Conflict impacts on local water management in the Gaza Strip

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Abstract:

Effective post-conflict environmental peacebuilding requires a thorough understanding of how the conflict affected natural resources and their management. This paper focuses on the Gaza Strip where we analyze the impact of the conflict between Israelis and Palestinians and the political instability within Palestine on local water management. Based on fieldwork in summer and fall 2018, we specifically identify key processes through which this political context affects the provision of water, sanitation and hygiene (WASH) services in peri-urban areas in the Gaza Strip.

Results indicate that insufficient access to construction materials for infrastructure development and electricity shortages are the key factors that underpin the local WASH-related problems. These factors are linked to broader contextual processes such as institutional pluralism in the Gaza Strip, import restrictions imposed by Israel and the severe limitations on fuel availability. We then analyze the implications for the involvement of humanitarian aid organizations in local projects.

Keywords: Armed conflict; local water management; WASH; Gaza Strip; Palestine; Israel

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1. Introduction

The potential of water in post-conflict peacebuilding has received increasing attention over the past decade (Krampe, 2017; Swain, 2016; Weinthal et al., 2014). However, the effective use of this potential requires a thorough understanding of the past conflict and its implications for water resources and their management. Relevant conflict impacts in these settings go beyond easily observable direct impacts such as the destruction of infrastructure and the loss of lives (Kooy et al., 2015; Zeitoun et al., 2014).

While direct impacts refer to “immediate and physical impacts caused by conflict” (Diep et al., 2017, p. 16), indirect impacts affect elements related to the key functions of the water system, such as the loss of access to land that harbors water resources and infrastructure or the lack of qualified personnel. Institutional capacity in conflict-affected settings is often reduced by ‘brain drain’ as qualified staff leaves the area in search for a more secure environment (Etienne and Nembrini, 1995; Zeitoun et al., 2017). Numerous studies agree that the indirect effects of conflict are often of larger magnitude and farther-reaching impacts than direct conflict impacts (Baumann and Kuemmerle, 2016; Gates et al., 2012; Wise, 2017). However, the effects of these indirect impacts on water management systems are significantly understudied (Zeitoun et al., 2017).

This paper addresses this knowledge gap by analyzes the impacts of conflict on local water management in the Gaza Strip with a particular focus on indirect impacts. A number of academic and non-academic studies assessed the direct damage done by military interventions in the Gaza Strip (e.g. Nembrini, 2010; Weinthal and Sowers, 2019), yet little work has been conducted on indirect impacts and long-term implications. The paper specifically analyzes the role of other sectors related to water management in transmitting conflict impacts and the implications of these mechanisms for local water management systems and the involvement of humanitarian aid organizations.

The structure of the paper is as follows: We first give some background information on the Gaza Strip. Secondly, the research context and methodology is briefly introduced. Then, we address the key contextual processes we identified in our data analysis, grouped into one section on constraints to the operation of water services and one section on the role of institutional pluralism and donor dependency in the Gaza Strip. These results are then set in context for a specific sanitation project by the international non-governmental organization (NGO) WeWorld-GVC. We conclude the paper with a summary of the implications for local water management systems in the Gaza Strip and for the humanitarian organizations engaging with these systems.

1.1 Empirical background

The Gaza Strip is a territory of 365 km², bordering the Mediterranean Sea to the west, Egypt to the south and Israel to the east and north. It is home to approximately two million people, putting its population density around 5,500 people per km² (UN, 2017).

Control over the Gaza Strip has been contested several times over the past century. After the collapse of the Ottoman Empire after the First World War, the Gaza Strip became part of the British mandate over Palestine. When the British withdrew from the region in 1948, Egypt took control over the territory (Wolf and Ross, 1992). Israel captured the Gaza Strip from Egypt as one of several areas that came under its control after the Six-Day War in 1967. It

Figure 1. Map of the Gaza Strip, including the locations of the municipalities Beit Lahia, Al-Moghraka and Khan Younis (red). Geospatial data provided by the United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA).

was subsequently occupied, as the Israeli military was stationed across the Strip and Israeli settlements were built. The Palestinian people received some degree of self-government with the Oslo Accords in the 1990s, establishing the Palestinian Authority (PA) as central government agency alongside a number of ministries, including the Palestinian Water Authority (PWA) (Weinthal and Marei, 2002; Wolf and Ross, 1992). In 2005, after attempts to develop the interim Oslo Accords into a permanent peace treaty had failed and tensions between Israelis and Palestinians continued to erupt in violence, Israel unilaterally withdrew all military and settlers from the Gaza Strip. The international community largely considers the occupation of the Gaza Strip as still ongoing as Israel retains control of airspace and sea space and over the entry and exit of people and goods along its border (Human Rights Watch, 2006). Three major Israeli military operations in 2008, 2012 and 2014 followed (Table 1), and skirmishes between Palestinians and Israeli military persist along the border.

Parallel to the persistent conflict with Israel, Palestinian politics been greatly affected by an internal divide between the two dominant parties Fatah and Hamas, dating back to the first popular uprising (*intifada*) against Israel in the 1980s. While Fatah has historically taken a more moderate position regarding Israel and has filled the majority of political offices in the Palestinian authorities, the more militant Hamas denies Israel’s right of existence and is designated as a terrorist organization by numerous, particularly Western, countries (Cavatorta and Elgie, 2010). Tensions between the two parties escalated in 2006 when Hamas’ resistance against the Israeli occupation had gained the party popularity among the

Table 1. Major Israeli military campaigns in the Gaza Strip. Data source: B'Tselem (2017).

Operation	Duration	Palestinian casualties*	Israeli casualties*
Cast Lead	27 Dec 2008 – 18 Jan 2009	1,391 (759)	13 (3)
Pillar of Defense	14 Nov 2012 – 22 Nov 2012	167 (87)	6 (4)
Protective Edge	8 Jul 2014 – 26 Aug 2014	2,202 (1,391)	73 (6)

* Total number of casualties. Estimate of civilian casualties is provided in brackets

Palestinians and led to a landslide victory in the parliamentary elections, which was dismissed by Fatah officials, including Palestinian president Mahmoud Abbas, after significant international pressure (Sirriyeh, 2011; Weisman and Smith, 2006). After a brief period of civil war between the two Palestinian factions, Hamas forcibly took control over the Gaza Strip in June 2007 and established its own governmental authorities separate from the PA (Cavatorta and Elgie, 2010). There have been several attempts to reconcile Fatah and Hamas and to form a unity government since then, however, none of them proved successful.

The impact of conflict and political instability on natural resources management and service provision in the Gaza Strip has been thematized in a few recent studies. Based on a stakeholder consultation conducted in collaboration with the United Nations Development Programme (UNDP), Mason et al. (2011) concluded that the impact of climate change on food and water security in the Gaza Strip is negligible compared to the impacts of the blockade and military operations. Brück et al. (2018) additionally found that the prolonged conflict has structural effects on the capacity of Gazan households to cope with food insecurity. Analyzing the direct impacts of the conflict in the form of damage to infrastructure in the water, energy and agriculture sector, Weinthal and Sowers (2019) provided insights on the impact of repeated cycles of violence on livelihoods and human security in the West Bank and the Gaza Strip.

Assessments of the direct damage caused to water systems after the Israeli military operation ‘Protective Edge’ in summer 2014 reported damage to a total of 33 km of water and wastewater networks (Brück et al., 2018) and damage to 60% of all wastewater treatment plants and 27% of all pumping stations in the Gaza Strip (Weinthal and Sowers, 2019), bringing the access to safe drinking water from the municipal network down to 10.5% and leaving around 450,000 people without any access to the network at all (Weinthal and Sowers, 2019).

2. Methods

2.1 Research design

This research investigates the indirect impacts of conflict on local water management in the Gaza Strip by the means of an in-depth case study, with a special focus on the three municipalities Beit Lahia (North Gaza governorate), Al-Moghraka (Gaza governorate) and Khan Younis (Khan Younis governorate). It is part of a larger research project titled “Multi-

Level Contextual Factors of Local Water Management in the West Bank and the Gaza Strip” (CONAWAT). The project comprises a comparative analysis of cases in the Gaza Strip and the West Bank by researchers from Al Quds University, Islamic University of Gaza and University of Twente in collaboration with WeWorld-GVC, an Italian NGO which implements water, sanitation and hygiene (WASH) projects in both territories.

The research is conceptually guided by the Contextual Interdependencies framework that is being developed by one of the authors and field-tested in the CONAWAT project. At the core of this framework stands the proposition that local water management does not function in isolation from its context, but is deeply embedded with related systems and sectors on different levels. These connections, or interdependencies, allow conflict impacts to propagate through numerous systems and affect local water management indirectly (Figure 2). In order to assess the multitude of impacts of a conflict on a water management system, it is therefore important to consider the linkages between the water management system and the different facets and levels of its context. Three dimensions of such interdependencies are seen as particularly relevant for local water management: 1) sectoral interdependencies between the water sector and other sectors, 2) vertical spatial interdependencies between the local water system and other levels and 3) horizontal spatial interdependencies between the local water system and systems at other localities.

2.2 Data collection and analysis

Primary data used in this paper was collected in the Gaza Strip in summer and early fall 2018, with some follow-up data collection in early 2019. The key data sources were semi-structured interviews with key stakeholders of local water management in the different case

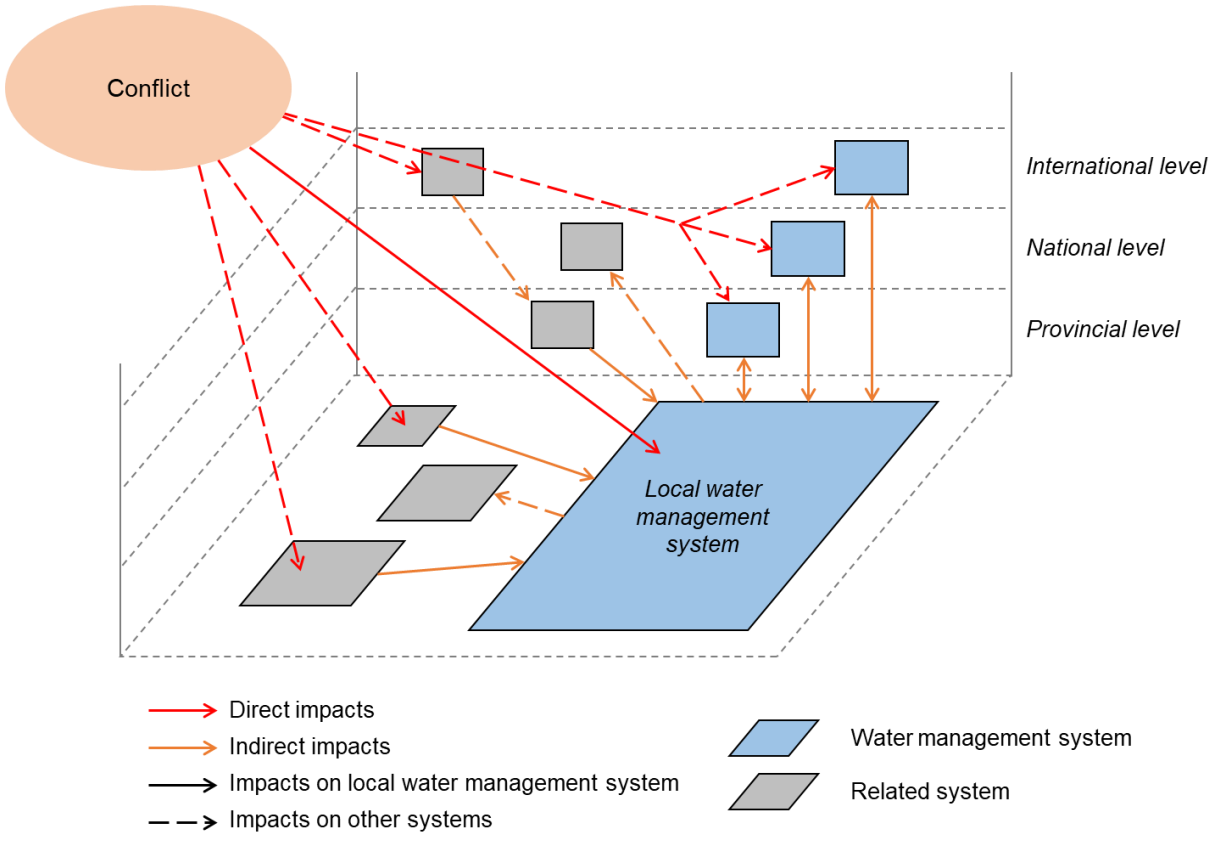

Figure 2. Illustration of conflict impacts on a local water management system and contextual elements at different levels.

study locations (Table 2), and informal conversations with local communities. Stakeholders were selected according to their different roles within the water sector and to several localities within the Gaza Strip. The three municipalities considered in this study are indicated in Figure 1. Due to the potentially sensitive nature of information provided during the interviews, all interviewees are treated strictly anonymously, including the omission of their specific organization or employer.

Additional data was gathered from field visits throughout the study period and a focus group discussion with representatives of government, international organizations and academia in January 2019. The primary data was supported by secondary data from internal project documents provided by WeWorld-GVC for the period 2016-2018 and public reports and strategic papers related to the water sector in the Gaza Strip.

Interview transcripts, field notes and relevant publications were analyzed using the qualitative data analysis software Atlas.ti. Data was coded based on the analytical framework’s focus on sectoral and spatial interdependencies and on common themes that emerged from the interviews. The key elements identified through the data analysis are further elaborated in the next sections.

3. Constraints to the operation of water and wastewater services

3.1 Low accessibility of land resources

Since the unilateral withdrawal of Israel from the Gaza Strip in 2005, movement restrictions within the Strip exist primarily with regards to the border areas. The first 500 meter behind the border were declared a ‘no go’ zone by Israel, followed by an additional ‘high risk’ area. Infrastructure development in these zones requires additional permits from Israeli authorities and can hinder or at least delay construction projects. The construction of the Khan Younis wastewater treatment plant near the border was delayed for three years pending Israeli approval (interview GOV4).

While the area directly next to the border is thus barely accessible even during peaceful periods, movement near the border becomes highly restricted during skirmishes and full-fledged military operations, both due to formal restrictions and due to security concerns. Access to water facilities in these areas is thus extremely limited and it is not uncommon for

Table 2. Formal interviews with key stakeholders.

Code	Date	Sector
INT1	June 2018	International organization
GOV1	August 2018	Government
UTI1	September 2018	Public utility
GOV2	September 2018	Local government
GOV3	September 2018	Local government
GOV4	September 2018	Local government
CON1	September 2018	Local contractor
CON2	September 2018	Local contractor
INT2	March 2019	International organization

stray bullets to hit either equipment or personnel. According to accounts by local authorities, repairs to damaged facilities are often only possible thanks to the involvement of international organizations, such as the International Committee for the Red Cross (interviews GOV2, GOV4).

3.2 Insufficient energy resources

The energy sector is one of the most important sectors related to the water sector, as electricity is a key prerequisite for most forms of water and wastewater treatment. High energy consumers in the Gazan water sector include water treatment plants, wastewater treatment plants, desalination plants and the water supply network. Limitations to the availability of electricity can therefore create significant constraints to the operation of water and wastewater facilities.

There are three main sources of electricity in the Gaza Strip: electricity imports from Israel, intermittent electricity imports from Egypt and electricity production at the Gaza Power Plant (GPP). Combined, these three sources provided between 127 and 155 MW of electricity in 2017, covering only one third of the total estimated demand of 450 MW and causing blackouts with electricity provided to end-users for only six to twelve hours per day (UN, 2017). Figure 3 links some of the changes in electricity supply since 2006 to geopolitical developments. A more detailed analysis of conflict impacts on each electricity source is presented below.

Over the past decade, electricity imports from Israel to the Gaza Strip have been mostly stable around 120 MW over the past decade, yet they are sensitive to developments in both

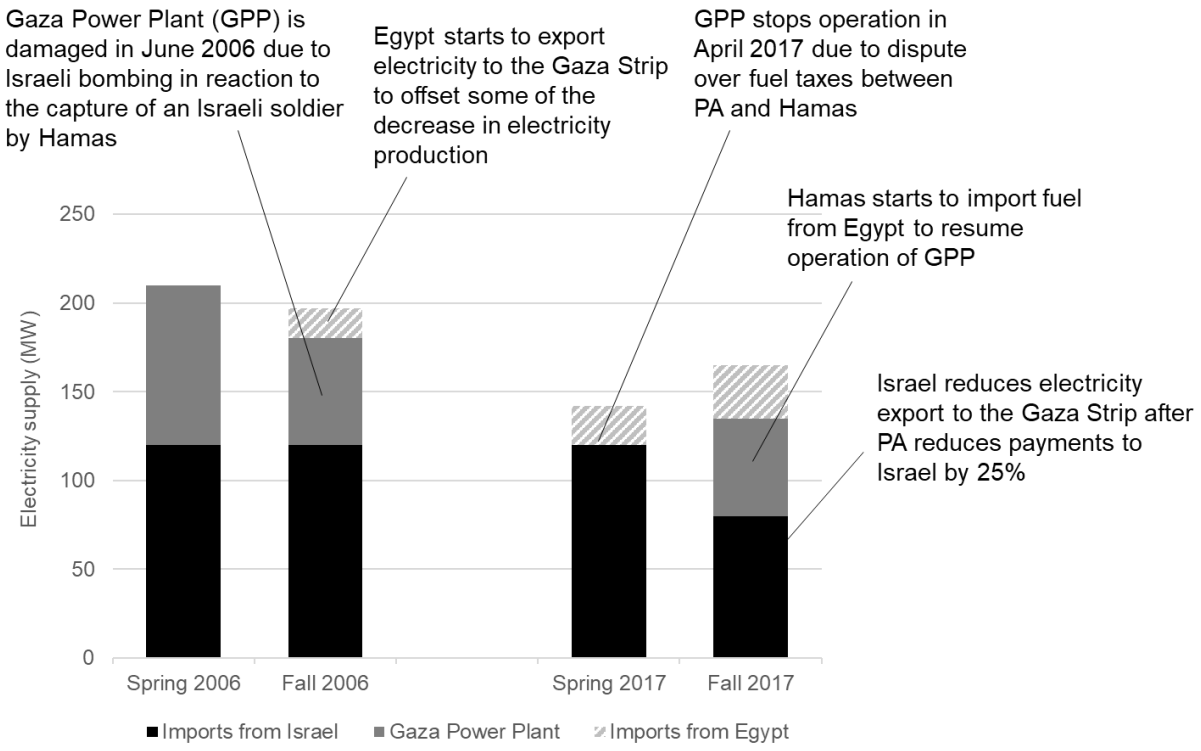

Figure 3. Electricity supply to the Gaza Strip in MW based on imports from Israel (black), electricity production of the Gaza Power Plant (grey) and intermittent imports from Egypt, alongside geopolitical factors affecting the electricity supply. Source: own illustration based on information gathered from UN (2017).

the Israeli-Palestinian conflict and the internal Palestinian struggles for political leadership. The political rivalry between the Fatah-led PA and the Hamas administration in the Gaza Strip particularly influences the amount of electricity provided to the Gaza Strip by the Israel Electric Company (IEC). Electricity imports from Israel are directly paid for by the PA, putting the Ramallah-based Palestinian leadership in control of the transaction. The PA used this power position in June 2017 when it reduced its payments by 25%, leading to a subsequent decrease in the amount of electricity provided by the IEC to the Gaza Strip (see Figure 3; UN, 2017).

The GPP, operated by the Gaza Electrical Distribution Company (GEDCO), is the only central power plant in the Gaza Strip. It was built in 2002 with a maximum capacity of 140 MW and designed to produce electricity from industrial diesel. After being damaged in an Israeli military operation in 2006, the GPP was reconstructed with a maximum capacity of 80 MW (Gisha, n.d.). However, limitations on fuel availability have prevented the GPP from operating at its maximum capacity. The supply of industrial diesel from Israel was first restricted by Israeli authorities in 2007, and no industrial diesel has been available since 2011. The GPP has since run on regular diesel, a substitute that causes heavier environmental pollution. Regular diesel was first transported to the Gaza Strip from Egypt via tunnels along the border, but its availability has been limited after the Egyptian crack-down on the tunnels in 2013 (Gisha, n.d.; OCHA-OPT, 2014; UN, 2017).

Next to the limited fuel availability, the high fuel costs and disputes between PA and Hamas over the taxation of fuel are the main constraint of GPP operation. The so-called “blue tax” on diesel was levied by the PA in accordance with the Oslo Accords to match Palestinian fuel prices with those paid by Israelis. After the 2014 war, the PA temporarily exempted fuel imports to the Gaza Strip from the tax (Al-Ghoul, 2015). Yet the dispute between PA and Hamas over fuel prices continued and eventually led to the Hamas’ refusal to buy taxed fuel and a cessation of GPP operations in April 2017 (see Figure 3; UN, 2017). The GPP resumed operations shortly afterwards thanks to fuel imports from Egypt paid for by Hamas directly (UN, 2017) and with the help of Qatari financial support starting in October 2018 (OCHA-OPT, 2019).

Electricity provision from Egypt constitutes a smaller portion of the supply mix and is regularly interrupted due to technical problems and maintenance issues in the grid. It is indirectly paid for by the PA, as Egypt deducts the appropriate amount of money from its contributions to the PA fund in the League of Arab States, meaning the PA cannot influence the amount of electricity imported from Egypt as in the same way as the Israeli imports (UN, 2017). The electricity imports from Egypt, almost exclusively supplied to the Rafah governorate, are not only erratic, but also under voltage compared to the Palestinian and Israeli grid and cannot be used efficiently in Gazan water and wastewater facilities (interview UTI1).

The large gap between electricity demand and supply necessitates decentralized energy resources. Many donor-funded facilities nowadays include photovoltaics or other renewable energy production modules, such as the Southern Gaza Desalination Plant (Figure 4) funded by the European Union and the United Nations Children's Fund (UNICEF) or several hospitals supported by the World Health Organization (OCHA-OPT, 2019). However, the common solution to electricity shortages are fuel-run stand-by generators that are used to bridge blackouts. While these generators are currently the only viable option for most energy users in the Gaza Strip, they are just as reliant on expensive fuel as the GPP. Furthermore,

Figure 4. Photovoltaic panels at the Southern Gaza Desalination Plant. Photo credits: Juliane Schillinger, October 2018.

generators available on the local Gazan market are not suitable for the use in water facilities, as they have a high fuel consumption rate and thus high operation costs and are limited in their daily runtime, usually designed for a maximum runtime of eight hours per day. Environmental pollution is another problem related to the generators (interview GOV3).

The Gaza electricity crisis outlined above leads to a significantly reduced capacity to produce non-conventional water resources such as treated wastewater and desalinated sea water. As mentioned earlier, the electricity provided by Egypt to the Rafah governorate is not of sufficient voltage to use in water facilities, meaning that all water and wastewater treatment plants need to run on individual generators. As the generators cannot provide sufficient electricity for around-the-clock operation, water supply is reduced and wastewater is discharged into the Mediterranean Sea untreated (interview GOV4). Desalination plants are equally unable to run at full capacity, including short-term low-volume (STLV) plants that were built as part of humanitarian projects in different parts of the Gaza Strip. A STLV desalination plant in Deir Al Balah serves as an example: designed to produce 6,000 cubic meters of water per day, the plant only produced 6,000 cubic meters of water over the course of the entire year 2017 due to the lack of electricity from the public network and the insufficient capacity of its standby generator (interviews GOV1, UTI1).

Power outages and an overall lack of electricity also reduce the efficiency of the water supply system. Low-pressure water networks that are used in many urban areas cannot be accessed by individual households when there is insufficient electricity to pump water into the household’s water tank (interview GOV3) The reduced access to clean water and the discharge of insufficiently treated wastewater in the environment also increase public health risks, particularly with regards to waterborne diseases (interview GOV1). Repeated cuts in power further wear down water and energy equipment such as pumps, generators and control panels, reduce their efficiency and increase malfunctions (interview UTI1).

3.3 Shortage of materials and equipment

Constraints to the operation of water and wastewater services due to a shortage of construction materials, equipment and consumables are common in settings of economic

sanctions or import restrictions (see for instance Zeitoun et al., 2017). The Gaza Strip is no exception from this.

The Israeli siege of the Gaza Strip started in 2007, two years after the Israeli withdrawal from the Strip, with the closing of its borders and a ban on most construction materials, with the exclusion of materials needed in humanitarian projects (Barakat et al., 2018). A formal list of ‘dual use’ materials[1] that require special licenses for the import to the West Bank or Gaza was introduced in 2010 and subsequently updated to tighten restrictions in the aftermath of different military operations and escalations between Israeli forces and Palestinians (interview INT1; Oxfam, 2017). The list of dual-use materials includes key construction materials such as cement and steel, and construction equipment, as well as specific water equipment such as pumps and pipes and a range of chemicals that are needed for water and wastewater treatment. During the first years of the siege, the main coping strategy to ensure the supply of restricted goods to the Gaza Strip was the smuggling of these materials through tunnels along the border to Egypt (Mason et al., 2011). However, this supply route ceased to exist after the tunnels were destroyed by the Egyptian military in 2013 (Barakat et al., 2018).

In the aftermath of Israel’s military operation ‘Protective Edge’, the Gaza Reconstruction Mechanism (GRM) was established in September 2014. The GRM is administered by the United Nations (UN) and designed to monitor the flow of goods into and out of the Gaza Strip. It includes both the Palestinian government in the form of the PA and the Israeli government in the form of the Coordinator of Government Activities in the Territories unit (COGAT) and comprises of a multi-step approval process for infrastructure projects and the import of required materials (Barakat et al., 2018; Oxfam, 2017).

The GRM includes procedural streams both for international organizations and for private individuals and companies to access materials. For the latter, this means to receive a permit from the GRM parties to purchase the restricted goods from previously vetted, UN-monitored vendors within the Gaza Strip. These vendors need to fulfil a set of requirements and be cleared by the Israeli Ministry of Civil Affairs (MoCA, n.d.). Contractors working with GRM sourced materials need to be cleared by Israeli authorities as well and are not allowed to use alternative materials from the local market, lest they risk losing their clearance (interview UTI1). The UN’s reporting website on the GRM currently lists 114 vendors and 237 contractors as cleared to work with restricted goods[2].

While the GRM was designed to improve the access to materials for the reconstruction of the Gaza Strip after repeated wars, it has been criticized for delaying or hindering the import of necessary materials (Oxfam, 2017) and for “[institutionalizing] the siege” and “making international actors, in particular the UN, complicit in regulating and enforcing the blockade” (Barakat et al., 2018, p. 220). Impacts of the GRM on local water management projects were outlined by numerous interviewees, including the significant delay of projects (interviews UTI1, GOV2, GOV3, GOV4, INT1) and the disruption or failure of projects if import licenses can only be obtained for most, but not all required materials (interviews GOV1, UTI1, GOV3).

[1] ‘Dual-use’ materials describe materials that can be used for both civilian and military purposes. The full list of dual-use materials by the Israeli government is available here: The full list is available at http://www.cogat.mod.gov.il/en/services/Documents/List%20of%20Dual%20Use%20Items%20Requiring%20a%20Transfer%20License.pdf

[2] UN website: https://grm.report/#/Lists/Vendors; numbers as of 28 August 2019.

The North Gaza Emergency Sewage Treatment (NGEST) project serves as an example. NGEST includes both the construction of a new wastewater treatment plant in the Northern Gaza governorate and activities to alleviate environmental pollution stemming from the old wastewater treatment plant in Beit Lahia. First funded by a number of development aid agencies in 2004, the project has been delayed numerous times due to security concerns, changes in import restrictions and raw material costs, limitations in access to the wastewater treatment construction site directly adjacent to the border and a number of financial constraints (World Bank, 2014). The NGEST plant has finally been operational since mid-2018. A field visit in October 2018 showed that the state-of-the-art wastewater treatment process was indeed operational. However, the internal energy production, designed to use biogas generated from the treatment process to produce electricity in order to make the plant self-sufficient, was not operational. The generator imported via the GRM alongside all other required equipment had been damaged during the transport when a small tube on the outside of the machine broke (Figure 5). As long as no license for the import of a replacement tube is issued, the generator is not functional.

Significant delays in the construction of new infrastructure projects in the water sector, even if less extreme than in the case of NGEST, combined with the fast population growth in the Gaza Strip, mean that new water facilities often already approach their maximum designed capacity when they finally become operational. The short-term focus of many humanitarian infrastructure projects that manifests itself in low capacity and efficiency rates in order to – presumably – speed up construction further compounds this problem (interview UTI1).

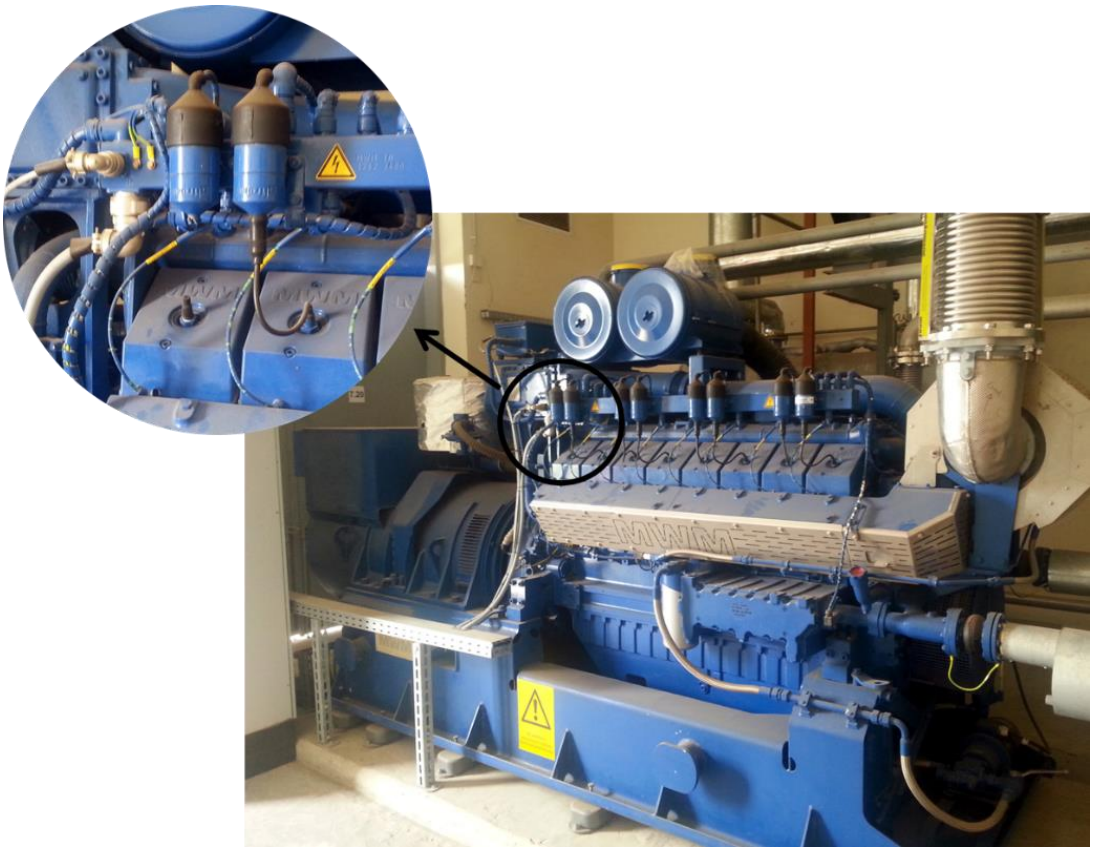

Figure 5. The generator at the Northern Gaza Emergency Sewage Treatment Plant. Zoomed-in photo on the left shows the part of the generator which is missing a small piece of tubing that broke during transport, rendering the entire generator non-functional. Photo credit: Juliane Schillinger, October 2018.

4. Institutional pluralism and donor dependency

4.1 The political split between Fatah and Hamas

The political split between the Fatah-led PA in the West Bank and the Hamas-led authorities in the Gaza Strip after 2007 has resulted in significant institutional pluralism in the Gaza Strip. The water sector is particularly affected by the doubling of its key agency, the Palestinian Water Authority (PWA) which is tasked with setting policies and strategies for the Palestinian water sector and issuing abstraction and infrastructure development licenses. The ‘regular’ PWA, part of the Fatah-led PA, with seat in Ramallah has a branch in the Gaza Strip staffed with civil servants paid by the PA. At the same time, Hamas set up its own PWA and hired staff on its own dime. This second PWA is referred to as ‘PWA-Gaza’ in the following. Water-related projects in the Gaza Strip require permits from both PWAs, often leading to delays in fulfilling all bureaucratic requirements (interview UTI1). Issues also arise due to discrepancies between the PWA’s agenda for water resources development in the Gaza Strip and PWA-Gaza’s approach to the situation. Where, for instance, the PWA’s national water strategy includes a provision that no new groundwater wells should be dug in the Gaza Strip due to overextraction from the Coastal Aquifer, the PWA-Gaza still issues licenses for these wells (interview UTI1).

The position of the Coastal Municipalities Water Utility (CMWU), the central water provider in the Gaza Strip, has also been affected by the political split. The CMWU is in charge of the operation of all water and wastewater facilities in the Gaza Strip and subsequently provides water to the individual municipalities. The municipalities themselves thus have no control over these facilities. However, after the political split, some Gazan municipalities withdrew their support to the CMWU and took charge of their own water supply. At the same time, the CMWU remains responsible for all water provision in times of crisis, namely in case of war or natural disasters (interview UTI1).

Alongside the discrepancies in water sector development strategies between PWA and PWA-Gaza, the focus group discussion with key stakeholders revealed that there are no agreed-upon joint standards for service providers and no active regulatory body for both Gaza Strip and West Bank. This leaves the Gazan private sector largely unsupervised and without strict health standards. The PA’s Ministry of Housing and the Palestine Standards Institution, which were in charge of monitoring the quality of materials entering the Gaza Strip, have ceased their activities in the Gaza Strip after the political split (interview CON2).

The institutional pluralism in the Gaza Strip also manifests itself in the doubling of taxes, as both PA and Hamas are levying taxes on materials and services. Local contractors thus need to pay the same taxes twice or even three times, including Israeli taxes in the case of imported materials (interview UTI1). International organizations are affected by this doubling as economic activities related to international projects are usually VAT-exempt by the PA, but not exempt by the Hamas authorities and incur unexpected additional costs (interview INT1).

4.2 Lack of financial and institutional capacity

Israeli and Egyptian blockades, repeated violent escalation and governance limitations due to the internal PA-Hamas struggle have led to a period of economic de-development across the Gaza Strip. The United Nations estimate that between 2012 and 2017, the Gaza Strip’s

gross domestic product (GDP) per capita decreased by around 10% (UN, 2017). Unemployment in 2017 was at 44.4%, with significantly higher rates among women and young people (PCBS, 2018). The weak economy along with limited labour availability has limited the local population’s financial capacity and their ability to pay for basic services such as water (Mason et al., 2012; UN, 2017).

GWP (2015) estimates the rate of non-revenue water, i.e. water that is not billed due to losses and leakages in the water infrastructure or problems with metering, across the Gaza Strip at 42%. Of the remaining 58%, a fraction of bills are actually collected on. While bill collection is supposedly the responsibility of the CMWU, it is done by the municipalities in most areas. Interviewees from local authorities reported collection rates as low was 15% (interviews GOV2, GOV3). In the absence of significant revenue from the service provision, municipalities and CMWU are fully dependent on external funds for both the construction and the operation, including maintenance and staff costs, of water infrastructure. This is problematic as most humanitarian projects only budget for the construction of new facilities, but not for the operation (interviews UTI1, GOV2).

The ‘brain drain’ often observed in conflict settings does not affect the Gazan water sector significantly, as the Israeli and Egyptian blockade minimizes emigration from the Gaza Strip. However, the blockade also limits the exchange of experiences with Palestinian personnel in the West Bank and restricts the access of international experts to the Gaza Strip for staff training beyond specific humanitarian projects (Barakat et al., 2018).

4.3 Role of external donors

As mentioned above, water management in the Gaza Strip is highly dependent on external funds. This makes international donors key actors of the Gazan water sector and puts them in a power position towards local authorities and organizations dependent on these funds.

The key issue related to donors is connected to the political split between PA and Hamas and concerns the question of who is willing to work with whom. Most international organizations involved in the Gazan water sector, particularly those from Western countries, enforce a strict ‘no contact’ policy regarding Hamas, meaning they do not collaborate with any Hamas-led authorities (Barakat et al., 2018; Mason et al., 2011). Most municipalities are included in this ‘no contact’ policy and can thus not be direct partners of the implementing agencies (interview GOV1, GOV4). Instead, the CMWU is the partner of choice in the water sector for many international organizations, leaving municipalities that ceased to work with the CMWU after 2007 at a disadvantage. The municipalities Gaza City and Jabalia are in fact currently excluded from USAID funded interventions (interview UTI1). The collaboration with third-party implementers instead of with the municipalities also leads to donor-funded projects that are not in line with the priorities and needs of the municipalities themselves (interview GOV4).

Variations in the amount of external funds available to projects in the Gaza Strip has impeded medium- to long-term planning over the past decades. A trend away from long-term development projects towards short-term humanitarian aid interventions has been observed since the war of 2014, with a sharp increase in funds in the direct aftermath of military operations and a slow decrease as more time passes (interview INT1). There has also been an overall decrease in the budget made available for interventions in the Gaza Strip. Barakat

et al. (2018) explain this with the onset of donor fatigue and the unwillingness to provide money for “futile” (p. 215) reconstruction projects while the Israeli-Palestinian conflict is still going on and infrastructure is at risk of being damaged or destroyed again. Additionally, one interviewee pointed out that over the past few years, international funds have been allocated away from the Gaza Strip and towards other deteriorating crises in the Middle East, such as Syria and Yemen (interview INT1).

5. Implementation of WASH projects by WeWorld-GVC

WeWorld-GVC’s project “Humanitarian response to improve household WASH services for the most vulnerable families in Gaza” serves as an example of an externally funded and implemented project in the Gaza Strip. It highlights some of the implications of the conflict setting on such interventions in the local water sector. The project at hand in the Gaza Strip aims to improve the access to hygiene and sanitation services for highly vulnerable families through the rehabilitation of several WASH components at the household level. This includes better access to domestic and potable water supply and storage, wastewater connections and sanitation and hygiene facilities, as well as the distribution of hygiene kits and campaigns to improve local WASH competencies. In 2018, the project beneficiaries included 960 households across four communities.

In internal project documents that were made available to the authors, the organization identified four core risk factors to the viability and effectiveness of the project (WeWorld-GVC, 2018): 1) the deterioration of the security situation in the Gaza Strip, 2) the tightening of the blockade of the Gaza Strip or an unrelated deterioration of the economic situation, 3) natural disasters and 4) complications with partner organizations. Factors 1 and 2 directly relate to the geopolitical situation of the Gaza Strip, while factor 4 echoes the expectation of more general governance issues. A detailed description of each risk factor is provided in Table 3.

Comparing the risk factors determined by WeWorld-GVC to the constraints to water and wastewater services identified in the previous sections, the question of energy supply is conspicuously absent from the risk assessment. As the project itself which mainly concerns itself with infrastructure development and awareness raising, problems related to energy resources might have been perceived as not directly relevant or impactful. Yet the availability of electricity to the beneficiary households plays an important role in the effectiveness of the new sanitation facilities, as it affects the access of households to municipal water. While not suitable for drinking purposes, this water is used for a range of domestic purposes like cleaning and flushing toilets – activities crucial to good hygiene.

Both WeWorld-GVC and its funding agency UNICEF enforce a policy of limited to no contact with Hamas-led authorities in the Gaza Strip. There is thus little coordination with local government agencies and municipalities regarding their own spatial planning; instead, CMWU functions as a facilitator.

Like many international organizations, WeWorld-GVC’s Gaza office consists of mostly local staff members with one or two international colleagues sent from its Italian headquarter. Conversations with these local staff members during field visits gave insights into the different perspectives that need to be consolidated in project implementation. Since the war of 2014, funding agencies active in the Gaza Strip have been focusing on humanitarian

Table 3. Project-related risk factors identified in internal project documents by WeWorld-GVC.

Risk factor	Impact	Likelihood
Deterioration of the security situation, either due to Israeli incursion or due to conflicts between political groups	Access to areas of intervention within the Gaza Strip will be limited due to movement restrictions such as checkpoints, closures and curfews. Organization staff members and beneficiaries will suffer from growing insecurity.	High
Tightening of the blockade around the Gaza Strip or deterioration of the economic situation	Availability and access to raw materials that are required for the project will be reduced.	Medium
Natural disasters	Access to beneficiaries will be limited, overall security for organization staff will be reduced.	Medium
Managerial complications with second tier partners	The capacity of WeWorld-GVC’s implementing partners will be limited with regards to fund management, supply and procurement, management and reporting. Weak internal control mechanisms at the level of the partners working within communities and households will limit oversight.	Medium

projects with short runtime in an effort to minimize financial risks should the security situation deteriorate again. This is reflected in WeWorld-GVC’s project which has been running since 2016, but needs to re-apply for funding from UNICEF every year. However, as local staff is quick to emphasize, the humanitarian projects are not sufficient to improve the situation for the Gazan population. Instead, medium- to long-term development projects are needed.

The WASH project analyzed here is an example of a compromise between emergency and development aid. While the project’s focus on humanitarian interventions at the household level is emblematic of the majority of externally-funded projects in the Gaza Strip, it also includes an element that focuses on improved access to the sewage network. In most of the peri-urban areas in which WeWorld-GVC is active with their interventions, households are not or insufficiently connected to the network and discharge their domestic wastewater in local cesspits. In one neighbourhood, houses were connected to the main sewage line along the town’s main road, however, no sewage could reach the main line as all other pipes were located at a lower level and no pumps were installed. While outfitting the protect beneficiaries’ households with new bathroom and kitchen facilities, WeWorld-GVC also fixed the sewage connection.

6. Conclusion

In this paper we analyzed the multi-faceted impacts of the persistent Israeli-Palestinian conflict and of the internal Palestinian political divide on local water management in the Gaza

Strip. Based on the analysis of qualitative data obtained from interviews, document reviews and field observations, key processes that affect water management in the Gaza Strip were identified as follows:

- Restrictions on electricity and fuel imports that limit the capacity of water and wastewater facilities and render water supply networks dysfunctional;
- Restrictions on the import of construction materials, equipment and chemicals that delay the (re-)construction and operability of water facilities;
- Institutional pluralism between PA and Hamas that leads to a doubling of permit requirements, taxes and other bureaucratic processes;
- A full dependency on external funds for the construction and operation of water and wastewater facilities, while financial support remains volatile and focused on short-term projects;
- Strictly enforced no or limited contact policies of most international organizations with regards to Hamas-led authorities, including all Gazan municipalities, that leads to a lack of coordination between international organizations and municipalities.

The combination of these processes, along with direct conflict impacts and external drivers such as climate change, has led to local water systems across the Gaza Strip that are unable to supply piped water of sufficient quality for drinking purposes, to effectively collect and treat wastewater and to reach financial self-sufficiency. Possible solutions to the central electricity problem that are applied in an increasing number of projects include the establishment of decentralized power production from renewable energy and the alignment of electricity schedules and water pumping schedules to ensure sufficient electricity supply for households to fill their individual water tanks.

On the longer term, however, all processes identified above – and their potential effects on other systems beyond water supply – should be taken into account in order to improve the humanitarian situation in the Gaza Strip, which the UN have repeatedly warned might be uninhabitable by 2020 (UN, 2017). This includes a reflection on the short-term nature of humanitarian interventions and a critical assessment of the role played by aid organizations and other international actors. Funding agencies are thus in a tough spot to re-evaluate the financial risks of engaging in development-related projects during an ongoing conflict against the risk of slowing, but not stopping the deterioration of the Gaza Strip. In the latter case, cumulative conflict impacts will eventually render the area uninhabitable. Regarding the institutional development of the water sector in that goes beyond the mere reconstruction of infrastructure, Pinera and Reed (2014) emphasize the importance of accepting the local governmental agencies as program partners. The case of the Gaza Strip thus also raises the difficult question of where to draw the line for ‘no contact’ policies. Collaboration with local authorities and municipal agencies, albeit limited in its scope, is essential to accommodate local needs and to account for official development plans.

The Palestinian situation is often described as uniquely complex. Yet different elements that converge to create the extraordinary context of resources management in either Palestinian territory can also be found in other settings. Import restrictions are common to countries under economic sanctions, military occupation by state or non-state actors remains an occasional outcome of escalating territorial disputes and deep-sitting political divides between factions occur in where civil wars were insufficiently resolved. The systematic analysis of how such processes affect natural resources and their management can inform

humanitarian and development interventions during conflicts and identify key opportunities and constraints to the inclusion of natural resources management in peacebuilding in the aftermath of the conflict.

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