipalities. In this case it would be Israeli and Palestinian municipalities establishing a single institutional structure to carry out tasks viewed by the parties as crucial for adequate management.

Joint efforts, might also take the form of deregulation/denationalization of the wastewater sector. Municipalities would be encouraged to delegate responsibility, by tendering wastewater to companies who can operate both in Israel and Palestine, providing wastewater services (the latter option was proposed by Feitelson and Abdul-Jaber, reviewed in chapter two).

For this last scenario a mechanism for developing infrastructure in an optimal and efficient manner requires some kind of strategic plan that looks at both Israel and Palestine as one planning unit. The pit fall of this kind of cooperation is be the mere consideration of operation costs and construction costs while ignoring other benefits that might be derived from having the plant in either state Israel or Palestine. Therefore it is imperative that components such as land-use, electricity purchase, outside contracting, and employment be considered as part of those gains attributed to the wastewater treatment plant.

I suggest that in the occasion that this scenario is deployed the area be treated as a planning unit in a fashion where empowerment and training of the workforce is equal where public servants from across the border, where tenders and contracts are fully accessible to both Palestinian and Israeli private sector and where capacitation and technical training is done in a competent matter. This competency should go beyond language and cultural barriers and seek to integrate both sides of the border.

Additionally, due to the expected disparities between Israel and Palestine I suggest that contracts should be short and preference be given to Palestinian companies once such companies are ready. I also expect that the main impediments to this scenario are the lack of trust. Therefore mechanisms of transparency must be part of this scenario.

The Questioner

This following section makes the connection between the research tool – the interview - and the scenarios above. My interviews started by asking the interviewee background in question one. Then, I went on to ask questions directly related to the scenarios and guided by the thesis question and the sub questions presented in the introduction. The questionnaire can be found in appendix A.

The first two question where opened ended questions and where designed to start a conversation with the interviewees. Question two was asked at the end of the survey, as in the pilot interviews I noticed that the buildup of the survey allowed the interviewee to express his vision in more detail. This question was considered the single most important question of this survey. Through this question I was trying to understand the prospects for future cooperation and the vision of the wastewater managers regarding this cooperation.

Interestingly enough, though lots of effort was put into the design of the closed ended questions, I then noticed that the more than anything I learned from the statements the interviewees made after ranking and rating. I believe that the ranking system directed the interviewee in responding in a more concise way, while the statement after the rating was a re-enforcement rather than a long explanation.

Questions three to six, referred to the JWC / IWA / PWA. These questions seek to understand the preferences of wastewater managers of setting wastewater policy on the national level versus the local level and the role national organizations played and should play in wastewater cooperation. These questions helped the interviewees recall the process of cooperation in its early stages and the role of a broad range of actors.

Questions seven and eight are a set of questions relating to the relationship between the wastewater managers in both sides of the green line. Through these questions I expected to understand the attitudes of the wastewater managers towards cooperation.

Questions nine and ten were statements designed to get the wastewater managers attitudes towards cooperation in its current and present form. These questions brought emotions and where difficult to answer. Question ten had only agree/disagree as I wanted to force the wastewater manager to be in one side or another. After the interviews, I think it was a good decision.

Question eleven deals with the local or national approaches to wastewater management. The question seeks to understand the preferences and opinions of wastewater managers as for where wastewater policy should be formulated. The question asked; should local government bodies have decision making power regarding wastewater management? Then the following three statements were offered as possible alternatives; "Local governments should have most of the decision making power." "Policy should be set on the national level but implementation and decision making should be on the local level." "The national government should decide and lead on matters regarding wastewater management." Interviewees provided definitive answers to this question and should be considered as a hot topic that is still debated in the public arena.

Question twelve and thirteen, directly relates to the "duplicate infrastructure" scenario and "Status Quo" scenarios. Questions fourteen and fifteen were designed to directly relate to the joint management scenario. These questions ended up evolving into conversations with rich and nuanced opinions. That did not result in definitive statements, rather in nuanced perspectives.

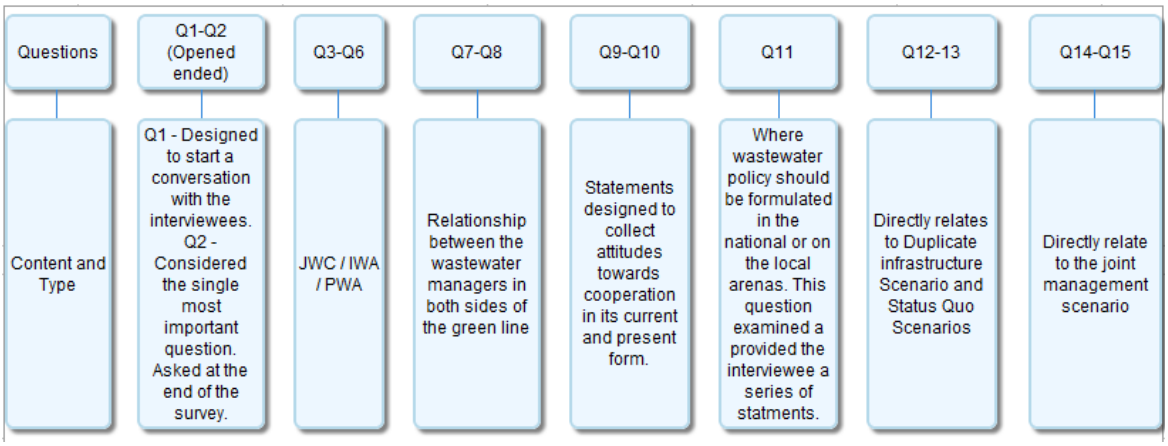

Figure 7 Questions description

Evaluating the scenarios using the questionnaire

Duplicate infrastructure; the first statement directly relates to the first scenario, "each party Palestinian and Israelis should manage the infrastructure within its political boundaries but coordinates its actions with the other party" (Q13). Then, together with responses to previous questions (Q3-6) about the JWC about the IWA/PWA and the previous question (Q12) "Israel and Palestine should take independent routes in managing wastewater" a question where the interviewee was asked to agree or disagree helped me directly rank and rate the interviewees' attitudes and perspectives towards the first scenario.

Questions twelve and thirteen were meant help me determine the attitudes towards the second scenario. Status quote scenario was also assessed by extrapolating from the first part of the interview. Interviewees' accounts on questions about the about the JWC

about the IWA/PWA where assumed to be helpful in determining the preference towards a specific scenario.

The third scenario; was rank and rated using the last two questions (Q14-15). These questions presented the interviewees with the following statements; "Israeli and Palestinian local got governments should establish a single institutional structure to carry out tasks viewed by the parties as crucial for adequate wastewater management quotations(Q14)" and the last statement; "Israeli and Palestinian municipalities should tender wastewater management to private companies who can operate both in Israel and Palestine(Q15)" these two questions/statements allow for, not only an assessment of the personal preference of the wastewater manager about his attitude towards the third scenario but also allows for understanding in specific terms how he envisions the implementation of such scenario.

The last and most important point to consider when assessing the scenarios, is that this work is devoted to the day when it independent Palestinian state is established therefore the scenarios should be understood in a context where Israelis and Palestinians have reached a two state solution agreement in which both Israel and Palestine are sovereign states.

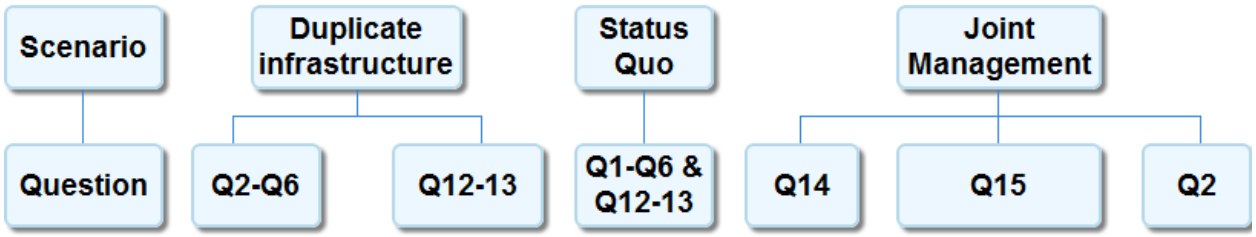

Figure 8 The questionnaire and the scenarios

CHAPTER FIVE – INTERVIW FINDINGS AND ANALYSIS

In this chapter I present the interview findings according to six themes the interviews were geared towards. (1) The reasons for cooperation from the Israeli and Palestinian perspectives. (2) The role of the PWA/IWA. (3) The classification of cooperation. (4) Policy and implementation a local or a national issue. (5) Communication amongst wastewater managers. (6) Obstacles to better practices. The themes were broken up into half a dozen categories. In order to compare between the interviews within the thematic categories; I noticed nuanced between the opinions of the interviews, such as definitions, relationships and connections, justifications and trends. The purpose of this chapter is to report on the interviews. In the next chapter I analyze the interviews. Due to IRB limitations, I do not provide names of the interviewees. Therefore I refer to the interviewees in the following manner. I-# for the Israeli interviewees and P-# for the Palestinian interviewees. A brief description of the interviewees is provided in the following table.

Table 2 Interviewee classification

Palestinian Interviewees	About	Israeli Interviewee	About
P-1	Leading position in local government	**I-1**	Senior planner.
P-2	Senior engineer at a leading Palestinian NGO	**I-2**	Policymaker on the local and regional level from the highest tier
P-3	Senior manager in the sanitation services sector in local government	**I-3**	Senior manager at Israeli NGO

Why Cooperation?

Until October 1996, cooperation between Emek-Hefer and Tulkarem was merely the management of a seasonal dirt dam built by the Israeli regional drainage authority on the Israeli side of the Greenline (I-1). This dam was built with the aim of stopping this sewerage that was running downstream through the Wadi Zomar in to the Nablus River, The alexander river is the continuation of the Nablus river). The dam created a sewerage lake. In the winter, the floods would wash the sewerage into the Mediterranean Sea leaving little reminisce to the pollution coming down stream in the Alexander River (I-1, I-2).

Over the years the Alexander River became a sewage channel where most of the natural ecosystem disappeared and the water became a black, stinky source of nuisance (I-1,P-1, P-3). During the early 1990s, there was a building boom in Palestine as a result of the peace negotiations (I-1). This new residential construction in the Tulkarem region, did not drain their sewerage into boreholes (then ending up in the aquifer), but instead dumped it into to the Nablus River that flows into the Alexander River (I-1). The degraded river brought mosquitoes and the riverbanks were sprayed against them which resulted in harm to the fauna.

In late summer 1996, when the river's water was at its lowest, the dam holding the sewerage lake from flowing towards the Mediterranean collapsed, because it could not

hold back the large quantities of sewerage (I-1). The collapse occurred during the harvesting season, when about twenty five Palestinian olive mills dumped their collective concentrated waste into the Nablus River (I-1, I-2). This waste contained phenols and detergents. One of the Israeli interviewees described it as follows "The river was black with oil on its upper surface and white foam streaming from detergents and hundreds of thousands of dead floating fish on this liquid," adding that the collapse of the dam caused a shocking ecological disaster, and the event brought policy makers from Emek Hefer to seek cooperation with Tulkarem over wastewater. He concluded by saying that unfortunately to bring people together to cooperate or act on an environmental issue you need a disaster (I-1). I-2 said cooperation was a pragmatic decision, "if you want to restore you need all the polluters involved". Tulkarem has lots of common concerns with Emek-Hefer said a Palestinian interviewee. Adding "we are neighbors and we needed to work together" (P-1). The Oslo years brought optimism and therefore efforts to cooperate, was seen as the proper mechanism to solving these environmental and public health problems (P-1, I-2).

The open sewage which flowed into the riverbed caused a range of, public health and sanitation problems. The sanitation issue was more acute in Tulkarem than in Emek Hefer, as the Nablus sewerage flowed between houses in Tulkarem as a result of the dam's collapse (P-3, P-1). With the sewage came the spread of mosquitos, who carried

the West Nile Fever virus which killed Israelis and Palestinians (I could not confirm numbers of affected by West Nile Virus in the West Bank, yet there are extensive reports about the epidemic in the Israeli media and reports such as (Israel Ministry of Health 2000; Weinberger 2001; Leshem 2002)). "Unfortunately mosquitoes can fly higher than 4 meters (referring to The Barrier) and across the border –then cannot be shot when they do so," said an interviewee. This made it clear that the only solution to the sewerage problem was cooperation (P-2, I-1, I-2).

The Palestinian interviewees spoke about the economic benefits from collaboration on the sewerage problem. Aside from the direct benefits from reducing the smells and the mosquitos, cooperation also meant international investment. This investment supplied jobs urgently needed. The Germans, the donor who financed the Palestinian side of the project, made a case to tender only to Palestinian contractors, and the work boosted the local economy (I-2, I-3). The Emek Hefer municipality did all it could to make this possible, even importing pipes from Gaza and making sure Palestinians from Gaza where able to work at the site (I-2).

A senior Israeli policy maker, explained that the current Prime Minister of Palestine, who was then the treasury minister, Fayad, personally signed on the tax deduction regarded as the "offset mechanism," for the Palestinian wastewater treated by Israel. He added that according to Oslo Palestinians are obligated to treat their sewerage, and if

they don't treat it they must pay for the treatment cost (Note that in the literature review other versions are presented. Palestinians highly criticize this practice). When probed about the "offset mechanism" one of the Palestinians interviewees (P1) gave an answer that surprised me. He said "sewerage causes us lots of problems, to agriculture and health." He explained that the sewerage ponds that existed near the city prior to the agreement with Emek-Hefer were a big hazard.

In general, the interviewees felt strongly about the benefits of cooperation/coordination. "Policymakers understand perfectly that in order to achieve sustainability there has to be cooperation" and "nobody fools himself that end of pipe solutions are environmental" (I-1). The end of pipe solutions, are an ideal solution for the surface wastewater but there are 30 km from the head of the River in Nablus till the Greenline. In this distance more than 50% of the wastewater enters the aquifer (I-3). This pollutes the most important water resource both for Israeli and Palestinians (P-2). Another interviewee said; "the only way is to reach sustainability is through cooperation" (P3) (referring to Israel and the Aquifer).

Although all interviewees agreed that cooperation/coordination is most secure way to ensure sustainability, Israeli interviewees explained they believed that cooperation must serve the interests of all partners (I-2, I-1). I-2 explained that before any meeting with Tulkarem the Israeli team conducted a preparation meeting to understand what

the interests for cooperation in Tulkarem. “Why would they want to cooperate with us?, you need to get them to want to cooperate if they don't have an interest there is no cooperation(I-2).” “They obviously don’t love Emek-Hefer.” He concluded “for cooperation to succeed it must be based on a joint interest, “it’s not that they want to cooperate in an altruistic manner.

When analyzing the agreement between Tulkarem and Emek Hefer from 1996, there are three key components. The first is the recognition of the problem, “recognize the acute necessity to promote and protect the environment”, the commitment to act to solve the problem. The second is, “… It was therefore decided to establish a steering and planning committee”. The third is a mutual agreement to work together to secure funding from international donors, “Those who stand at the helm will jointly work for obtaining funding and consent from…” (Quotes from the 1996 agreement translated by Benveniśtî , 2002).

The critique in the literature about the missing mechanisms of cooperation to sustain cooperation weren't an impediment in the Tulkarem-Emek-Hefer cooperation. The interviews show that regardless of the vagueness of the agreements and the lack of mechanisms between Tulkarem and Emek Hefer, cooperation continued even in the most difficult of times. This was possible as the cooperation was based on personal

relationships. It is apparent that mutual trust can go beyond many mechanisms and detailed agreements.

Both Israeli and Palestinian wastewater managers talked about a strong conviction to improve the environment, to solving the health problems and most surprising to me a quest to demonstrate that collaboration between Israelis and Palestinians on environmental issues is possible.

Apart from the vision and ideology, both sides also shared the concrete interest of protecting the important fresh water source, the aquifer and benefit from surface water. Sewerage disappearing into the aquifer is understood by both Palestinian and Israelis to be a time bomb. The economic and health issues were also pragmatic causes that facilitated this cooperation in this difficult period. Lastly, the economic help to the Palestinians from the German government was also an incentive essential to this cooperation.

The contradictions between what I found in the literature and what I heard in the interviews such as lack of cooperation and frustration might be explained by the difference between programmatic pragmatism and rhetoric.

IWA/PWA and the JWC

The JWC was considered by the Israeli interviewees as a very important body for water cooperation. Yet, on the wastewater realm, this cooperation is seen as a local government concern. One of the interviewees pointed out that in the JWC meetings wastewater is often the Israeli yellow card (call for attention) to Palestinians (I-3). For the Palestinian interviewees, the JWC is perceived as a body that brings complications and hurdles. Looking for "only coordination, no control" an interviewee told me while trying to envision a future cooperation mechanism (P-3), adding that the JWC is seen as part of the military occupation rather than a cooperation body. Another Palestinian interviewee said the JWC was very bureaucratic (P-1) and also said Israel had superiority that could not continue after an independent Palestinian state is established.

Palestinians judge the JWC by the lack of progress since the Oslo accords were signed in 1994, while Israelis see the JWC as an important cooperation body constrained to water allocation. (I-2) found the role of the JWC played as "it depends on the people and the time." For example, an Israeli JWC member worked against the treatment plant in Yad Hanna, on the grounds that peace will be achieved and Palestinians will treat their sewerage within Palestine.

The IWA was described as an organization that set the guidelines, for the Emek-Hefer – Tulkarem cooperation from the Israeli side. It was agreed amongst

interviewees, that the IWA provided assistance in the cooperation between Tulkarem and Emek Hefer. "The IWA understood the importance of this cooperation for environmental sustainability," though they also wanted to make sure [Israeli] national interest where not compromised (I-2).

For Palestinians, the PWA is perceived to be a centralized organization, that though it plays an important role in securing water both in urban and rural settings in the wastewater realm it was agreed it played a neutral -to negative role particularly in the Tulkarem – Emek-Hefer cooperation.

The economic burden of treating wastewater especially the capital investments in the wastewater treatment plant was seen as one of the bigger barriers to treating wastewater (P-3). In addition, Palestinian interviewees commented on the public awareness towards wastewater reuse for agriculture. They argued that the PWA or other Palestinian organizations will need to work with the public so properly treated effluent is widely accepted as a healthy and accepted practice.

Classification of Cooperation

Both Israeli and Palestinian interviewees were split on the nature of cooperation. "Why not treat in Palestine" P3 said, when asked about economies of scale or engineering complications that might be solved by cooperating. He told me once there

is an independent Palestinian state we can discuss that but, only if we have the choice, hinting that current cooperation is forced.

All but one of the interviewees offered creative solutions to improve cooperation on wastewater management between Israel and Palestine. Creative cooperation schemas might entail compensation for the Palestinian treated effluent in Israel sold to Israeli farmers, or maybe the exchange of the effluent for other commodities e.g. electricity or health services or some kind of technology transfer.

One creative solution came from an Israeli interviewee (I-3). The idea was to store treated wastewater in Israel, due to the lower cost associated with building storage facilities due to gradient. Another creative approach came from (P-1), who suggested transferring the treated effluent into water rights. This way the PWA can decide where it wants to receive the water and not be limited for using the same water in the same region (P-3).

The head of the PWA, S. Attili suggested a creative solution to Schalimtzek and Fischhendler; the PWA calls on Israel to deduct the benefits it receives from having the treated water from the cost of treating the Palestinian wastewater (Schalimtzek and Fischhendler 2009). I interpret this as a suggested temporary solution by Attili with the following rational. First, recognition in the responsibility Palestinians have for their

wastewater, and secondly, while Palestinians don't treat their wastewater and therefore Israel is forced into cleaning it, Palestinians should only pay the actual treatment cost minus the benefits Israel gets from the treated effluent.

National or Local

While there was consensus amongst Israeli interviewees that local governments should have most of the decision-making power on the wastewater cooperation, Palestinian interviewees were divided. One of the interviewees (P-1) argued strongly for a national approach that is centralized. He argued wastewater is a national issue and Palestine is in need of a centralized approach as this is the only way to achieve high standards. When I pressed, asking him about the important role local government plays, he was convinced the local government should be confined to service provision, and should not, set policy or manage infrastructure. This same interviewee thought that the only way for Palestine to address the wastewater problem is by tendering wastewater facilities to the private sector. The other Palestinian interviewees preferred a local government approach. They argued that the PWA along the years has been delegating powers to the wrong people - hinting to corruption. Furthermore they said that in reality it's local government who is directly responsible to the residents and have taken Palestinian people through the hardest of times (referring to the intifada).

I-2 was present when the conversation between the governor of Tulkarm and Chairmen Arafat spoke about the cooperation project in 1996. In the conversation the governing of Tulkarem asked Chairmen Arafat to approve the project. Once Chairmen Arafat was convinced the local government would receive the funding from the KFW (German government-owned development bank), he granted his approval and thereafter the project was managed on the local level.

Interviewees on both sides agreed that local government officials (Israeli and Palestinian) care more about solving the hazards of pollution on the local level. One interviewee when prompted said "they understand the context and therefore they're the best people to be dealing with it." The concern this interviewee expressed related to the relationship with weak local governments and therefore less cooperative. A Palestinian interviewee mentioned that regional and local governments are in direct contact with donors on sanitation (P-2).P-3 advocated for a national approach to wastewater policy, but a local approach for implementation.

The polluter pays principle (PPP) came up in a couple of interviews when I asked if municipalities should tender wastewater management to private corporations both in Israel and Palestine. The idea was that if Palestinians were paying for treatment they should be able to choose and pick who would be doing this treatment and at what expense. Interviewees from the Israeli side thought the PPP to be an appropriate policy.

Palestinian interviewees expressed concerns about the economic implications but did not have an alternative framework or proposition for dealing with transnational pollution.

To conclude, local governments were seen as more apt to deal with wastewater management as it is understood that they have a vested interest in having a clean environment, and are not as easily distracted by external political issues.

Communication with Counterparts

All interviewees regularly meat their counterparts from the other side of the Greenline. This should not be surprising, though the intensity of the meetings and their frequencies were a surprise. "Meetings are face-to-face. I meet with the head of the project for the city of Tulkarem" an Israeli interviewee tells me, adding "I just met face-to-face with anybody who is working on the project from the Palestinian side." Our relationship with the Israelis are excellent" a Palestinian interviewee tells me, "and these days the cell phones and e-mails and all the other technology we can be in contact as much as is necessary, even if there is a ban on travel (P-1)."

P-3 added that the Palestinian Ministry of Local Government is updated on any cooperation or meeting that happens these days. In some cases the municipality has been banned from meeting their Israeli counterparts by the Local Government ministry

and instead the issue was routed to the PWA or another Palestinian government entity (P-3). This was not mentioned by Israeli interviewees or other Palestinian interviewees and might be a local and isolated issue pertaining to higher politics.

Another Palestinian interviewee made a distinction between the Israeli NGIs and Mekorot (the Israeli water company) and the IWA. About the IWA he spoke with anger, “they want to control” he said. This distinction, between the Israeli government representatives and Israeli local government came to me as a surprise.

Nachum Itzkowitz, the former head of the Emek Hefer Regional Council who initiated the cooperation from the Israeli side, often says that none of the restoration of the Alexander River would have been possible without the friendly cooperation with the mayor of Tulkarem. He further explains that had they not traveled together to Germany [him and the mayor of Tulkarem] to convince the Germans to reach into their pockets, the shells of the Alexander River turtles would have continued to absorb the waste from the olive presses in northern Samaria, and the odor would have been overpowering. Itzkowitz stated, "I don't even have a shred of a complaint against the Palestinians," explaining that "For all these years [from 1967-1994], we [Israel] were the rulers in the area, and we didn't lift a finger to prevent pollution of the groundwater"(Eldar 2006). In this interview, Itzkowitz categorizes the relationship as friendly and attributes its success to this friendly cooperation. I-2, shared with me the

important role of the mediator. He tells me that the mayor of Baka Al-Garbiya and Israeli-Arab town near the Emek Hefer region, was the first to make the connection with the governor of Tulkarem.

I-2 said “This did not start as a “cooperation project,” this was purely a social and environmental project that evolved into a cooperation project after wanting to engage all stakeholders. In order to restore the Alexander River we needed to cooperate with Tulkarem.

All the interviewees spoke or hinted to the existence of secret meetings. These meetings were held in neutral places and were key for the continuation of cooperation during times of heavy fighting. The success of the cooperation was achieved by avoiding the big political issues. In the meetings between the Israeli teams and the Palestinian teams there was a "talking sewerage only" policy. This policy was introduced by the Mayor of Tulkarem who opened a meeting in one of the most tense times with the declaration that whoever says anything relating to political issues will have to leave the room immediately. This helped even when one of the most sensitive issues was discussed during that meeting, and the rule from then on was “sewerage only.”

Building trust was a major topic that came up while interviewing the wastewater managers. I think that if there is anything worth learning from this cooperation it's the personal relations developed within the project. First, the personalities of the Governor of Tulkarem, the Mayor of Tulkarem, and the Mayor of the Regional council of Emek Hefer were noted as inducers of peace. Two interviewees and the Eldar article talked about the commitment to the environment of these three. One interviewee told me "the vision of the Palestinian leader was to improve quality of life and to reduce the health risk for the population he represents," referring to the mayor of Tulkarem. He then told me Israeli and Palestinian local leaders wanted to demonstrate that Israelis and Palestinians can cooperate as neighbors.

A Palestinian interviewee tells me that the role of the Germans might be important, yet nothing can compare with their direct talks and communications he had with Israelis. Trust he told me, "was built after major differences were overcome," adding that "working together and respecting each other helped all partners gain trust." He called it "friends beyond sewerage." Meals and informal interaction were also cited as causes for more trust amongst wastewater managers. Two Israeli interviewees commented on the friendship with their Palestinian colleagues, telling me about the importance of respecting the cultural backgrounds of each other; "[trust is built] by respecting the differences and cultural backgrounds."

Obstacles for Cooperation

One of the lessons from the Tulkarem – Emek-Hefer cooperation is the need for a comprehensive approach, not to focus only on sewage removal. In order for cooperation to be successful it needs a holistic approach, it needs to be concerned with water quality water quantity landscaped land-use drainage, preservation, economy education public participation in many other components need to be brought together in order to be able to solve this one transboundary issue.

Some of the main tensions in these meetings were who will treat the sewerage, on what side of the border, and who will use the treated effluent (I-2). According to the Oslo agreement, it is up to each side to treat its own sewage and reuse its effluent. Yet the topography, land-use ownership engineering and economical aspects of the area do not readily allow for Palestinian sewerage treatment in the Palestinian side (P-3). The partners decided that for the short term the discussion on the contentious issue of where the sewerage was to be treated and by whom, would be put aside. And thereafter based on engineering and environmental recommendations the sewage ponds of the city of Tulkarem were rehabilitated and connected to the treatment facility on the Israeli side. This solution was not to rule out future solutions in which Palestinian sewerage would be treated on the Palestinian side (I-1, I-2, P-3).

A Palestinian interviewee complained about the lack of outreach in the Palestinian side, and that doing nothing to protect the aquifer means that the next generation will have an even harder time and fewer safe water resources. He then asked me to mention the unequal and unfair distribution of the water from the aquifer.

An Israeli wastewater contractor said his organization, builds wastewater infrastructure and then pass it to local governments to manage. "Give me a plan for cooperation with the Palestinian local governments' or organization and I will be happy to work accordingly." He therefore argued it would be easier for him to be sub contracted by an Israeli municipality. Although this might not be the way Palestine should cooperate with Israel, it sounds that an institutional arrangement might allow for cooperation on this matter.

Concluding remarks on interviews

Wastewater managers ranged in their attitudes towards cooperation on wastewater. From the analysis of my interviews I could not identify support to any of the scenarios presented in chapter four. Rather more nuanced opinions where expressed and I will explained in the following paragraphs.

Palestinian interviewees, where inclined towards the duplicate infrastructure scenario, although one interviewee was willing to consider total privatization of

wastewater management and cooperation with Israeli companies. Though, he did make it clear that this is after Palestinian independence. Israeli interviewees had somewhat of an inclination towards this scenario. Their rationale was based on the magnitude of the wastewater problem, especially the pollution of the aquifer. Israeli interviewees argued for independent Palestinian treatment; the Nablus wastewater flowing towards Emek Hefer is harmful to the environment, I heard a couple of times and therefore must be treated by Palestinians closest to the creation of the pollution. Yet, when it came to engineering limitations such as the gradient or economic Palestinian limitations, the same interviewees pushed towards a joint solution – yet not joint enough to have a joint entity that deals with the wastewater problem.

The status quo was what wastewater managers I interviewed had in mind. This might have come from the difficulty to imagine a completely different reality. The components of such scenarios seen as most important in the interviews were the centrality of local and regional governments in Palestine in setting the wastewater policy. Yet, the quest to a better quality of life led wastewater managers to decentralize wastewater policy and put it in the hands of local and regional government.

Joint infrastructure was not endorsed by any of the interviewees; it was unthinkable that a joint entity would be established to address wastewater. Yet, as I mentioned above, elements from this proposal were thought to be positive. Primarily there is

support and even excitement about having the private sector treat wastewater and the effluent then sold to farmers for agriculture purposes. The "every drop is crucial" mantra was prominent in each and every interview. Unfortunately, in reality most drops are discarded in their sewerage form ignoring the acute need for water and the benefits of sewerage treatment.

In a grim look back, Tulkarem-Emek-Hefer cooperation is a typical intermunicipal cooperation. Hertzog the author of the EU commission "Inter-municipal Cooperation Toolkit Manual," says that Inter-municipal Cooperation is usually ad hock and on a specific topic. After all, what we see is the narrowest possible cooperation. For the Israelis it meant solving the pollution of the upstream Alexander River and for the Palestinians reducing the health and sanitation risk.

In my work in Palestine in summer 2009, it was apparent that Palestinian municipalities lack the human and financial resources, environmental awareness, management capabilities, and/or political commitment necessary to discharge waste in an environmentally sound manner. Training of municipal decision-makers and professionals will be required to improve the overall effectiveness and environmental performance of Palestinian municipalities.

Limitations

The major limitations of my work are. (1) the number of people I spoke to, (2)difficulty to extrapolate from a short survey, difference between Israel and Palestine visa-vi the institutions and economic differences. While the number of people I interviewed is low and the generalizability compromised, the where many nuances amongst the interviewees. These nuances and the seniority of the wastewater managers: who were in the forefront of this cooperation allowed me to reflect on their attitudes and perspectives on future wastewater policy.

Extrapolating from a short survey was challenging. Though I prepared and proofed the survey and then used the thematic approach to gather the perspectives and attitudes, reaching a clear conclusion on such complex topic are very difficult.

Any comparison between Israel and Palestine visa-vi the institutional and economic differences complicates manners quite a bit. In the one hand there is no field that is even, and this is just the nature of cooperation. There will always be a party that is stronger and one that is less.

Policy Implications

There are a several key points that came across in the interviews. (1) preference for local government to lead wastewater projects. (2) Coordination between Israel and

Palestine rather than cooperation, (3) the centrality of personal relations and (4) trust being a crucial factor for cooperation.

Tension is revealed to: (1) ownership and leadership over the wastewater treatment plant which were "solved" with a temporary solutions. (2) Tech-disparities were reviled to be a central problem.

The starting point for a framework for effective coordination would be a political mechanism that is effective for both sides, in peaceful moments that is resilient to times of tension. This mechanism should be flexible and adaptive, ranging from conflict resolution and triggers to deepening future cooperation. This can be achieved by addressing the joint objective for reaching an agreed cooperation structure. In the following section I will dedicate thought to these prominent points. Where there is little trust, the design of a cooperation agreement must be as thorough as possible, starting from the design period.

One of the hurdles in the way of the Tulkarem – Emek Hefer cooperation in 1996 was the question of where the wastewater coming from Tulkarem would be treated and by whom it would be treated (I-2). It was then decided for the time being it would be treated in Yad-Hana and the Tulkarem ponds would be rehabilitated to treat the Nablus waste (P-1) and in a later time Palestinians would be able to build a full WWTP in that

area. Also, the treated water would be stored in Israel in case the Palestinians wanted the treated effluent for agriculture. The Yad-Hana WWTP was regarded as an emergency project meant to provide a temporary solution to a severe problem (I-2)

This was a way of postponing an important decision on ownership and control. It can be understood that the main goal of the The Yad-Hana WWTP plus and rehabilitation of the Tulkarem sewerage ponds was to provide what was called an "emergency" solution.

The Israeli part of the project involved a major river restoration project that included a restoration plan, a master plan approved in 1996, a planning process and millions of dollars invested in the rehabilitation and restoration of the once polluted areas. A similar investment was not made in the Palestinian side. These investments would have resulted in benefits to residents and an improved quality of life. Not only a solving the acute problems. How sustainable is it when Palestinians have minimal gains and Israel solved the acute part of the problem?

For sustainability it is crucial that cooperation projects include a discussion of ownership, operation and maintenance, and an agreement to refrain from unilateral actions. This would mean that important decisions are dealt with and not postponed.

On leadership, I heard much about the almost iconic personalities of the governor and the Mayor of Tulkarem and the Mayor of the Regional council of Emek Hefer. The absent robust leadership might have been fine for the short term, but not effective in the long run. A robust leadership would have allowed for a better community process and stakeholder representation, allowing for a more effective planning process.

Consequently, I propose that each project should have a broad leadership that represents a range of stakeholders. In addition, there is a need for a mechanism for timely decisions that ensure that decisions are guided by professional motives rather than by political ones.

In the interviews, I heard much about friendships and building trust. I also heard statements about the important element of any successful partnership are clear relationships and the responsibilities. Yet working principles were nowhere to be found. I would therefore advocate for a "spelling it out" policy, where roles and responsibilities of actors and leaders are clear. This working principle will help to clarify objectives, results, contributions and the work processes among the actors and to agree on their different roles in the context of any cooperation in the long and short term.

Although interviewees were skewed towards local initiative, their rationale was the motivation and sense of urgency they might have and therefore better address the issue of wastewater. Yet, alignment with national priorities would probably allow for a holistic approach much needed in environmental issues. However, cooperation is also or maybe more than anything a bi-national issue. Sequently, for and effective and meaningful outcome of a proposed bilateral agreement to materialize, it must be aligned with and integrated into the national level strategies and regional priorities of the two countries. This is not to say rural/marginalized areas should be ignored but to suggest that national integration receives preeminence to regional integration. It also advocates for development of local strategies in line with national priorities.

The main concern expressed by the interviewees was keeping the aquifer clean and safe for future generations. This is also the justification for the cooperation with Emek-Hefer. Is the current solution achieving this? It has been suggested by an interviewee that 50% of the sewerage seeps into the ground by the time it reaches Emek Hefer. This is why I believe a focus on concrete development results might have contributed to better results on the long run. Let's not forget that cooperation is not an end in itself, but a means to achieving results. In order to reach results we must ensure an effective accountability system as well as monitoring and evaluation process. The mechanism should be required to disseminate its periodical findings to the responsible

governments and to civil society. Starting in the project design period we must ensure measurable outcomes are spelled out and are clear to all parties so monitoring and evaluation can take place.

In my original thesis design, I wrote a list of hypotheses. One of them was that cooperation on wastewater can lead to further cooperation and improve both economies. Further integration for increased economic opportunities was not mentioned once by any of my interviewees. Yet, I still believe that economic opportunities derived from cooperation should play a role in the cooperation process. I would suggest that limiting a project to wastewater cooperation falls short of the possibilities opened by cooperation. I therefore suggest that projects supported by the international community should be required to have a regional dimension or pay special attention to cross country economic possibilities rather than a single dimension. This approach may result in more effective development and more economic projects, were both parties win from economic growth.

There is a stark contrast between Israeli cutting edge centralized wastewater treatment and management and Palestinian local and national institutions. Frustrating it was to hear Israeli wastewater managers praising the achievements in the wastewater treatment and management, while a Palestinian interviewee from one of the most

important Palestinian organizations talking about wastewater household treatment projects he promotes.

Learning from each other (tech transfer) did not seem to be of interest. Yet bilateral cooperation provides an outstanding opportunity for exchange and learning among participating actors (national government, local government, civil society and the private sector). This seems to be intuitive as there is a common goal to achieve e.g. protecting the aquifer. The knowledge management and information sharing aspect of cooperation should therefore find its way into the design of any agreement, particularly if it is a long term project.

Collecting attitudes and perspectives from wastewater managers should only be understood as a beginning to a planning process rather than an approach for a top-down planning schema. Using this approach one can begin a planning process that involves all stake holders.

Cooperation requires a long term commitment and capacity development at all levels – individual, national and institutional to be successful. Capacitation and technical training must be done in a culturally competent manner. This competency should go beyond language and cultural barriers and seek to bring both sides of the border to a similar technical and institutional competency. The value of

interdependence should highlight the joint destiny of both countries and the prospects for mutual gains from cooperation.

In summary, beyond a political environment that supports cooperation, the interviewees understand successful cooperation as appropriate prioritizing, strategizing, outcomes and accountability.

Further Research

Further research should focus on opportunities and mechanisms of technology transfer. Using engineering modeling programs or economic models we would be able to calculate the necessity of another wastewater treatment plant and this way base research on actual scenarios, this would also allow for the examination of alternatives. Other research could look at the livelihoods benefits from additional treated wastewater. The social-economic costs of the sanitary related health problems should also be investigated. The role donors, such as the Germans in the case of Emek-Tulkarem, played in facilitating cooperation or beyond facilitator should also be studied.

APPENDIX A: QUESTIONNAIRE AND COMMUNICATIONS

This survey is conducted by students from Tufts University who are interested in prospects for wastewater management between Israeli and Palestine in regions which are in close proximity to one another. This work uses the Tulkarem / Emek Heffer region to examine attitudes and preferences of wastewater managers towards wastewater management

Open ended questions:

Q1. Can you describe the relationship between the municipality of Tulkarem and the Emek Hefer Regional Council with respect to wastewater management?

Q2. Can you describe how you envision future wastewater management in the Tulkarem /Emek-Hefer Region (after a Palestinian state is established)?

Fixed answer question:

Q3. Please rate the role the JWC played in wastewater cooperation between Tulkarem and the Emek -Hefer Region?

Q4. Please rate the influence the PWA played in the cooperation between EH/TK

Q5. Please rate the influence the IWA played in the cooperation between EH/TK

Q6. The JWC should continue its work after a final peace agreement is reached between Israel and Palestine

Q7. How would you characterize the relationship with your counterpart in Tulkarem Municipality or Emek Hefer?

Q8. In what form do you communicate with your counterpart?

Q9. Environmental sustainability depends on coordination with your counterpart in Israel or Palestine

Q10. Do you agree or disagree: The only way to manage wastewater is through cooperation

Q11. Should local bodies have in decision making power regarding wastewater management?

Local governments should have most of the decision making power

Policy should be set on the national level but implementation and decision making should be on the local level

The national level should decide and implement on matters regarding wastewater management

Q12. Israel and Palestine should take independent routes in managing wastewater?

Q13. Each party (PA/IL) should manage the infrastructure within its political boundaries but coordinate its actions with the other party

Q14. Israeli and Palestinian local government should establish a single institutional structure to carry out tasks viewed by the parties as crucial for adequate wastewater management

Q15. Israeli and Palestinian municipalities should tender wastewater management to private companies who can operate both in Israel and Palestine

Response scale;

Q3, Q4, Q5, Very positive, productive, Neutral, Negative, No role at all

Q6, Q9, Q13 Strongly Agree, Agree, No opinion, Disagree

Q7 Excellent, Good, Reasonable, Poor

Q8 Face to Face meetings, Over the phone, Email, We do not communicate

Q10, Q12, Q14, Q15 Agree, Disagree

Email example:

I am working on an academic paper regarding wastewater cooperation between Israel and Palestine, after a Palestinian state is established. My work considers prospects for wastewater management between Israel and Palestine in regions which are in close proximity to one another such as the Tulkarem - Emek Hefer regions. My work is looking to understand attitudes and preferences of wastewater managers towards wastewater management in these regions. I am looking to interview "wastewater managers," this title encompasses a range of actors directly involved in wastewater management; environmental agencies, regional and municipal environmental or/and health departments, wastewater treatment facilities and non-governmental organizations. My goal is to examine attitudes and preferences of wastewater managers towards managing wastewater.

The phone interviews should take about 30 minutes. Alternatively, I also have the survey online http://tiny.cc/wastewaterPAL in case respondents prefer to see the questionnaire prior to our interview. I am also open to responses in writing (Arabic is fine). Yet, if possible I strongly prefer a phone conversation.

I would appreciate if you can recommend of put me in contact with "wastewater managers" I might be able to interview. If you are willing to be interviewed I would also love to have a phone conversation with you.

Thanks allot and warm regards,

Simcha

APPENDIX B: MAPS

Percentage of Palestinian Population Served By Wastewater

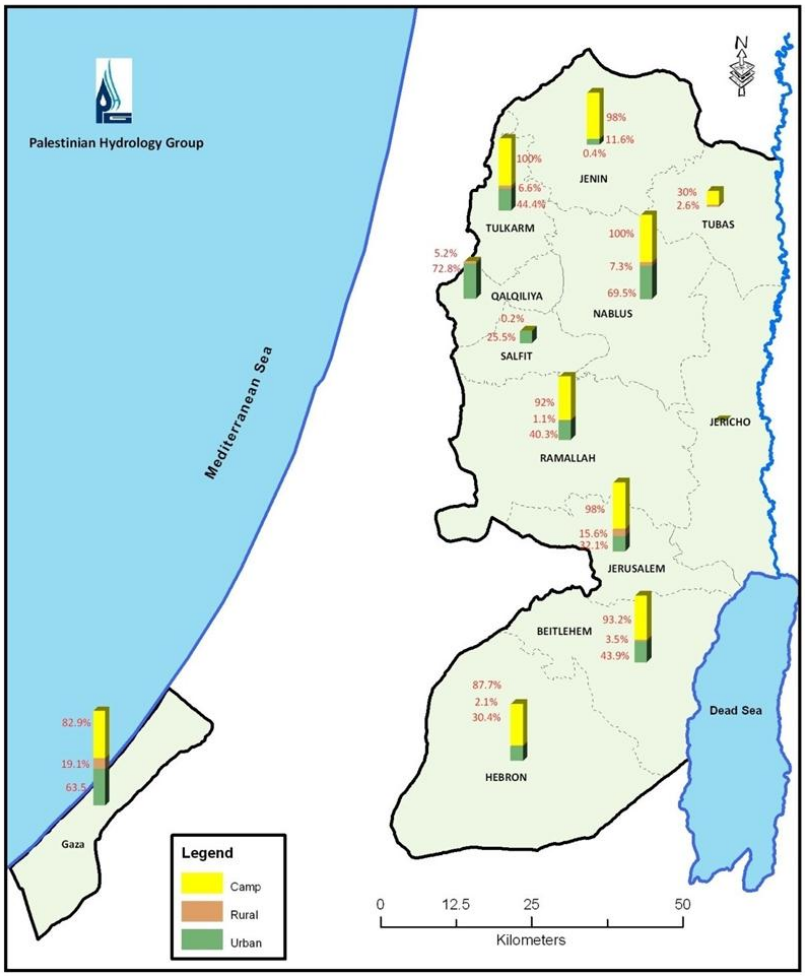

Figure 9 Percentage of Palestinian Population Served By Wastewater Networks According to the Type of Communities, Palestinian Hydrology Group 2009

Israeli water related infrastructure in the northern region

Mountain and Coastal Aquifers

Watersheds


Watersheds
MEDITERRANEAN SEA
Jenin
Tulkarm
Nablus
Tel Aviv-Yafo
WEST BANK
JORDAN
Jericho
(Ariha)
Jerusalem
(Al Quds)
Bethlehem
Hebron
(Al Khalil)
Dead Sea
Gaza
ISRAEL
GAZA
Rafah
0 10 20 km
N
Legend
Lake & Sea
Rivers
International Boundary
Armistice Demarcation Line
Main City
Watershed Boundary
Catchment name:
1 Auja/Fasayil
2 Lower Jordan
3 Far'a
4 Wadi El Qilt
5 Jenin
6 Northern Jordan
7 Nablus
8 Barta'a
9 Jerusalem
10 Jerusalem Desert
11 Auja Tamaseeh
Geographic Projection
Compiled by: UNEP/GRID-Geneva
Date printed: December 2002
Source: ArcWorld, UN Cartographic Section, DCW, Palestinian Environmental Quality Authority, Applied Research Institute - Jerusalem (ARIJ)
The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the UNEP concerning the legal status of any country, territory, city or area of its authorities or concerning the delimitation of its frontiers or boundaries.

APPENDIX D: IRB EXEMPTION

Tufts UNIVERSITY

OFFICE OF THE VICE PROVOST

Social, Behavioral, and Educational Research
Institutional Review Board
FWA00002063

Re: IRB Study # 1102043
Title: Wastewater Management Between Israel and Palestine
PI: Simcha Levental
Department: Urban and Environmental Policy and Planning
IRB Review Date: 2/25/2011

February 25, 2011

Dear Simcha,

This is the official notification that your project, *Wastewater Management Between Israel and Palestine*, protocol # 1102043 does not meet the definition of human subject research under the Code of Federal Regulations Title 45 Part 46.102(f); therefore is not subject to review by the Institutional Review Board.

Please be sure to file this notification.

Sincerely,

Yvonne Wakeford, Ph.D.
IRB Administrator

20 Professors Row, Medford, MA 02155 | TEL: 617.627.3417 | FAX: 617.627.3673 | EMAIL: SBER@tufts.edu

REFERENCES

Al-Sa'ed, Rashed, and Sana' Mubarak. 2006. Sustainability assessment of onsite sanitation facilities in Ramallah-Albireh district with emphasis on technical, socio-cultural and financial aspects. Management of Environmental Quality: An International Journal 17, no. 2: 140-156 Available at SSRN: http://ssrn.com/abstract=1676714

Al-Sa`ed, Rashed. 2010. A policy framework for trans-boundary wastewater issues along the Green Line, the Israeli-Palestinian border. International Journal of Environmental Studies 67, no. 6 (December): 937-954. doi:10.1080/00207233.2010.528887.

Arlosoroff, Saul. 2007. Wastewater Reuse–Risk Assessment, Decision-Making and Environmental Security. Ed. Mohammed K. Zaidi. Vol. 27. Dordrecht: Springer Netherlands. doi:10.1007/978-1-4020-6027-4.

Assaf, Karen. 2007. Institutionalization of Treated Wastewater Reuse in Palestine " From Conflict to Collective Action : Institutional Change and Management Options To Govern Transboundary Water Courses ." Water Resources Management. Ramallah, Palestine.

Ben Elia, Nahum. 2009. Israel's Corporatization of Water and Sewerage Services: an Unresolved Reform Jerusalem, Israel.

Bradburn, Norman M., Seymour Sudman, and Brian Wansink. 2004a. Asking Questions: The Definitive Guide to Questionnaire Design. For Market Research, Political Polls, and Social and Health Questionnaires Jossey-Bass.

Brooks, David, and Julie Trottier. 2010. Confronting water in an Israeli – Palestinian peace agreement. Journal of Hydrology 382, no. 1-4: 103-114. doi:10.1016/j.jhydrol.2009.12.021. http://dx.doi.org/10.1016/j.jhydrol.2009.12.021.

Central Bureau of Statistics (PCBS). 2006. Projected Mid -Year Population for Tulkarm Governorate by Locality 2004- 2006. http://www.pcbs.gov.ps/Portals/_pcbs/populati/pop03.aspx.

Eldar, Akiva. 2006. Even sewage is not free of politics. Haaretz Daily Newspaper. http://www.haaretz.com/print-edition/news/even-sewage-is-not-free-of-politics-1.187189.

Feitelson, Eran, and Marwan Haddad. 1998. A Stepwise Open-Ended Approach to the Identification of Joint Management Structures for Shared Aquifers. Water International 23, no. 4 (December): 227-237. doi:10.1080/02508069808686776.

Fischhendler, Itay; Dinar Shlomi; Katz, David. 2011. The Politics of Unilateral Environmentalism: Cooperation and Conflict over Water Management along the Israeli-Palestinian Border. Global Environmental Politics 11, no. 1: 36-56.

Fisher, Franklin M., Annette Huber-Lee, and Ilan Amir. 2005. Liquid assets: an economic approach for water management and conflict ... Washington, DC. Resources for the Future.

FoEME. Projects - Good Water Neighbors. http://foeme.org. http://foeme.org/www/?module=projects.

Haddad, Marwan. 2004. Future water institutions in Palestine. Water policy 7, no. 2: 181-200.

---. 2007. Politics and Water Management: A Palestinian Perspective. In Water resources in the Middle East: the Israeli-Palestinian water issues: from conflict to cooperation, ed. Hassan Shuval, Hillel; Dwiek. Springer.

Hertzog, Robert; Swianiewic, Pawel; Dave, Ken; Balducci, Massimo;. 2010. Inter-municipal Cooperation Toolkit Manual. http://www.municipal-cooperation.org/images/4/4c/IMC_Toolkit_Manual.pdf.

Hophmayer-Tokich, Sharon, and Nurit Kliot. 2008. Inter-municipal cooperation for wastewater treatment: Case studies from Israel. Journal of environmental management 86, no. 3: 554-565 ST - Inter-municipal cooperation for wast.

Israel Ministry of Health. 2000. West Nile fever. http://www.health.gov.il/download/forms/a296_mr44-00.pdf.

Kvale, Steinar. 2008. Doing Interviews. Sage Publications Ltd (United Kingdom)

LDK-ECO. 2006. Support to DG Environment for the development of the Mediterranean De-pollution Initiative. Support to DG Environment for development of the Mediterranean De-pollution Initiative "HORIZON 2020" No 070201/2006/436133/MAR/E3 .

Leshem, Guy. 2002. The Ecological Disaster Posed by the Palestinian Authority. Yediot Aharonot. http://www.ynet.co.il/articles/0,7340,L-1792752,00.html.

Massam, Bryan H. 1975. Location and space in social administration. Edward Arnold.

OPTIMA. 2006. Case Study: Alexander River – Wadi Zeimer Basin.

Ostrom, Elinor. 1990. Governing the Commons: The Evolution of Institutions for Collective Action (Political Economy of Institutions and Decisions). Cambridge: Cambridge University Press.

Palestinian Hydrology Group. 2009. Percentage of Palestinian Population Served By Wastewater Networks According to the Type of Communities. www.phg.org.

Palestinian National Authority. 1996. Law No 2Arlosoroff 1996 Concerning the Establishment of PWA. Gaza city.

Razin, Eran. 2000. The impact of local government organization on development and disparities—a comparative perspective. Environment and Planning C: Government and Policy 18, no. 1: 17-31. doi:10.1068/c9865.

Samhan, S, Rashed Al-Sa'ed, Karen Assaf, K Friese, M Afferden, R Muller, W Tumpling, M Ghanem, W Ali, and O Zimmo. 2010. Wastewater Management Overview in the Occupied Palestinian Territory. doi:10.1007/698.

Schalimtzek, Adam, and Itay Fischhendler. 2009. Dividing the Cost Burden of Environmental Services: the Israeli-Palestinian Wastewater Regime. Routledge 18, no. 4.

Selby, Jan. 2003. Dressing up domination as "cooperation": the case of Israeli-Palestinian water relations. Review of International Studies 29, no. 01 (December): 121-138. doi:10.1017/S026021050300007X. http://www.journals.cambridge.org/abstract_S026021050300007X.

---. 2007. Joint Mismanagement : Reappraising the Oslo Water Regime. In Water resources in the Middle East: the Israeli-Palestinian water issues : from conflict to cooperation, ed. Hassan Shuval, Hillel; Dwiek, 203 - 212. Springer.

Tagar, Z. 2007. Municipal Cooperation across Conflict a Preliminary Study. London. www.chathamhouse.org.uk.

Tagar, ZKTBG. 2007. A Seeping Timebomb : Pollution of the Mountain Aquifer by Sewage Friends of the Earth Middle East , Pollution of Groundwater. In Water resources in the Middle East: the Israeli-Palestinian water issues : from conflict to cooperation, ed. Hassan Shuval, Hillel; Dwiek, 417-425. Springer.

Tal, Alon. 2002. Pollution in a promised land: an environmental history of Israel. University of California Press. http://books.google.com/books?id=lP_Adcv7w48C&pgis=1.

Tal, Alon, and Alfred Abed Rabbo. 2010. Water Wisdom. Rutgers Press.

The State Comptroller. 1991. The Establishment of WWTP and their Maintenance. Vol. 41. Jerusalem. doi:ISSN :0334-9713. http://www.mevaker.gov.il.

The World Bank. 2009. Assessment of Restrictions on Palestinian Water Sector Development. World. Washington DC. doi:47657-GZ.

Weinberger, Miriam;. 2001. West Nile Fever Outbreak, Israel, 2000: Epidemiologic Aspects. Petach Tikva, Israel. http://www.cdc.gov/ncidod/eid/vol7no4/weinberger.htm.

Wolf, Aaron T. 2007. Shared Waters: Conflict and Cooperation. Annual Review of Environment and Resources 32, no. 1 (November): 241-269. doi:10.1146/annurev.energy.32.041006.101434. www.annualreviews.org.

Zalul. Emek Heffer Master Plan (summary). http://www.zalul.org.il/nehalim/naction.asp?cid=155&zid=156&item_id=222.