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ACTORS, GOVERNANCE AND MODALITIES OF SANITATION SERVICES: INFORMAL TENTED SETTLEMENTS IN ZAHLEH (LEBANON)

by
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AN ABSTRACT OF THE THESIS OF

Diala Mohamed-Ali Makki for Master of Urban Planning and Policy
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Title: Actors, Governance and Modalities of Sanitation Services: Informal Tented Settlements in Zahleh (Lebanon)

After the influx of Syrian refugees into Lebanon in 2011, informal tented settlements (ITSs) have been the center of debates in urban studies. Much of the literature focuses on labor and security conditions (Mourad, 2017), while neglecting the challenge of the provision of adequate public services.
Taking the case study of the informal tented settlements in Zahleh, one of the main hosts of Syrian refugees in the Bekaa (UNDP, 2016), this thesis aims to extend the debate regarding basic service provision in ITSs, looking at the formal and informal modes of service provision for the acquisition of sanitation in Zahleh.

The main research question is: What are formal and informal mechanisms of access to sanitation services in the informal tented settlements of Zahleh? Who are the actors, what is the governance process, and what are the modalities and performance of this service?
A thorough analysis of ten ITSs in Zahleh unraveled that the service provision in Zahleh ITSs is the outcome of a hybrid system operated both commercially and by self-help through both formal (municipal) and informal actors. Although this system responds to the dire needs of refugees in lieu of the ongoing ad-hoc, turn-a-blind-eye strategy adopted by the government, however, it suffers from many shortcomings, the most prominent of which is dangerous environmental pollution that results from sewage seeping in the underground water table and the disposal of untreated sludge in the rivers.

In order to respond to this reality, the thesis argues for the importance of acknowledging the potentials of informality, and investigating ways to learn from existing hybrid systems and integrating them in policy making. It proposes the following planning recommendations: (1) recognize the importance of the informal system; (2) distinguish between ITSs; (3) devise a strong interventionist strategy for ITSs located within proximity of sewer networks; (4) relocate scattered ITSs in agricultural fields, and (5) relocate the refugee presence within the larger framework of refugee management.

The research methods that were adopted included direct observations, interviews with dwellers of ITSs, INGOs, and members of the Zahleh municipal council. The data that was collected was substantiated by the mapping of ITSs in Zahleh, natural risks, and existing and proposed wastewater networks.

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Chapter I

INTRODUCTION

A. Research Problem and Significance[1]

1. Problem Statement: Research question, hypothesis and objectives

Informal tented settlements (ITSs) are home to large communities of Syrian refugees in Lebanon today (about 200,000 Syrian refugees registered with UNHCR by 2018 (HUMAN RIGHTS WATCH, 2018). Informal tented settlements are land lots of varying sizes, typically rented by groups of refugees from a Lebanese landlord who allows them to erect tents on her/his agricultural land. Refugees in these informal settlements live in overcrowded conditions and poor quality shelters, and they are prone to eviction. In other words, ITSs are "camp looking" housing options developed in transactions between refugees and landlords outside any state mediation.

The most noteworthy challenge faced in these unregulated areas is the extension of basic services, particularly water, sanitation and electricity. Though some efforts from humanitarian agencies and the public sector have been made to try and remedy the situation, little progress has been made as these informal tented settlements are often lost within larger debates surrounding immigration, security, and labor challenges.

[1] The topic of this thesis were developed as part of a larger collaborative research project led by the Lebanese Center for Policy Studies (LCPS) and funded by IDRC-Canada, entitled "Lebanese Municipalities and Syrian Refugees: Building Capacity and Promoting Agency." The project is co-led by AUB Professors Mona Harb and Mona Fawaz.

While the record of these challenges are outside the scope of this theses, I note that much of the literature about Syrian refugees residing in ITSs in Lebanon have targeted the labor and security conditions in these areas (Mourad, 2017), while the challenge of public services has been neglected. Hence, my aim in this thesis is to extend the debate regarding basic service provision in ITSs, looking at the formal and informal modes of service provision for the acquisition of sanitation in Zahleh (Lebanon), an area severely affected by the influx of refugees, in the aftermath of the war in Syria.

Sanitation provision in informal settlements contexts entails governance and operational challenges that both the state and non-state actors "have been unable, or unwilling, to deal with adequately" (Ahlers et.al, 2014). Typically unable to connect to public services main networks, ITSs in Zahleh resorted to self-help solutions, which they combined with informal services provided by or through INGOs.

It is important to note that although this thesis focuses on the informal tented settlements of the city of Zahleh, the study aims to provide a broader understanding of the drivers behind informal service provision, and the disconnection between the dwellers' needs and the *formal* services available in the area. It aims to propose solutions to both improve sanitation services to ITSs in a way that meet both the need of the dwellers and protect the environment. To do this, I deploy the conceptual tool of '**multi-stakeholder processes**' (MSPs) developed by Noor et.al (2010, p.45) and shown in figure 1. This tool helps understand governance regimes of service delivery in post-conflict societies. Three main axes guided my research:

i. What are formal and informal mechanisms of access to sanitation services in the informal tented settlements of Zahleh? Who are the actors, what is the governance process, and what are the modalities and performance of this service?

ii. How can the provision of wastewater services in Zahleh's refugee ITSs be improved to achieve more effective, equitable and sustainable systems of service provision?

iii. How has the influx of Syrian refugees impacted Zahleh's urban structure and infrastructure and especially its environment?

2. Findings

My findings show that the modes through which Syrian refugees access sanitation services are further fragmenting and "hybridizing" service provision. By hybrid system, I mean that rather than the imagined uniform and integrated network governed by one public agency, ITSs rely on an assemblage of systems managed and operated both commercially and by self-help through both formal (municipal) and informal actors. These actors vary between reluctant local public authorities, international organizations typically operating in "crisis/relief" mode, refugees, and local landowners. Although this system responds to the dire needs of refugees in lieu of the ongoing ad-hoc, turn-a-blind-eye strategy adopted by the government, however, it suffers from many shortcomings, the most prominent of which is dangerous environmental pollution that results from sewage seeping in the underground water table and the disposal of untreated sludge in the rivers.

3. Significance

In the aftermath of the Syrian war, the city of Zahleh has emerged as the center for the headquarters of international NGOs working on refugee relief issues in the Beqaa (e.g. UNICEF, UNHCR, NRC, Save the Children, Solidarité International, Mercy Corps). I hope through this research to orient the decision making processes of humanitarian agencies in a way that approach the area in a more constructive and sustainable way and that takes into consideration the needs of the dwellers of ITSs while protecting the environment. Thus I aim to contribute to articulating planning strategies capable of improving living and service conditions in these settlements.

I hope as well to bring greater visibility to the formal and informal service provision in ITSs in order to provide a specific understanding of the phenomenon, which has been explained in the literature as "*hybrid services*".

Another significance of the thesis is to challenge and push beyond the current discriminative regulations of temporary solutions set by the municipality of Zahleh towards Syrian refugees.

B. Literature Review

In order to locate my research in the literature and inform my research questions, I looked at the contemporary debates about (1) the systems of infrastructure provision and splintering urbanism, and (2) formal and informal service provision in which I present several similar case studies from Lebanon and other cities in the world.

1. Systems of Infrastructure Provision and Splintering Urbanism

In the aftermath of the Depression, World War II and the collapse of colonial empires, governments took the role of regulating the national economy by owning the production and provision of goods and services (Megginson & Netter, 2000, p.2). The government was responsible for many public services such as electric and gas utilities, manufacturing industries, and banks in some places (Megginson & Netter, 2000, p.3). The role of the government was perceived as a "welfare state" that controls the market economy (Megginson & Netter, 2000, p.9). It was responsible for protecting the social and economic status of its citizens by providing and distributing equal opportunities and wealth between them. But, the rise of liberal economic policies have impacted developing countries and led to the progressive withdrawal of the state from the provision of essential services (Simone & Pieterse, 2017).

In light of neoliberal reforms, the relationships between networked infrastructure and impacts on the space were studied by Marvin and Graham in *Splintering Urbanism* in 2001. They show how liberal economic policies favored the market and increased the privatized system of infrastructure provision to support "profitability… for an increasingly international capital" (Marvin & Graham, 2001, p.202). They argue that this new market model fostered social and spatial inequality by often favoring the provision of infrastructure to elites and upper-income groups in the contemporary metropolis who are wealthy enough to afford them, in spaces such as gated communities and shopping malls (Marvin & Graham, 2001, p.220; Simone & Pieterse, 2017, p.129). As such, the vision of providing infrastructure to a geographic area in an even and equitable way was replaced with new neoliberal reforms of

public goods, leading to the social and economic fragmentation of cities and to spatial marginalization in even the wealthiest cities of the North (Graham & Graham, 2001). This is what they term "splintering urbanism".

Accordingly, liberal economic policies affected urban services which were no longer recognized as a 'human right' but shifted towards 'private property rights' servicing only consumers who were able to invest in these systems (Bakker, 2007, p.431 & Mehta et al, 2012, p. 198).

Jaglin (2008-2014) and Simone and Pieterse (2017) used some of the arguments of 'splintering urbanism' to depict the inequality and growing differentiation in the provision of urban services to the poor. Simone and Pieterse argued that in the Global South, most people are either off or only partially connected to the grid, which hinders the work and operation of municipalities, regional administrations and service sectors (Simone & Pieterse, 2017, p.16). Jaglin (2014) explains that in the absence of formal conventional network provision in some cities, people resort to alternative solutions and informal mechanisms to access urban services (Jaglin, 2014, p.437-438).

2. Formal and Informal Service Provision

The informal system is 'practice-rooted' and supported by unwritten rules and informal practices (Allen et. al, 2004, p.2). Informal institutions are described as "unruly social practices" that don't depend on sets of official rules and regulations recognized by a government, but rather depend on "auto-licensing and socially shared rules based solely on their existence and their effectiveness" (Yassin et. al, 2016, p.342). Main features of informal institutions are: 'silent encroachment', 'do-it-yourself mechanisms', 'reform by stealth' and

'autonomy' (Yassin et. al, 2016, p.343). Conversely, the formal systems of service provision are 'policy-rooted', i.e. defined by set of rules and principles that "allow the operation of different agents in different roles" (Allen et. al, 2004, p.2). In other words, formal institutions are practices authorized and sanctioned by the state through a set of "rules that are openly codified" (Yassin et. al, 2016, p.342).

Allen et. al note that there is no clear limit between the formal and the informal (Allen et. al, 2004, p.6). The public sector could be in the form of centralized and decentralized state agencies whilst the private sector could be operating in large companies under the formal sector and have informal vendors working at the local level (Allen et. al, 2004, p.6). The community sector could be supported by the public sector or external NGOs who provide services in a formal way but also it could have informal relations between members of the community which facilitate access to these services (Allen et. al, 2004, p.6).

This position is echoed by Simone and Pieterse (2017) who stress that informal mechanisms of service provision are accompanied by a "hybrid" system of delivery where "some formal government provision, combined with formal and informal private suppliers, held together by a host of intermediaries that continually calibrate supply and demand for neighborhoods, households and micro business" (Simone & Pieterse, 2017, p.145). This hybrid system leads to expensive delivery system for wealthy neighborhoods and often causes costs and indebtedness for poor households (Simone & Pieterse, 2017, p.145).

Governance is a term also used to describe formal and informal modes of policy-making, in the context of hybrid systems of service provision. Two definitions of the concept of governance emerged in the 1990s (Allen et. al, 2004, p.4): the first is characterized as

'state-centric' and focuses on the role of the state and its relationship to the interests of other powerful actors in steering society towards goals related to the public good. The second definition is 'society-centered' and focuses on multi-stakeholder groups and seeks a coordination of formal and informal systems of public-private interactions (Allen et. al, 2004, p.4).

3. Case studies of a Hybrid System of Service Provision

Case studies regarding hybrid systems of service provision often highlight the multiple modalities of accessing services and the key role of community management. Yassin et. al (2016) studied the informal mechanisms of accessing water used by Palestinians in the Maashouk neighborhood in Sour, Lebanon: community wells dug with the help of INGOs and managed by a local committee; connections to an informal local water network regulated via the local committee; purchasing drinking water from water providers. The Maashouk case shows that the provision of water is fragmented, controlled and regulated by different actors. Another case focuses on the role of local knowledge in the management of local drinking water supplies in eight villages in Nkayi, a poor rural district in Zimbabwe. People in these villages managed to sustain reliable water supply, through local community management of water points constructed as part of a rural development policy, as well as the support of an NGO that "trained communities on management of water supply projects for sustainability… [and on] the formulation of water point constitution, registration and operationalizing" (Mazango & Munjeri, 2009, p.29-31). The NGO helped these communities to depend on themselves in terms of participating in repairing and maintaining water points. They thus come up with strategies of sustainability for the repair and maintenance of water points, and

were also planning and constructing new technologies for water points. Women played an important role and some became the chairpersons of the water point committees. Water points were progressively turned into an economic hub with the construction of nutrition gardens around them (Mazango & Munjeri, 2009, p.33). The case of Nkayi shows that a demand-driven approach, community participation, and the community management of services are important factors in the successful process of water access and sustainable provision.

Allen et.al (2004) highlight how provision and access to services should be accompanied by "policies, regulations and official practices that recognize the existence of a wide range of both formal and informal practices" (Allen et.al, 2004, p.9). They study the governance of water sanitation services in five metropolitan regions: Mexico City, Caracas (Venezuela), Dar es Salaam (Tanzania), Cairo-Giza (Egypt) and Chennai (India). These five cases reveal that recognizing informal practices and articulating them to the formal system by using a society-centered governance system is key to structural improvements in WSS service provision.

In Lebanon, urban service provision is affected by wars, political conflicts and different political parties who govern and control networked infrastructure. Verdeil (2008) uses the term 'fragmentation' to refer to the case of water and electricity provision in Lebanon, which he qualifies as unequal and non-permanent. Inequality leads to a great disparity and fragmentation on the socio-economic and geographic level and intensified fragmentation between the cities of Lebanon (Verdeil, 2008, p.5). An effort to universalize basic infrastructure by Fouad Chehab (1958-1964) failed, and was further aggravated when the civil war erupted in Lebanon in 1975 and militias used infrastructure as a tool to expand

their control (Verdeil, 2008, p.2). With the end of the civil war, the Solidere project was launched along with other massive investments in water and electricity infrastructural projects, which focused on the city of Beirut and disregarded other regions (Verdeil, 2008, p.6). The favoring of the capital city exacerbated the differentiation between regions and cities leading to the unequal and fragmented supply of basic services, to the expansion of informal mechanisms of accessing services and to the depletion of the quality of services (Verdeil, 2008). At the end of 2004, the differences in terms of service provision between Beirut and its suburbs aggravated social and spatial inequalities, with Beirut getting fewer electrical rationing than nearby poorer areas (Verdeil, 2008, p.4). In other words: "rather than resulting in a national upgrading, the rehabilitation policies (new infrastructural work) and the management of networks policies (tariff, fees collections, theft repression) have added new layers of differentiation between regions and cities" (Verdeil, 2008, p.2).

4. Conclusion

To understand well the hybrid system of service provision in a context of infra-deficiency, we need to look beyond the official network and to understand the historical trends and the roles of different actors involved in service delivery. The review of the literature regarding the approaches to service provision shows that informal access to services and self-help systems have emerged as alternative solutions to fill the gap created by the absence of the state, and to meet the service demands of unserved areas.

C. Framework

Using the MSPs framework of Noor et al. allowed me to focus on three main components of the sanitation service provision system: actors, governance and outputs. As such, I study the contributions and roles of actors involved in WSS services provision by analyzing different resources and capacities (financial, information, and networks) that actors use to develop their means of influence. I also study how long has a service provider been operating the sanitation service, where, and its degree of institutionalization to identify degree of in/formality. To qualify the characteristics of governance process, I examine the scope and geographical range of sanitation service, the type and means of exchanged information, as well as interactions, decision-making processes and relations to gauge governance networks (Stel & Mandefro Abate, 2014, p. 746). For the outputs of the sanitation service, I observe modalities of the service (e.g. pipes, pits, and septic tanks), as well as the performance of the service (e.g. access, quality, range).

Noor et al. refer to several definitions for MSPs: they are "processes which aim to bring together all major stakeholders in a new form of communication, decision-finding (and possibly decision-making) on a particular issue (Noor et.al, 2010, p.36). MSPs can be an effective tool that tackles service delivery in situations where services are fragmented, states are fragile, and where individual stakeholders, including the state, lack the capacity for service provision (Stel et.al 2012, p.15). They are seen as "a preferred tool geared towards enhancing participation, legitimacy, and effectiveness of policy-making and implementation" (Noor et.al, 2010, p.36).

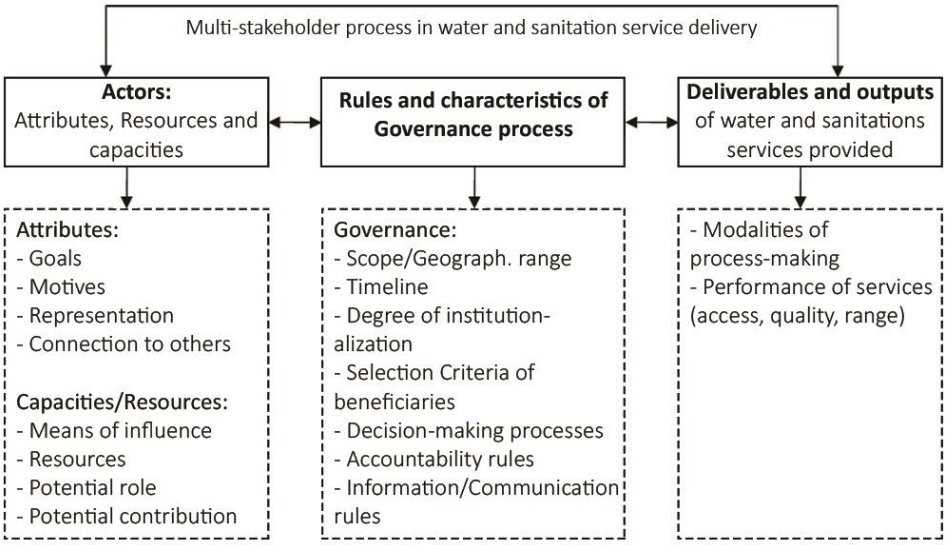


Figure 1: Analytical framework based on Noor's (2010) Multi-stakeholder process in sanitation service delivery (Source: Noor et.al, 2010. Modified by author).

D. Methodology

The thesis relies on qualitative methods to understand the ways Syrian refugees access wastewater services in Zahleh ITSs (namely through interviews) and to sketch their impact on the environment (namely through field observations), on mapping and data visualization.

At a macro-scale, and in order to assess the overall landscape and consequence of ITSs, I mapped the whole area. I used data of existing and proposed sewer network collected from the Center for Development and Reconstruction (CDR) and overlapped them with the maps of ITSs and urban sprawl. This map allowed me to situate my findings within geographical studies and look critically at the legal conception of sanitation service delivery.

I then selected 10 ITSs in the agricultural areas of Zahleh that varied among sizes, female and male ratio, and landowners' power. By choosing different ITSs, I was able to compare between the wastewater service provision across these ITSs in order to gain a better understanding of the specific strategies and practices deployed by refugees in accessing services. I traced the formal and informal arrangements in the WSS system. I identified main actors in the delivery and access to wastewater system (the state, the private sector and the community) and I characterized their roles and relationships.

I then conducted semi-structured interviews with 5 key stakeholders involved in the wastewater services in Zahleh ITSs, namely the mayor, members of municipal councils, and key people from the UN and INGOs, in addition to 25 in-depth individual and group interviews with Syrian refugees in the 10 ITSs. Accordingly, I was able to assess the weaknesses and opportunities in the current wastewater system and its management (including both formal mechanisms and informal practices).

Syrian refugees in Zahleh ITSs were eager to share their experiences regarding the provision of wastewater services since the topic touches on their daily lives and impacts their health, hygiene and environment. In addition, I ensured all interviewees anonymity and confidentiality.

My interview protocol is organized in two broad categories. I start with an inquiry about the type of wastewater system in each ITS: Do they get wastewater services? How are they connected to the service (pits, septic tanks, etc.)? Are they connected to the main wastewater network of Zahleh? How much do they pay for WWS services on a monthly basis? Does this include installation and equipment? How much of their monthly income

does this constitute? What is the frequency of their access to sanitation service? What are the main mechanisms through which they acquire or arrange access to this service? Then, I moved to a discussion on the challenges and barriers they faced regarding the current sanitation system's operations: Who is responsible for discharching and cleaning wastewater from septic tanks and pits? Who built them and whose permission did he/she take? Who is responsible for the maintenance of this service? What happens when a breakdown or malfunctioning is observed? Who repairs it?

I started the fieldwork in the Saker camp given that the church gave me the contact of its shaweesh who is the representative of the landlord who assigns him to manage the camp's affairs (El-Helou, 2018). Here I used the snowballing technique to identify more ITSs where dwellers face different experience of wastewater provision. I established a list of ITSs documenting the following basic information: date of establishment, location, distance from the Zahleh-Baalbek highway, number of tents in each camp, camp management (shaweesh/no shaweesh, landowner, NGOs), as well as data on wastewater service. In the first round of fieldwork in July 2017, I walked into the camps, introduced my research and asked to interview the shaweesh first. Then, I returned couple of times to the Saker camp and the ITS in its vicinity (Camp 020) and interviewed ITSs' dwellers. As I built trust, dwellers referred me to other ITSs in Zahleh agricultural areas. In a next stage of fieldwork, in February and March 2018, I interviewed more Syrian refugees in the remaining 8 ITSs. I had 3 of them through asking dwellers from the first two camps in the first stage. I then asked my interlocutors if they could refer me to others which led me to 5 new ITSs.

The analysis of the findings allowed me to identify three types of wastewater service provision which I use to classify the ITSs. Findings are discussed in chapter five and which I interpret through maps and data visualizations.

In a second stage, I looked at the environmental and social impacts of ITSs at the larger scale of the Zahleh area in order to define my intervention. I reviewed several case studies of hybrid system of service delivery and defined the costs and benefits of such a system. I then applied the findings of the analytic framework to the case studies of Zahleh by analyzing the formal and informal practices of wastewater delivery.

To conceptualize environmental and social concerns in a spatial and physical manner and to enrich the current understanding of the city of Zahleh, I overlapped and generated maps of natural risks and urban expansion by using data collected from the national master plan of Lebanon (Schéma Directeur d'Aménagement du Territoire Libanais or SDATL). I examined the natural risks maps as they are important asset in connecting and defining any proposed policy recommendation. The natural risks that I studied are: erosion, flood, landslides and seismic hazard.

The analysis results in a set of policy recommendations that aim to integrate ITSs as legitimate part of the ongoing urban expansion within the agricultural area of Zahleh.

E. Thesis Structure

The thesis is structured in four chapters, each of which builds toward an understanding for how the hybrid system of service provision in the informal tented settlements are produced in order to reach an informed set of policy recommendations that

respond to the protracted situation of Syrian refugees in Lebanon. Following the introductory chapter which focuses on the concepts that framed my research, which are: hybridity, informality and governance, the second chapter provides an overview of the Lebanese governmental response to the Syrian refugee crisis. It focuses on the legal framework, the policy of no-camps which led to the proliferation of informal tented settlements (ITSs). It provides an overview of the case-study focusing on the response of the municipality of Zahleh to the Syrian crisis. The third chapter examines the challenges and different systems of sanitation services in the 10 ITSs in Zahleh. Following this, the fourth and final chapter starts by analyzing the costs and benefits of the hybrid system of service provision. It then argues for the need to modify current policies and regulations applied by the municipality of Zahleh by providing the following set of recommendations: (1) recognizing the importance of the informal system; (2) distinguishing between ITSs; (3) connecting ITSs in immediate Proximity to the Sewer Lines and to Urban Expansion in the Valley of Zahleh; (4) relocating isolated ITSs in agricultural fields to ITSs near the sewer network or within urbanized areas; and (5) locating the refugee presence within the larger framework of refugee management

Chapter II

INFORMAL TENTED SETTLEMENTS OF SYRIAN REFUGEES: PROFILES AND URBAN IMPACTS

Chapter three develops an analysis of the governmental response towards the Syrian crisis, the associated legal framework and the no-camps policy. It then explores the erection of ITSs in Lebanon, and more specifically in the Bekaa area, and the different challenges that the municipality, the landlords, and the shaweesh enforce on the refugees. To this effect, the chapter examines the outcomes of the ad-hoc system in place and its impact on the refugees and the environment.

A. Overview of Syrian Refugees in Lebanon

Since the onset of the Syrian war in 2011, massive inflows of displaced people have sought refuge in Lebanon making it the country with the second largest population of Syrian refugees in the region and the highest-per-capita concentration in the world (UNICEF, UNHCR & WFP, 2017). Due to its geographic proximity and historical relations with Syria, Lebanon hosts more than 1 million Syrian refugees registered with UNHCR by 2018 and many more are present without registration (HUMAN RIGHTS WATCH, 2018 & Dionigi, 2016). The 2017 VASYR study shows that about 80 percent of Syrian refugees live in urban areas and 20 percent in informal tented settlements (ITSs), mostly in rural areas in the North and the Bekaa (UNICEF, UNHCR, WFP; 2017). Six percent of those in rentals have valid rental agreements and the rest are prone to evictions with no legal recourse (Yahya et.al, 2015).

This has threatened the country's political, social and economic stability and put pressure on its limited infrastructure and services (CRD, 2014). Lebanon has been a weak host to displaced Syrians as it has no clear governmental policy concerning the Syrian presence in the country (Cherri; González & Delgado, 2016; Dionigi, 2016). Also, it has refused to establish formal camps for Syrian refugees as they are seen as security threats.

In what follows, I examine the response of the Lebanese government and the legal framework throughout the course of the Syrian crisis. I then highlight how the refugee crisis is an urban crisis and how given the protracted crisis, the role of urban planning in ITSs can be explored at the scale of wastewater and its impact on the environment.

1. A Policy of Inaction

Lebanon deals with asylum issues through immigration laws (the 1962 Law of Entry and Exit) as it lacks a formal national refugee legislation (Janmyr, 2016). Additionally, and since Lebanon is not a party to the 1951 UN Convention on the Status of Refugees and its 1967 Protocol (Stevens, 2014), Syrian refugees are referred to as 'displaced' (Nazihoun in Arabic) rather than 'refugees' (laji'oun) (Janmyr, 2016).

Initially, the Lebanese government implemented a "policy of inaction" (Mourad, 2017) by maintaining an "open door" policy towards the entrance of Syrians who were governed via official border crossings and were granted an 'entry coupon' and 'entry stamp' on their valid national Syrian identities or passports (Janmyr, 2016). These were allowed to reside legally in Lebanon for a period ranging between six and 12 months. After this period, Syrians above the age of 15 were obliged to pay $200 to renew their residency (Janmyr, 2016). As for those who entered Lebanon illegally or have expired residence permits, they

are subject to prosecution and deportation (Janmyr, 2016). The "policy of inaction" propelled ambiguity at the municipal level (Mourad, 2017).

The 'policy of inaction' of the Lebanese government has enabled international organizations to act as key players in the crisis (Dionigi, 2016). UNHCR and its partner organizations are the leaders in the humanitarian operation. The first plan to respond to the crisis was developed by UNHCR in 2012 and targeted only Syrian displaced people (Dionigi, 2016). This plan expanded in 2014-2015 to include developmental objectives for host communities and became the Regional Refugee and Resilience Plan (3RP), under the 'Lebanon Crisis Response Plan' (Dionigi, 2016).

To reduce the number of refugees, their access to Lebanon was constrained by regulations and an invested securitization. Municipal police and municipalities were required by the Ministry of Interior and Municipalities (MoIM) to keep a census of refugees (UNHCR, 2015). Also, the UNHCR suspended in May 2015 the official registration of both Syrian refugees living in Lebanon and new comers (Janmyr, 2016). A series of evictions were noticed in the Bekaa in that year (UNHCR, 2015).

This policy along with the non-encampment policy rendered displaced Syrians more vulnerable, increased the labor supply and competition for jobs, and reduced wages (Turner, 2015).

2. A Policy of no-camps

The management of the Syrian crisis is informed by previous experiences with Palestinian refugees in Lebanon. Worries to replicate the Palestinian experience and induce "tawteen" (permanent residency) as well as fears over the potential militarization of camps

and the associated security threat, the Lebanese government refused to establish formal camps for Syrian refugees (Turner, 2015). “Palestinian camps became enclaves out of reach of Lebanese law” (Şahin Mencutek, 2017) after the 1969 Cairo Agreement between the Lebanese government and the Palestinian Liberation Organization (PLO) delegation which have shifted control from the Lebanese Armed Forces to the Palestinian Armed Struggle Command (Sanyal, 2017). As such, Palestinian camps became militarized spaces and threat for radical non-state groups (Sanyal, 2017) and the Lebanese government, and specifically Hezbollah and the Free Patriotic Movement, opposed encampment out of fear of establishing armed militias within them (Turner, 2015). Indeed, the Deputy Secretary-General Sheikh Naim Qassem argued that

> “Any camp for Syrians in Lebanon will turn into a military pocket that will be used as a launch pad against Syria and then against Lebanon” (Turner, 2015).

While some argue that camps would provide safe havens for Syrian rebels, other Lebanese political parties fear that camps would embody mostly Sunni Muslim refugees which would destabilize Lebanon’s sectarian ‘balance’ (Turner, 2015). This has increased the vulnerability situation of refugees struggling with security issues, indebtedness and segregation. Additionally, this has caused disruption between the local host community and Syrian refugees who are struggling over public services, employment and resources.

Humanitarian agencies suggested instead that a camp policy would be a better option since refugee camps attract donations and funding “by rendering refugees ‘visible’ and countable, ‘proving’ their presence to potential donors” (Turner, 2015). However, the

government insisted on refusing to build official refugee camps or adopt alternative shelter policy which "created challenges for both UNHCR and for local communities who became the primary hosts of Syrian refugees" (Mourad, 2017).

"With INGOs and UNHCR insisting[2] on 'camps', a form of shelter typically borrowed from other contexts where the 'concept' of a refugee settlement is typically associated with 'non-urban' tropes such as open areas, tents, and others" (Boustani et.al, 2016). Refugees formed what is now called informal tented settlements (ITSs) that have proliferated over 1700 localities (Mourad, 2017), mainly on private agricultural lands in rural areas in the North and the Bekaa. As of March 2017, the number of ITSs in Lebanon have reached 7,056 and they range between 1 to 238 tents (INTER-AGENCY SHELTER SECTOR COORDINATION, 2018). Although these refugees consist only 20 percent, ITSs have received the widest attention of the global community because: (1) they hosted the most vulnerable populations; (2) they are easy to locate, compared to refugees in urban areas, thus providing aid to a large number of refugees at once; and (3) "they tend to remain in their primary place of settlement" (Boustani et.al, 2016).

The self-settlement of refugees has placed an unequal pressure on local communities and municipal governments who have not been included in any formal policy-making role of developing the LCRP (Mourad, 2017). However, because municipalities were able to control access to refugee populations, UNHCR gave them a frontline role by creating the position of

[2] "Despite relentless pressures, the Lebanese government maintained its opposition to the formation of any official 'refugee camp' in its national territory, claiming that the failure of this form of shelter with respect to the Palestinian refugees set a precedent it would be unwilling to support" (Boustani et.al, 2016).

Liaison Officer within its operations and making them important actors within the refugee response (Mourad, 2017).

This role was criticized when some municipalities imposed discriminatory measures against refugees, such as curfews. In late 2013, MoIM expanded the role of municipal authorities by putting forward a security plan and giving the responsibility to municipalities to provide security while arguing that municipal curfews are illegal. “The plan called for, among other provisions: arming municipal police; establishing joint patrols between the International Security Forces (ISF) and municipal police under the authority of the mayor and the relevant heads of security; compiling a list of organizations within each municipality that provide security within its boundaries; confiscating the documents of displaced Syrians in every town/village and overseeing the issue of aid and assistance” (Mourad, 2017).

Mourad argues that the state frames these instances as illegal to alleviate its responsibility, call for the need to support Lebanese institutions and host communities, and shift the focus of international humanitarian aids from refugee rights towards a policy of stability and containment (Mourad, 2017).

3. The ITSs and the Protracted Crisis

“An informal tented settlement is defined as “…a settlement that was established in an unplanned and unmanaged manner, which means they are generally unrecognized. There may or may not be an informal or formal agreement between landlords and residents of the settlement. The 2015 Lebanon Shelter Sector Strategy formally defines an Informal Tented Settlement as: ‘Unofficial group of temporary residential structures, often comprising of plastic-sheeting and timber structures and can be of any size from one to several hundred

tents. Informal Settlements may have some informal community-led management…ITSs share similar spatial features and governmental practices with 'camps', such as "forms of screening and policing of residents, but without the formal legitimacy granted to them either through the state or humanitarian organizations" (Sanyal, 2017, p.118).

ITSs have overarching commonalities such as the limited access to the labor market as they are more dependent on relief and aid assistance, and limited mobility of refugees (Bowles, 1998). ITSs erected in time of 'emergency' adopt short-term solutions for meeting refugees' basic needs, and they are controlled by humanitarian agencies and public actors that take swift decisions and policies targeting refugees (Boustani et.al, 2015, p.33). While ITSs or camps established in the 'post-emergency' phase use longer-term solutions "wherein refugees seek to achieve a respectable standard of living, be it economically or socially" (Boustani et.al, 2015, p.33). However, refugees in both cases still depend on humanitarian assistance. Since the influx of refugees in 2011, the Lebanese government is still taking stance of an 'emergency' phase and refuses to perceive the protracted situation of the crisis (Boustani et.al, 2015, p.33).

The largest concentration of informal tented settlements is in the Bekaa where over third of all ITSs in Lebanon are established on agricultural lands, which owners have been renting out to UNHCR (UNHCR, 2015). Refugees in these informal settlements live in overcrowded conditions and poor quality shelters, and they are prone to eviction.

In a survey conducted by UNHabitat and UNHCR in 2014, informal settlements were found to be usually refugees' second choice. Syrians are forced to move to camps when they are unable to afford the increasing rental payment in urban areas and the scarcity of

employment opportunities (UNHabitat & UNHCR, 2014). However, some refugees choose to reside in informal tented settlements to avoid tension with the host community and to stay close to social connections (UNHabitat & UNHCR, 2014).

Settlement happens where a landowner is willing to lease her/his land. There is no planning, and as a result, the landscape is ad-hoc and sprawls over entire regions (Figure 2).

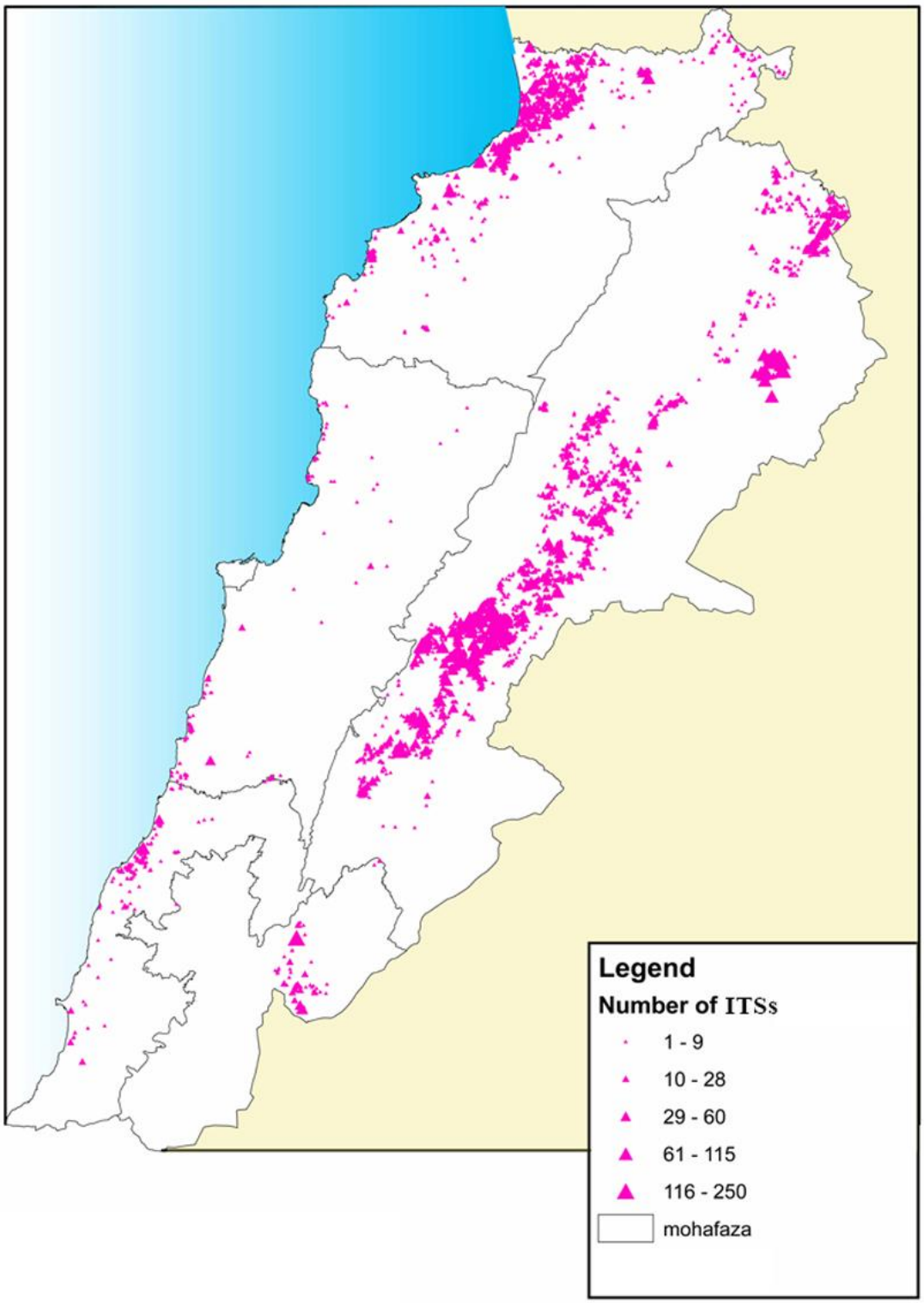


Figure 2: Distribution of informal tented settlements in Lebanon in 2018 (Source: UNHCR. Adapted by author. Date: October 2018)

Refugees access informal settlements through three form of leases: First, individual families of Syrian refugees pay directly monthly fees to the landowner. The rental price of a tent for one family of 6-7 persons is usually around $900 per year. Second, the land is rented out to a shaweesh who manages the settlement and rent to Syrian families. Third, the land in rented out to an NGO which "pay an agreed lump sum as rent" (UNDP, 2017).

In the Bekaa, the most common form of renting is under the management of a shaweesh (UNDP, 2017). "This rent arrangement does not entail official documents" (UNDP, 2017). In this case, the shaweesh has a central role as he is responsible for employment, shelter and setting the rental rate for each tent, which create opportunities for exploitation and conflict between refugees and the shaweesh (UNDP, 2017).

However, when rent management is under the jurisdiction of NGOs, "especially Islamic NGOs that are well organized and have ample financial resources" (UNDP, 2017), it is much easier as they use official documents for the rent agreement and manage to secure lower rents than when Syrians rent through the shaweesh (UNDP, 2017).

Refugees set up their own tents using materials distributed by humanitarian organizations, such as poles and nylon sheets which provide poor insulation and insufficient privacy (UNHabitat & UNHCR, 2014). The erection of ITSs is affected by municipal regulations and land-ownership. Some municipalities were glad to host refugees and others were not. The level of receptiveness was influenced by the following factors: First, the sectarian background of the Lebanese hosting areas influenced the choice of residence of Syrian refugees, with for instance Hermel and Baalbeck accommodating mainly pro-regime Syrian families (Hourani & van Vliet, 2015).

Second, proximity in border areas where people are accustomed to the presence of Syrian migrant workers made them more hospitable to refugees. However, this receptive attitude of the Lebanese communities that are traditionally tied to Syrian workers is decreasing following the increased concerns over the continued presence of disadvantaged Syrians in these areas. The Bekaa, which has poor developed infrastructure and weak local civil society structure, was the first region to close down Syrian businesses which are mostly informal (54% of all informal Syrian businesses in Lebanon are located in the Bekaa) and to evict Syrians from their shelters (rentals and ITSs) since it was affected by "the reduced economic border trade with Syria, deteriorating security in many areas, and the enormous pressure of Syrian refugees on the host communities… including labor competition, infectious diseases, environmental degradation; etc." (Hourani & van Vliet, 2015).

And the third factor affecting receptiveness is work opportunities in larger cities, such as Beirut and Saida, which attracted refugees who mostly worked in construction that is largely taking place in these areas. Economic competition also appears in the increase in rent prices (UNDP, 2017). Informal tented settlements have affected agricultural lands which are re-purposed for rental purposes and increased rent for farming land (UNDP, 2017).

Refugees in informal tented settlements are prone to exploitation by landlords who are taking advantage of Syrians by setting rental prices at unrealistic levels (UNHabitat and UNHCR, 2014). This has led to unforeseen profit for some landlords (UNDP, 2017). In this light, Jad Chaaban, a professor of economics at the American University of Beirut, estimates that "the rental market for refugees generates every year nearly $50 million in revenues for Lebanese landlords" (Chaaban, Al Jazeera Newspaper, 2017).

B. Case Profile

This section profiles the case study. I begin by introducing Zahleh. I then move to profile the ITSs in Zahleh and analyze their impact and the threat they face in relation to natural conditions of settlement. In addition, the chapter maps the various actors involved in service provision and organization of the refugee life.

1. Zahleh - A General Overview

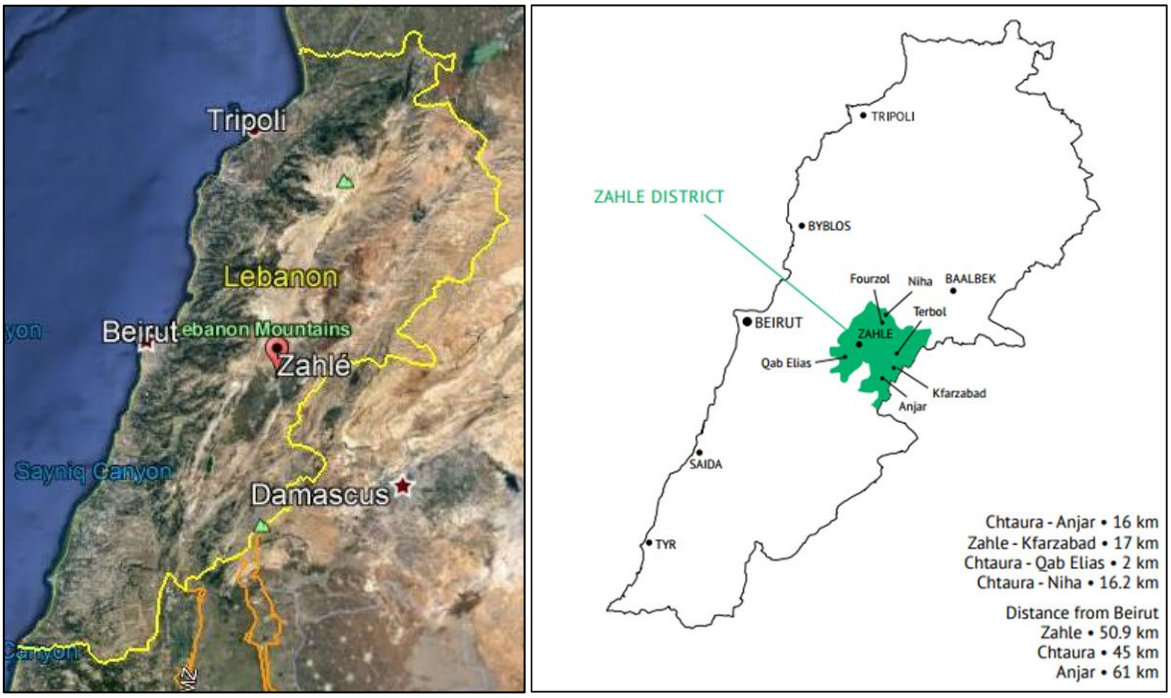


Figure 3: Location Map - Zahle and surrounding municipalities (Source: USAID, 2015)

Zahleh (Figure 3) is the third largest city in Lebanon following Beirut and Tripoli. The city of Zahleh is the center of the Beqaa governorate housing in its district (Qaza) around 150 thousand inhabitants spread over the city proper and 34 villages (UNESCO Regional Office, 2013, p.16). Zahleh city is "located at an altitude of 1010 m and covers an area of 700 km^2" (CDR, 2015). The Lebanese population of Zahleh was estimated at 220,000 in

2015, amongst whom 180,000 are permanent and 40,000 are seasonal residents (CDR, 2015). It is predominately a Christian city with significant minorities of Shiites and Sunnis.

The municipality of Zahleh was established in 1920 when the two towns Zahleh and Maallaqa were united. As for the Federation of Zahleh District Municipalities, it was established in 2005 and its administrative center is located in the city of Zahleh. It includes the municipalities of Ablah, Chtaura, Fourzol, Hazerta, Jdita, Niha, Saadnayel, and Taalbaya (Localiban, 2015).

Today, well-known political figures from Zahleh as well as members of the municipal council are mostly affiliated with dominant Christian Lebanese political parties, namely the Free Patriotic Movement, the Lebanese Forces and the Kataeb Party (UNDP, 2017, p.6). However, the presence of other parties is dominant in nearby towns, such as Hezbollah in Karak and the Future Movement in Haouch el-Omara Aradi. Historically, Zahleh was known as a strong Christian stronghold in a large Muslim area.

During the fifteen years of the Lebanese civil war (1975-1990), Zahleh, which was the stronghold of the Kataeb party, was besieged for 91 days by Syrian troops who used artillery and sniper fire (McLaurin, 1986, p.8). This experience has further entrenched the political identity of the city as staunchly Christian and anti-Syrian, an identity that has had massive repercussions on the attitudes of many city dwellers vis-à-vis refugees since 2012.

Zahleh is an important trade center and its economy mainly relies on “small businesses…artisan producers, food processing family-owned companies which directly benefit from locally grown products” (Unesco Regional Office, 2013, p.43). The local

economy depends on farming and agro-manufacturing (UNDP, 2017, p.9), but the city is also known for its industrial institutions that create employment for the region. The city is well-known for its wine industries and arak manufacturing due to its increasing grape production and vine growing. In addition, Zahleh is also the home of baking and food industries, such as dairy, poultry, meat and agro-food processing companies (UNSECO Regional Office, 2013, p.47).

2. Syrian Refugees in Zahleh

Shortly after the outbreak of the war in Syria, Zahleh became a main host city for refugees in the Bekaa (UNDP, 2016). The city attracted refugees through the employment opportunities they hoped to find in its agricultural and industrial centers, while remaining in close proximity to the Syrian-Lebanese border.

According to the municipal police commissioner in Zahleh, the number of refugees living in rented houses inside Zahleh and in the industrial zone is 17,000[3]. In addition, the valley of Zahleh is home to 23,000 Syrian refugees[4] who lived in 224 ITSs on plots of lands they rent from Zahleh landlords (Data from UNHCR, 2017) (Figure 4).

Syrians living in the city of Zahleh, are usually of middle income categories and they rent houses and/or shops in the industrial zone of the city and inside the main city. The average rent ranges between $200-$500 per month in these areas, whereas Syrians in ITSs, who are of poor socio-economic condition, pay in installments every 2-3 months an average

[3] Interview with the Municipal Police Commissioner. June 2018

[4] Interview with the Municipal Police Commissioner. June 2018.

of $100-$200[5]. In terms of labor, Syrians in Zahleh and the Bekaa have traditionally worked in semi-skilled manual labor which varied from painting, plumbing, construction, and agriculture (UNDP, 2017). Examples of entrepreneurial activities are rare in Zahleh, as the municipality closed in 2017 several shops and restaurants belonging to Syrian refugees, as well as shops owned by Lebanese citizens and run by Syrians[6]. Employed refugees are mainly employed as daily laborers with no contracts. Most employment is short-lived, ranging from a few days to a few weeks. Refugees typically wait at the city roundabout for someone to come hire them as day laborers[7].

Syrians living in the city of Zahleh access basic services such as water and electricity through the buildings they live in. In addition, the Catholic church of Zahleh plays a significant role in providing several social services such as access to schools, summer camps and cultural and religious activities. The church also has its own database where it keeps track of the Syrians who are mostly Christians in the Zahleh region[8]. Refugees in rentals in the city are constantly haunted by threats of eviction. Indeed, the municipality of Zahleh has since 2017 forcibly expelled Syrian refugees from their homes and localities (HUMAN RIGHTS WATCH, 2018). Evictions are typically based on housing regulation infractions or noise complaints.

As for the Syrians in ITSs, they do not have direct access to water, wastewater or electricity. The municipality only collects solid waste and cleans the streets outside the ITSs.

[5] Based on interviews conducted during the month of July 2017.
[6] Interview with Assad Zogheib, the mayor of Zahle. July 2017.
[7] Interview with refugees during the month of July 2017.
[8] Interview with the Catholic Church's fundraising manager and the head of the church's social office for the Syrians.

Landowners provide electricity to ITSs by connecting those to electric hookups and makeshift cables that power the overhanging cables from sheer metal roofs[9]. ITSs are provided with water tanks and wastewater pits by INGOs and NGOs, working in coordination with UNHCR according to a sectoral and geographic mapping. The municipality is not involved in the process which is increasingly managed by the landlords and within which the shaweesh play a key role.

[9] Interview with Zahle Mayor in July 2017 and the Municipal Police Commissioner in June 2018.

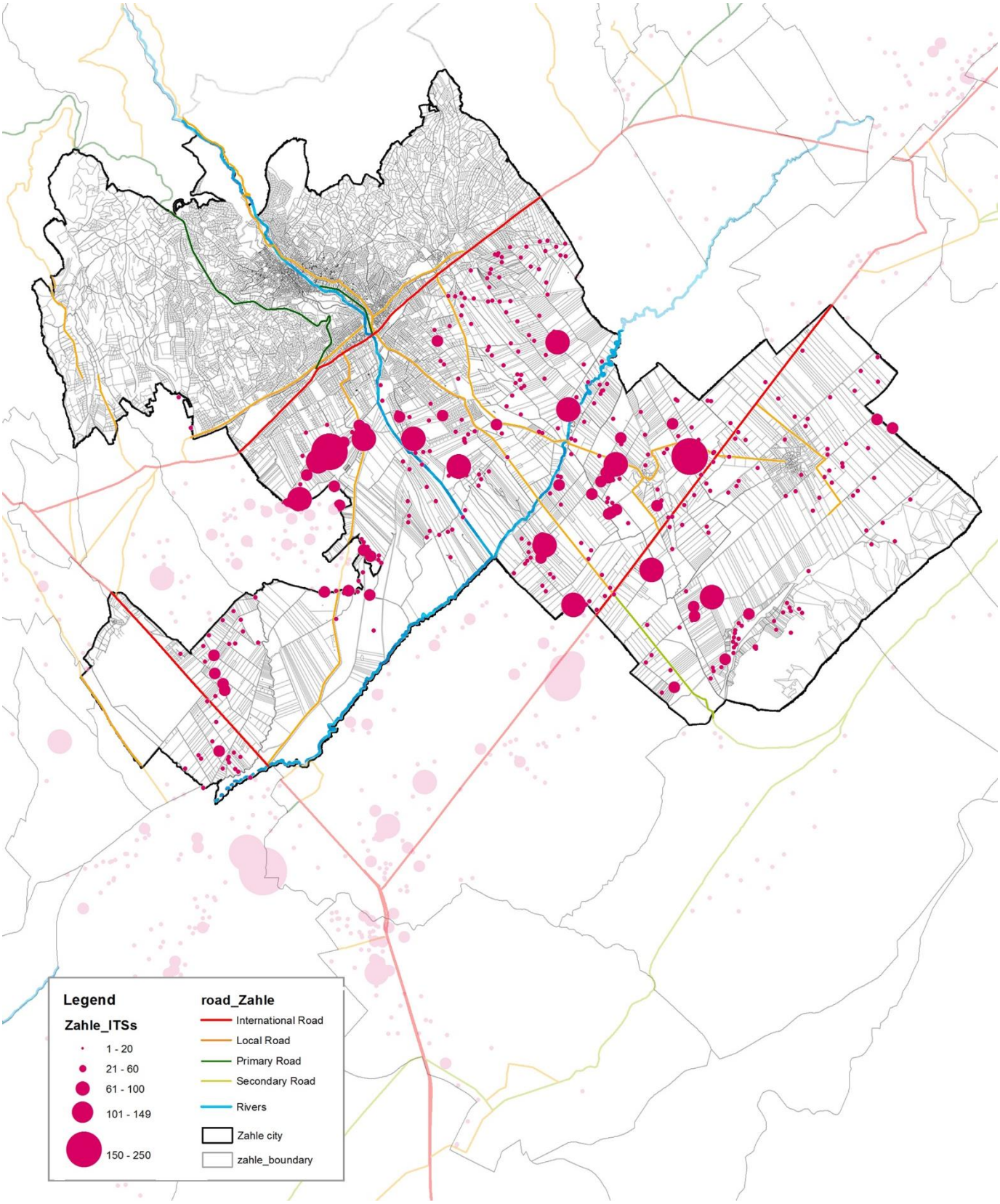


Figure 4: Informal Tented Settlements in the Administrative District of Zahleh (Source: UNHCR. Adapted by Author. Date: November 2018)[10]

[10] GIS Data were a combination of materials kindly provided by Professor Ibrahim Alameddine from the "Introduction to GIS" course - Fall 2015, from SDATL, and from UNHCR.

3. Analyzing Informal Tented Settlement Locations

Most of the ITSs in agricultural lands were established on sites where Syrian workers used to live and work long prior to the Syrian war. ITSs are established in an ad-hoc way and depend on the willingness of landowners to lease their land. Many are located on agricultural lands where refugees brought their families after 2011, and where they were joined by other members of their kin in negotiation with the landlord.

In order to analyze the conditions of refugees living in ITSs and assess their impacts on the land and the threats they face, I used UNHCR's refugee ITSs maps which I overlapped with the maps developed by the Landuse National Master Plan / Schéma Directeur d'Aménagement du Territoire Libanais (SDATL), which revealed how Syrians in Zahleh ITSs are mainly located in areas prone to natural risks (Figure 5, 6, 7 & 8), more specifically risks related to earthquakes, flood, soil erosion and landslides.

Figure 5, figure 7 and figure 8 show that seismic hazards, erosion and landslide risks are low for Zahleh ITSs. The frequency of large seismic events is low as Zahleh has low to moderate seismic hazard. About 80% of Zahleh ITSs are located in areas of medium seismic risks, whereas about 20% of ITSs are not disposed to earthquake hazards (Figure 5). High risk landslide zones only exist in places with steep slopes (Yammouneh and Wadi et-Taym) and all ITSs in Zahleh are not in danger of landslide as they exist on safe zones (Figure 8). As for erosion risks, class 2 and 3 (low to medium potential erosion) cover the largest part of Zahleh, mainly in the North in the mountainous chains and in the South in the Valley. It is followed by class 5 (very high potential) in the Center of Zahleh Caza, and then by class 1 and 4 (very low and high potential) which resume in the North in the mountainous chains.

The majority of ITSs in the city of Zahleh are located on areas that vary from very slight to medium erosion, whereas a small number are subject to damage from severe soil erosion (Figure 7).

However, Figure 6 shows that Zahleh ITSs that are located in the North and central part of Haouch el-Oumara aradi and Maalaqa Aradi are subjected to flood which further affect their settlements and infrastructure. ITSs that are not located in flood prone areas are the ones in the southern part of Haouch el-Oumara Aradi and Maalaqa Aradi, Dalhamieh and Terbol.

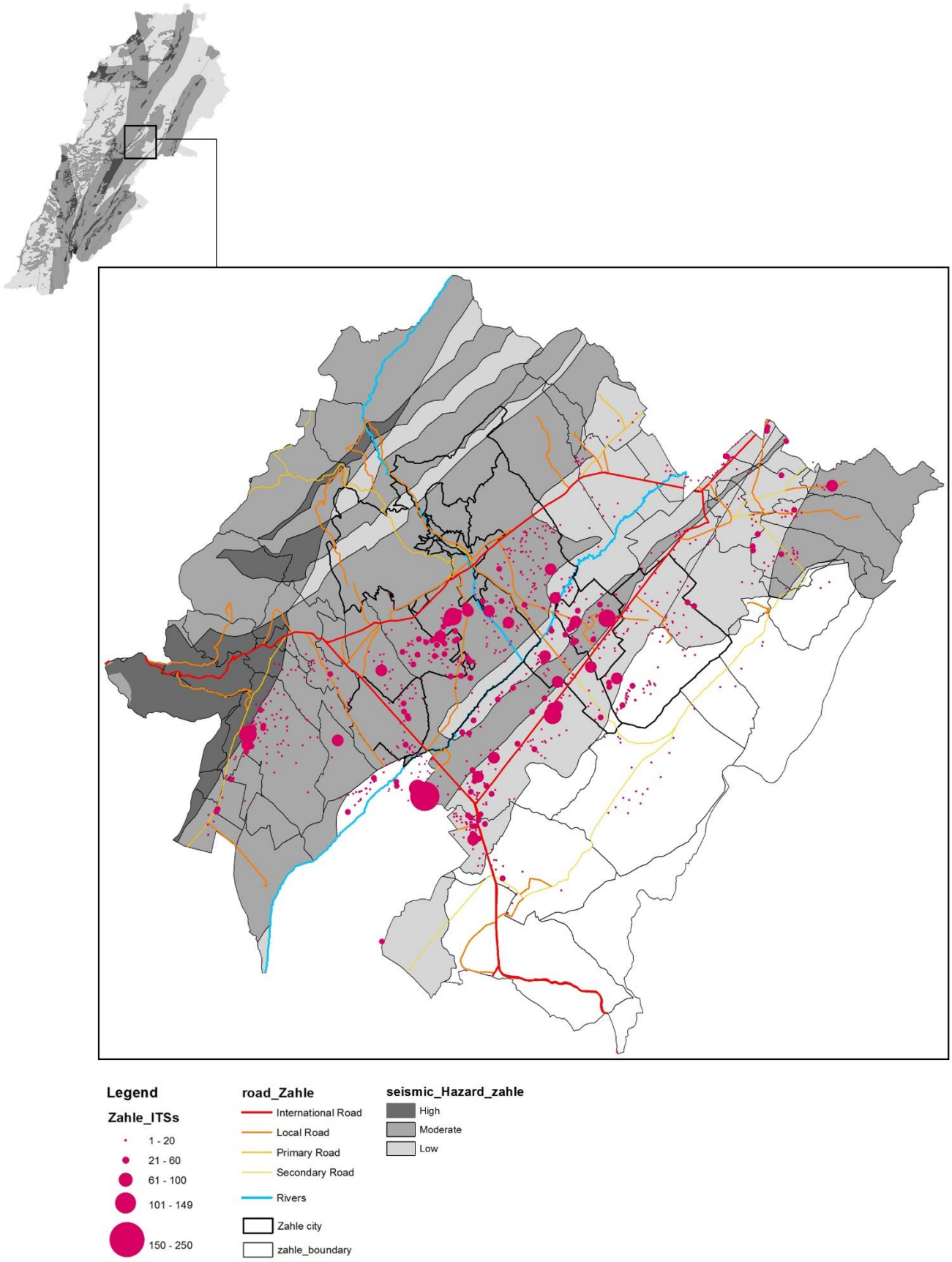


Figure 5: Informal tented settlements that are prone to seismic hazards in Zahleh District (Source: SDATL. Adapted by Author. Date: November 2018)

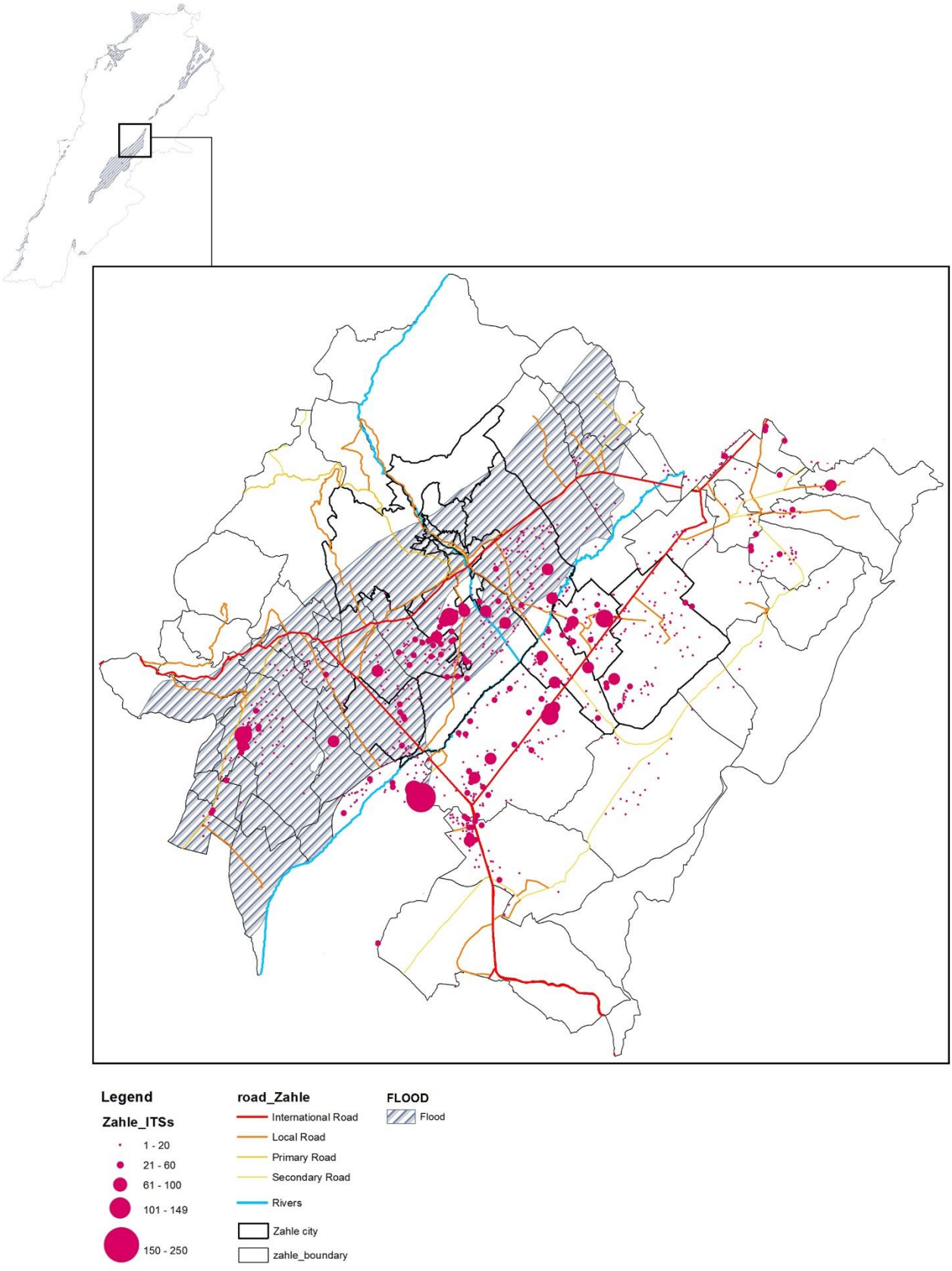


Figure 6: Informal tented settlements that are prone to flood risks in Zahleh District (Source: SDATL. Adapted by Author. Date: November 2018)

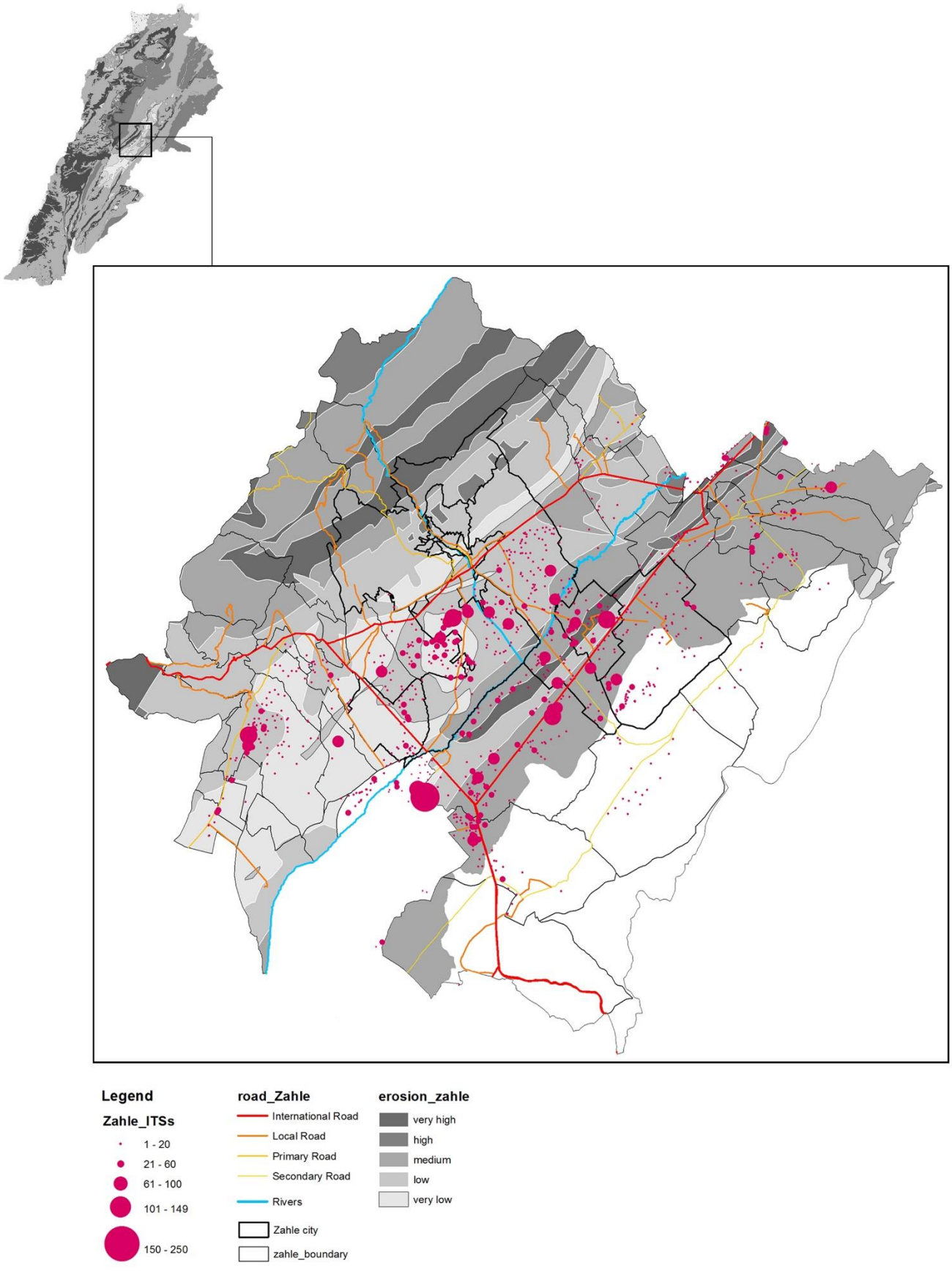


Figure 7: Informal tented settlements that are prone to erosion risks in Zahleh District (Source: SDATL. Adapted by Author. Date: November 2018)

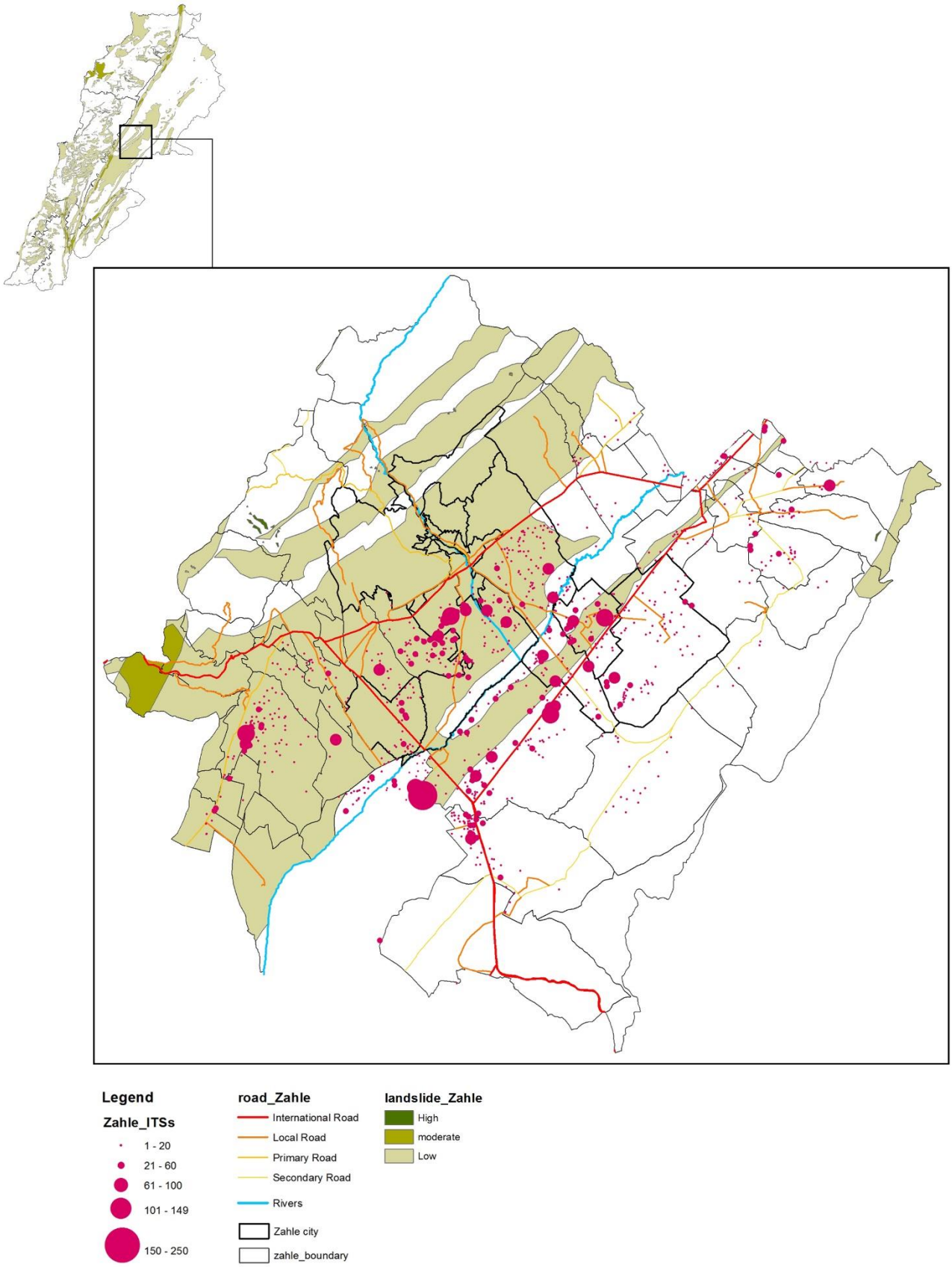


Figure 8: Informal tented settlements that are prone to landslide hazards in Zahleh District (Source: SDATL. Adapted by Author. Date: November 2018)

4. Understanding the Social Organization in ITSs

Syrian workers that lived in their tents on agricultural lands prior to the war often became the shaweesh of the ITSs. The term shaweesh was used in Lebanon to refer to men managing foreign labour. But after the establishment of informal tented settlements, the shaweesh became the supervisor and decision-maker of the settlement (Mawad, UNHCR, 2018). ITSs are managed by shaweeshes who act as mediators between refugees, NGOs and the UN agencies. The shaweesh is responsible for monitoring and reporting the number of refugees to local Lebanese authorities (UNDP, 2017, p.23). They collect rent and take a cut on them and are responsible for shelters and the distribution of aid to the tents (UNDP, 2017, p.21). The shaweesh usually lease the agricultural land, where ITSs are currently set up, from the landlord for a period of time. They "used to be the link between farm operators and the casual farm workers" (UNDP, 2017, p.21). In this light, and since the shaweesh are responsible for employment and shelter in ITSs, this created a patronage relationship that exist between them and dwellers which often facilitates exploitation of the refugees (UNDP, 2017, p.21). Landlords usually "get a good deal with minimum management obligations, as management is centralized with the Shawish, who rents the plot and then sets the rate for each tent, offers services at his discretion, and potentially imposes additional fees on tenants" (UNDP, 2017, p.21).

In addition, a number of religious and non-religious NGOs are working in Zahleh to provide social, medical, religious, cultural and educational services mostly to Syrian refugees such as the Catholic Church and Caritas, Dar el-Sadaka and Dar el-Fatwa. Other International

NGOs operate in Zahleh as well, such as Mercy Corps, Solidarite International, NRC, and Save the Children (Inter-Agency Information Management Unit, 2016).

5. The Municipality of Zahleh – Position vis-à-vis Refugees

The Governor of the Bekaa issued a number of circulars demanding from all municipalities to keep a census of refugees and not to give birth certificates or shelter agreements to those who are not registered with the municipality. Furthermore, the governor issued a circular in 2016, prohibiting the establishment of additional informal tented settlements and prohibiting circulation between existing settlements (see annex 1) (UNDP, 2017, p.9). The municipality of Zahleh welcomed the decision and implemented it aggressively. It went further introducing, as of 2017, restrictions on Syrian refugees including evening curfews to limit their movement, and evictions from rental houses and informal tented settlements. Additionally, the municipal police carry out regular raids in ITSs in an effort to arrest individuals who do not have legal residency permits.

The evictions are not limited to ITSs, but also extend to rented homes, justifying interventions by infractions to the buildings code and/or noise complaints. Furthermore, the municipality of Zahleh has referred to the Lebanese law ensuring all rentals to Syrian are done through contracts and for the landlords to commit to pay the municipal taxes of 6.5% in case Syrians do not. In ITSs, the Zahleh municipality levies additional charges on landowners as it argues they need to pay for the costs of solid waste management. When landowners do not comply, evictions follow.

The legacy of a strained relationship as a result of the Syrian tutelage during Lebanon's civil war is likely a powerful influence on the current anti-Syrian sentiment in

Zahleh. The response of the Zahleh municipality is aligned with the Lebanese government and opts to not deal with the refugees and leave things in the hands of humanitarian agencies. Refugees were depicted as a burden on the municipal infrastructure and an added cost, with very little benefits.

Representatives from MoSA and the mayor of the municipality of Zahleh stated that INGOs rarely consult with them on their projects, although UNHCR and UNICEF had urged all humanitarian actors in Zahleh not to bypass the municipality and to operate with their approval. This was difficult to implement given the new municipality (elected in 2016) did not want to be engaged with any matter related to the Syrian crisis. The mayor of Zahleh expressed that "the municipality wishes to serve its community while NGOs are here to serve their funders and, sometimes, the Syrians… These are not our priorities, and not the job of a municipality"[11]. Indeed, the mayor of Zahleh refused to cooperate and dealt with Syrian refugees through the municipal police, increasing their numbers as to allow them to control getting refugees in the city, and report to the Ministry of Interior and Municipalities. This generated strained relationships and weak coordination mechanisms between the international humanitarian actors and local authorities in Zahleh.

6. Humanitarian Agencies and Services

Many humanitarian agencies established their offices in Zahleh between 2011 and 2012 to assist Syrian refugees. The mandated agency for refugee protection, UNHCR, assists and coordinates with the government in all refugee response with support from the Humanitarian Country Team (HCT), and lead partners in the following sectors: shelter,

[11] Interview with Assad Zogheib, Mayor of Zahle; July 2017

protection, distribution of Non-Food Items and Social Cohesion, WASH (Water, sanitation and hygiene), and Education and Health (United Nations, 2013, p. 35). "UNICEF (the co-chair of the Child Protection Working Group with MoSA), WHO and UNDP respectively co-lead in the WASH and Education, Health and Social Cohesion responses" (United Nations, 2013, p. 35).

UNICEF organizes monthly inter-agency coordination meetings that include all UN agencies and partner NGOs. During these meetings, and to prevent duplication and conflicts, responsibilities are divided geographically among partners using the Inter–Agency Mapping Project (IAMP) which is updated every month by MEDAIR[12].

Solidarité International[13] started working in Zahleh in June 2016 in Haouch el Omara (3 ITSs), Haouch el Omara Aradi (90 ITSs), Terbol (80 ITSs), Dalhamiye (60 ITSs), and Taanayel (32 ITSs). Whereas Mercy Corps manages Maalaqa and Zahleh Aradi (Figure 9).

Along with food and shelter, UNICEF requested Solidarités International to be responsible of the WASH sector in Zahleh when Save the Children[14], which was previously

[12] MEDAIR was founded in 1989 in Switzerland to provide emergency relief in conflict and disaster areas. This international non-governmental organization's recovery services include Health and Nutrition; Water, Sanitation, and Hygiene; and Shelter and Infrastructure.

[13] SOLIDARITÉS INTERNATIONAL is a humanitarian NGO which focused its work in countries affected by war and natural disasters on two sectors: WASH and food and shelter. In Lebanon, SOLIDARITÉS INTERNATIONAL has been involved in the humanitarian response to the Syrian crisis since late 2012 in the North (Akkar) and the West (Bekaa) of the country.

[14] Save the Children has been working in Lebanon since 1953 and transitioned to Save the Children International in 2012. This INGO works with UN agencies, other INGOs, government departments, including education and social affairs to help support Lebanon's institutions and enable them to better assist the refugee populations and

managing this sector, faced cuts in fund from their donors in 2016. UNICEF chose to work with SI since both organizations have previously worked together in Akkar where they were partners for five years. UNICEF, Mercy Corps[15] and SI try to coordinate with Zahleh Water Establishment to implement and fund projects listed in the master plan for the water sector of the Bekaa designed by the Water Establishment whenever funds are available[16].

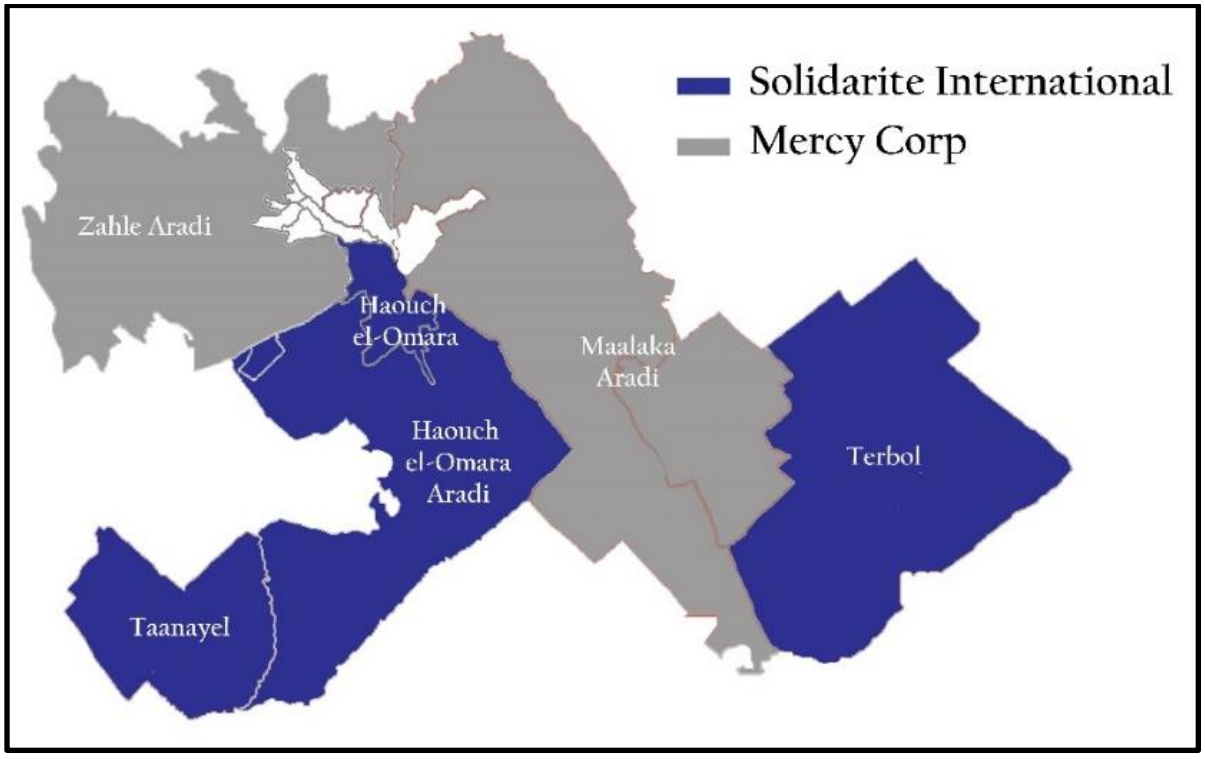


Figure 9: Distribution of humanitarian agencies covering the WASH sector in Zahleh (Source: Author).

host communities alike. They work in Shelter, Education, Child Protection, Food Security and Livelihood, and Child Rights Governance programmes.

[15] Mercy Corps has worked in Lebanon since 1993 and focused on promoting economic development by implementing community development programs, while at the same time, this global non-governmental humanitarian aid organization has responded to emergencies as they occur in the country. After the influx of Syrian refugees in 2011, Mercy Corps shifted its focus to integrate emergency response programming in the following sectors: Child and Youth Protection, WASH, Local Governance and Conflict Mitigation, Agriculture, Livelihoods and Economic Development, and Food Security.

[16] Interview with the Water Sector Field Coordinator at UNICEF in April 2018.

Chapter III

THE WASTEWATER SYSTEM AND OTHER SERVICES

I begin this chapter by introducing the wastewater system in Lebanon and Zahleh prior to the Syrian crisis. I then move to locate these services, and more specifically the wastewater service delivery, in relation to informality by profiling the different actors involved in service delivery. Finally, I examine the ten studied ITSs by documenting basic information and data related to wastewater services in each camp.

A. General Overview

1. Wastewater Services in Lebanon and Zahleh Prior to the Syrian Crisis

During the civil war (1975-1990), the lack of institutional control of public authorities led to a direct discharge of untreated domestic wastewater into the sea, and subsequently to a massive environmental hazard. (Karaa et.al; 2005). After the war, the government undertook actions to rehabilitate the existing wastewater collection and disposal systems such as constructing new sewage treatment plants, in order to reduce the pollution of the sea and the groundwater (Karaa et.al; 2005).

The first national master plan for wastewater collection and treatment in Lebanon was developed by Khatib &Alami (K&A) for the Council for Development and Reconstruction (CDR) in 1982 and funded by UNDP and WHO. Regarding recommendations for the Bekaa, the master plan proposed at that time to collect and treat wastewater generated by larger cities "such as Zahleh, Baalbeck, Joub Janine, Hermel, Rachaya, Aarsal and the environmentally critical area around the Qaraoun lake perimeter", and to implement 14 wastewater treatment

plants. In 1994, Dar Al Handasah-Taleb & Partners developed a comprehensive master plan for the Bekaa suggesting WWTPs that would serve all its population. However, this plan was not implemented because it required the availability of lands which was difficult to provide (KREDO s.a.l, 2015).

The first regulation against pollution was adopted in 1974 by Decree No. 8735 and "prohibited the digging of wells for the disposal of raw sewage, banned infiltration from septic tanks, and the use of sewage for the irrigation of vegetables and some fruit trees" (Karaa et.al, 2005). In 2001, the government issued standard measures regarding the discharge of wastewater into water bodies without developing the requirements for treated wastewater (Karaa et.al, 2005).

In 2012, the master plan developed for the Ministry of Energy and Water (MoEW) developed a policy paper for the National Strategy for the Water Sector which was approved by the Council of Ministers. This strategy proposes the following measures:

> "(i) Developing wastewater infrastructure to increase coverage of collection networks and treatment capacities, optimizing treatment processes and sludge disposal, and ensuring reuse where possible; (ii) Improving wastewater management by implementing an institutional and business model for wastewater collection, treatment and reuse; and (iii) Environmental protection by promoting and improving water quality management, and protection of recharge zones" (The World Bank, 2012).

In 2014, a business plan developed by the Ministry of Environment for combatting the pollution of the Qaraoun Lake estimated that, in the villages near the

Litani basin, the wastewater generated by refugees have ranged between 12 to 19 percent of the total amount of municipal wastewater generated in the Litani basin prior to the Syrian conflict (The Lebanese Ministry of Environment, the European Union & UNDP, 2014). Prior to the operation of Zahleh WWTP, the incremental quantity of the aforementioned WW was untreated when discharged in the Litani River and in open lands leading to massive environmental degradation (The Lebanese Ministry of Environment, the European Union & UNDP, 2014). Accordingly, WW discharges has impacted the water quality (which negatively affected fish and wildlife populations), agricultural crops, and decreased proper sanitation and hygiene among refugees which subsequently led to the emergence of communicable and previously absent diseases.

The pollution also increased as WW discharges are estimated to produce around additional 34% of the biological oxygen demand (BOD) load at the national level (The Lebanese Ministry of Environment, the European Union & UNDP, 2014, p.6). In the wake of the Syrian crisis, the Ministry of Energy and Water (MoEW) "estimated that more than two thirds of all resources received through appeals since 2015 have been spent on water trucking, latrine construction and desludging for families displaced from Syria living in temporary shelters and informal settlements" (LCRP, 2018). The assessment report conducted by the Lebanese Ministry of Environment, the European Union & UNDP in 2014 set several mitigation measures to combat the impact of the Syrian crisis on the environment. The proposed short-term mitigation measures consisted of transferring sludge and wastewater to the closest operating WWTP, in addition to providing municipalities suffering

from the large presence of Syrians with "tankers for de-sludging and trucks for cleaning and maintaining sewer lines operational" (The Lebanese Ministry of Environment, the European Union & UNDP; 2014, p.67). Whereas medium to long-term mitigation measures focus on installing wastewater treatment plants by accelerating implementation of already planned facilities and financing their operation and maintenance when constructed.

2. Zahleh Wastewater Treatment Plant

Lebanon generates 250 million m3/year of urban wastewater and 60 million of industrial wastewater which are not treated and are discharged along with urban wastewater into watercourses or unsafely used in agriculture. Although 60% of the population are connected to wastewater collection networks, only 8 percent is treated and connected to operational wastewater treatment plants (Salman et.al, 2016).

90% of the housing units in Zahleh are connected to a sewage network (Figure 9) where domestic wastewater is collected and discharged without treatment in the Berdaouni River (CDR; 2015). The Ministry of Environment and Water (MoEW) issued in 1994 a wastewater Master Plan which consists of constructing 54 wastewater treatment plants of which only few are operating (Ghadir and Saida), five (Tripoli, Chekka, Batroun, Jbeil and Nabi Younes) lack a sewage network and others have not been funded (Salman et.al; 2016). Zahleh wastewater treatment plant (WWTP), which was put in service in late 2017, is located 4 km south of Zahleh near the Litani River on a plot of land currently owned by Zahleh Municipality (CDR, 2015). The municipality of Zahleh is responsible for managing the plant and issuing authorization to NGOs to discharge wastewater collected in ITSs in the plant[17].

[17] Interview with the HP CM Activity Manager at Solidarite International (SI), April 2018

In addition to the municipality of Zahleh, the main governmental institutions that play a role in operating the plant include the Council for Development and Reconstruction (CDR), the Ministry of Energy and Water (MoEW), the Bekaa Water Establishment (BWE), the Ministry of Public Works and Transport (MoPWT), and Ministry of Environment (MoE) (CDR, 2015).

Zahleh wastewater treatment plant (Figure 10) was constructed to alleviate the impact of municipal and industrial wastewater on the Litani and the Qaraoun Lake which consists the main source for irrigation and potable water supply, and generates electricity in several hydropower plants in nearby cities (CDR, 2015).

This plant, which was funded by the Italian Protocol and became operational in late 2017, connected Zahleh and neighboring villages through 109 Km of sewer networks, and rehabilitated part of the old network. It was expected to serve about 214,000 people in 2015 and 300,000 in 2030. The sludge resulting from the plant is discharged in the municipal solid waste landfill located near the WWT plant. In 2019, the treated wastewater and the sludge from the plant will be repurposed for agricultural uses in Zahleh Valley (CDR; 2015). However, allegedly, Mrs. Khalil discussed in Al-Akhbar newspaper that as of April 2018, 35% of sewage sludge produced during the sewage treatment were discharged without treatment in the Litani River[18].

[18] When the construction of the plant started 16 years ago, the CDR and the municipality of Zahle had agreed to bury the sludge resulting in the treatment station in exchange of money. However, the current mayor of Zahle, Assad Zogheib, rejected this agreement and refused to dump the resulting sludge when the station operated last year, claiming that there's a "pressure on the landfill". Accordingly, the CDR is currently preparing a contract with a private waste recycling company to transfer the sludge from Zahle to be buried in an old crushing plant in Nabatieh, without having the approval of its mayor (Khalil, 2018).

The average person generates 135 liters of wastewater per day (Water Technology Engineering Ltd., 2018). The 23,000 Syrian refugees in Zahleh ITSs thus produce 2760 m3/day of wastewater. Zahleh wastewater treatment plant can accommodate up to 35,000 m^3/day of WW, and currently between 15,000 and 17,000 m^3 of WW is drained to the plant every day (generated by the 220,000 residents of Zahleh (CDR, 2015)).

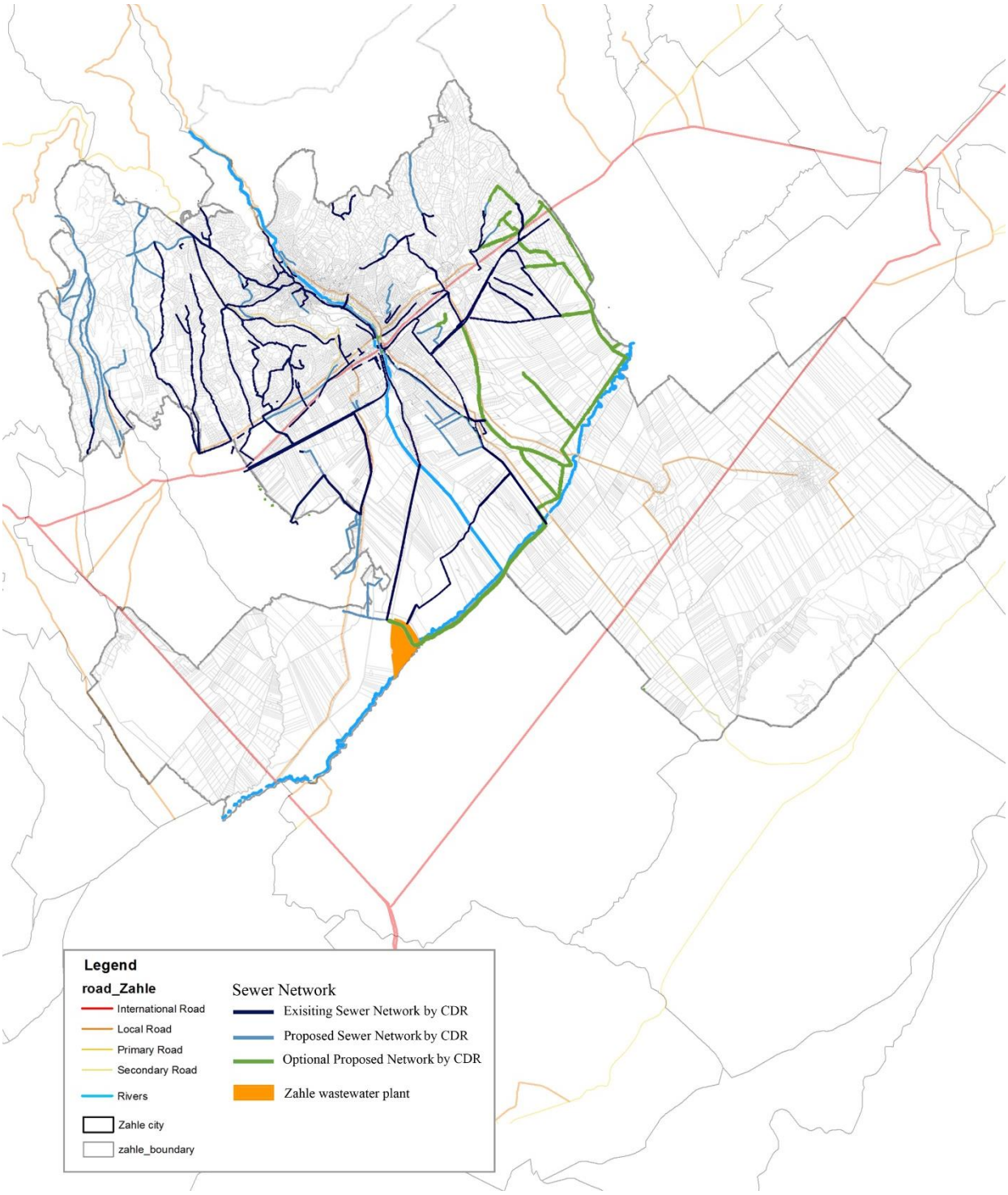


Figure 10: Project conducted by CDR consisting of expanding the sewer network to Zahleh wastewater treatment plant (Source: CDR. Modified by Author)

B. Locating Zahleh ITSs within Patterns of Informality

This section provides examples of the formal and informal practices happening in Zahleh's wastewater management in order to assess the hybridity extent of the service. It closes with an analysis of sanitation as provided in ten ITSs.

1. Sanitation Services Provided in Zahleh ITSs

The absence of national policy frameworks, the unwillingness of the municipality of Zahleh to provide sanitation services for displaced Syrians and to engage with humanitarian agencies to support refugees, and the protracted nature of the crisis has pushed state and non-state actors to elaborate interventions to meet the immediate needs of Syrian refugees, hence creating a hybrid system of service provision (Figure 11).

Zahleh ITSs lie on agricultural lands outside the coverage of formal municipal infrastructure services. Since the municipality is only intervening in waste collection services, a wide spectrum of informal practices has emerged in most of Zahleh ITSs to cope with service deficiencies (electricity, water and wastewater). These alternative practices are managed by both humanitarian agencies, landlords, and the shaweesh, in the domain of electricity, water and sanitation services. Landlords are providing electricity for tents by hooking to the network of the private electricity company (EDZ).

INGOs intervene in supporting access to water and wastewater. UNICEF, with the support of Mercy Corps and Solidarités International (SI), supply Zahleh's ITSs with these services. Regarding non-potable water provision, some ITSs have individual tanks for each tent, others have collective tanks, and still others have wells. In the ITSs with individual and collective tanks, these were distributed by UNICEF and Save the Children. In one ITS (020),

the landlord provided individual tanks for most Syrians. In addition to hygiene kits, this landlord provided pump and filter for the well in the land as well.

In spring and summer, ITSs which rely on wells experience draught, and dwellers have to purchase non-potable water from private providers they know through their own social networks (at the cost of 50,000LL/month). More rarely, NGOs send private providers to fill the tanks.

For potable water, ITSs with 2 tanks/tent purchase mineral water from water trucks and they pay also 50,000LL/month for 1,000 liters. Those with no tank for mineral water purchase bottled water from minimarkets once or twice a week. One ITS (019) have one common tank (2,000 liters) which is filled twice a week by Qatar INGO. Dwellers in camp 098 said they drink water from their non-potable water tank when they lack money to purchase bottled water.

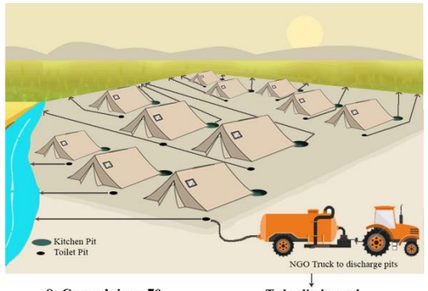
I will describe the wastewater services in details in the following section when profiling the 10 ITSs studied in Zahleh.

2. Wastewater Systems in the 10 ITSs

I undertook 25 individual and group interviews with refugees in these 10 ITSs and traced the way they have managed to gain access to sanitation services. Figure 11 shows the different findings that I documented on the camp's date of establishment, location, distance from the Zahleh-Baalbek highway, number of tents in each camp, camp management (shaweesh/no shaweesh, landowner, NGOs), as well as data on wastewater services.

TYPE 1: Camps with 2 PITS (kitchen+toilet)

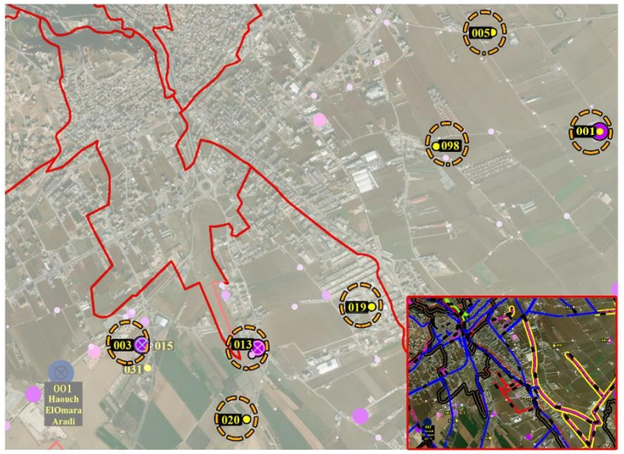
TYPE 1A: 6 camps
Toilet pits are not regularly discharged by NGOs



8<Camps' sizes<70

To be discharged by NGOs

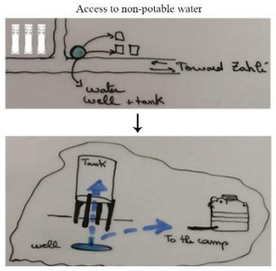
- SI: 4 Camps (020-003 001 Zahle Aradi 013)
- NRC: 1Camp (019)
- Mercy Corps: 2 Camps (098-005)



TYPE 1B: 1 camp

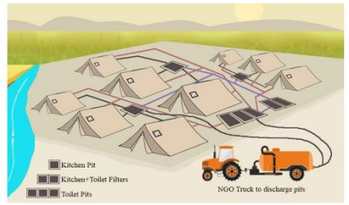
The "5 Stars Camp"
Toilet & Kitchen pits are discharged regularly (every month) by Solidarite International (SI)

Access to non-potable water

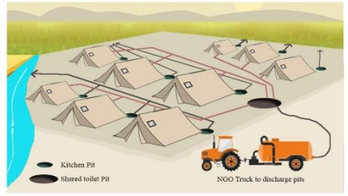


TYPE 2: Shared Pits

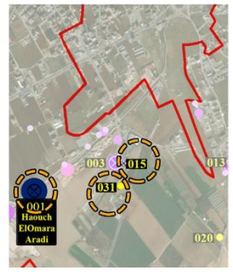
TYPE 2A - Camp 015

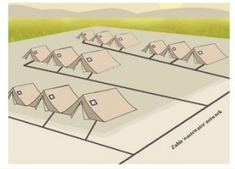


TYPE 2B - Camp 031



TYPE 3: Connected to Public Sewage Network





Kitchen Pits + Toilet pits + Pipes

Kitchen Pits

Underground pipes

	Camp nb	Camp 020	Camp 019	Camp 003	Camp 098	Camp 005	Camp 001 Zahle Aradi Workers Camp	Camp 013 'Saker Camp'	Camp 015	Camp 031	Camp 001 Haouch el-Omara Aradi
Camps' Info	Location	South the City Center and 1.46 km away from the highway	South-East the City Center and 1.35 km away from the highway in the industrial area	South-West the City Center and 0.27 km away from the highway	South-East the City Center and 1.75 km away from the highway	South-East the City Center and 1.04 km away from the highway	South-East the City Center and 2.23 km away from the highway	South the City Center and 1.06 km away from the highway	South-West the City Center and 0.21 km away from the highway	South-West the City Center and 1.04 km away from the highway	South-West the City Center and 0.03 km away from the highway
	Distance from sewer network	12 meter	23 meter	12 meter	44 meter	3 meter	100 meter	12 meter	20 meter	16 meter	45 meter
	Nb of tents	3 (2010)/Approx. 30 now	40	Approx. 8	13	21	70	50	9	47	Approx. 120
	Date of establishment	2010	2011	2011	2011	2011	2003	Probably in 2013	1993	Before 2011	2000
	Shaweesh	Yes	Yes + Wife	No	Yes	Yes +Wife	Yes	Yes	Yes + wife	Yes	Yes
	Landownership	Youssef el-Kallas	Ghassan Abou Naoum	Louis Abd el-Ahad	Fouad Iskandar	Elie Sayda + Hani Jaafar	Elias Skaff	Milad Saker	George Ghossein	Chafic Boulos	Abdo Skaff
	NGO	Solidarite International	NRC	Solidarite International	Mercy Corps	Mercy Corps	Solidarite International	Solidarite International	Solidarite International	Solidarite International	NRC
Wastewater		Impact on Envir: Very High Frqcy of Discharge: Iregular	Impact on Envir: Very High Frqcy of Discharge: Iregular	Impact on Envir: Very High Frqcy of Discharge: Iregular	Impact on Envir: Very High Frqcy of Discharge: Iregular	Impact on Envir: Very High Frqcy of Discharge: Irregular	Impact on Envir: Limited Frqcy of Discharge: Regular	Impact on Envir: Limited Impact Frqcy of Discharge: Regular	Impact on Envir: Limited Frqcy of Discharge: Regular	Impact on Envir: Limted Frqcy of Discharge: Regular	Impact on Envir: Limited Impact Frqcy of Discharge: Regular
Kitchen Pits	Who dug them?	Previously by ICRC/LRC Currently Self	Previously by ICRC/LRC Currently Self	Self + Solidarite International	Self	Self	Self	Medair	Solidarite International	Previously Save the Children Currently Self + SI	NRC connected them to Zahle Sewage Network
	Who discharges them?	Self - in water streams & Agricultural land	Self - in water streams	Self - in water streams	Self - in water streams	Self - in water streams & Agricultural land	Self - in Al-Faida river	Solidarite International	Solidarite International	Self - in water streams	N/A
	Frequency of Discharge	Everyday & multiple times a day	Everyday & multiple times a day	Everyday & multiple times a day	Everyday & multiple times a day	Everyday & multiple times a day	Everyday & multiple times a day	Every month	Every month	Everyday & multiple times a day	N/A
Toilet Pits	Who dug them?	ICRC/LRC	Previously by ICRC/LRC Currently Self	Self + Solidarite International	Previously Mercy Corps Currently Self	Previously Mercy Corps Currently Self	Self	Medair	Solidarite International	Previously Save the Children Currently Self + SI	NRC connected them to Zahle Sewage Network
	Who discharges them?	Solidarite International & Self using buckets	NRC	Solidarite International N.B: Syrians dig up new ones when they are full	Mercy Corps	Self N.B: Should be Mercy Corps	Solidarite International	Solidarite International	Solidarite International	Solidarite International	N/A
	Frequency of Discharge	Every couple of months N.B: they should come every month	Every couple of months Pits are fully filled every 6-7 months	Every couple of months N.B: they should come every month	Every couple of months N.B: they should come every month	2 times a week Discharged into Agricultural land	Every month	Every month	Every month	Every month	N/A

Figure 11: A sheet showing the data collected for the three types of wastewater septic tanks of the 10 visited camps in Zahleh (Source: Author)

Interestingly, all 10 ITSs predate the 2011 crisis and they have no permanent WW networks, except in two, Camp 015 and Camp 001 Haouch el-Oumara Aradi (Figure 12):

Camp 015 is an old camp. It was established in 1993 and it houses 9 tents. The camp did not increase in size after the beginning of the war. It has four shared kitchen septic tanks, three toilet septic tanks, and two filters (for wastewater) equipped with pipes. Pipes are installed by Solidarite International and are covered in concrete. This camp is 20 m away from the existing sewer lines.

Camp 001 Haouch el-Oumara Aradi is an old camp as well, established in 2000 and includes approximately 120 tents. It grew much larger than its pre-war size. It is the only camp among the case studies that is connected to Zahleh public sewage network. Though this camp is 45 meters away from it, NRC connected it to the network in 2016. However, the camp is not connected to the public water network: the tents have individual tanks which are filled by water trucks.

As for the other eight camps (Figure 12), and because landowners do not want to build a sewage network on their fertile agricultural lands, the camps have established their own WW systems using two methods: either providing each tent with two pits, one for the kitchen water and one for sewage, or providing shared pits for a group of 4-5 tents. Toilet pits are either emptied by the community (Syrians) or by INGOs. Most kitchen pits go to water streams.

I identified three types of wastewater systems which I use to classify the ITSs: a) ITSs with Two Wastewater Pits per Tent (Type 1); b) ITSs with Shared Wastewater Pits (Type 2); and c) ITSs directly connected to the network.

a. ITSs with Two Wastewater Pits per Tent (Type 1)

There are 7 ITSs with 2 wastewater pits for each tent, all established prior to the war in Syria. Zahleh agricultural lands were farms employing seasonal migrant workers from Syria that lived in tents on the land (Approx. 3-4 tents). Sizes range between 8 and 70 tents. In two of them, a female shaweesh, who is the wife of the shaweesh, manages the camp's affairs.

In these ITSs, each tent has two wastewater pits: one for black water (toilet) and one for grey water (kichen). Both have been dug by either NGOs, the International Committee of the Red Cross (ICRC), or the Syrians themselves who channel the wastewater to the closest water stream or to the nearby river directly, causing major pollution and contamination.

Refugees discharge kitchen pits regularly, through self-help unassisted processes. Toilet pits are dislodged irregularly (every couple of months) by the suppliers hired by INGOs. Only in the workers camp (001), toilet pits are dislodged regularly every month by the suppliers hired by Solidarite International. In cases when suppliers do not follow the regularly schedule and the pit overflows, refugees either discharge wastewater in water streams or agricultural areas, or they dig new pits.

The last ITS in this category stands out in its better more regular servicing which made refugees refer to it as the "5 stars camp". The Saker camp has 50 tents, and was established prior to 2011. It has access to water through a collective water tank, which distributes water, through pipes, to individual tanks for each tent. The Saker family owns private water trucks which they park near the camp.

As for kitchen and toilet pits, these were dug by the INGO Medair and are discharged monthly by suppliers of Solidarité International. It is the only camp I visited where there is no sewage smell. This camp is 12 meters away from the public sewer network.

Solidarité International uses two suppliers for water and wastewater services. One of them lives in the Saker camp which may explain the regular dislodging of toilet and kitchen pits.

Looking into the reasons behind the better service supply in the Saker camp, it seems that the land where the camp is established is owned by Mr. Milad Saker who is well connected. I was told he is an officer in the army who has very good relations to the UNHCR, NGOs and the municipality of Zahleh. For instance, despite the municipal request for camps not to be located 2 km away of the main road, Saker camp is on the main road.

In addition, every month, the municipal police of Zahleh and the Lebanese army conduct patrols in Zahleh camps to ensure refugees' legal status. Since Milad Saker is an officer in the army, the police and the army do not go into the Saker camp. This disparity between the Saker camp and other camps in Zahleh is translated as well in the relationship between the shaweesh of the Saker camp and camp dwellers. I noticed from my visits that the tent in which the shaweesh lives is well supplied with two LCD TV, a washing machine, a tiled toilet space, etc. This is not the case of other tents in the camp.

b. ITSs with Shared Wastewater Pits (Type 2)

There are two ITSs with shared wastewater pits (015 and 031) established prior to the crisis. Their sizes are 9 tents (camp 015) and 47 tents (camp 031).

In the first camp 015, dwellers have been living and working in the land since 1993. Solidarité International managed to convince the landowner to implement a septic tank sewage system to protect the agricultural area and the water stream next to the ITS (though it is 20 meters away from the public sewer network). The septic tank consists of three compartments ranging between 3,000 liters and 6,000 liters. It has a manhole that facilitate cleaning and a filter that reduce the escape of solids into the soak way. Tents are connected to the manhole. Black water enters the first compartment of the tank, allowing solids to scum and scum to float. The liquid component flows from one compartment into another carrying a small part of solids and drains into the filter which consists of gravels. This same model is applied on grey water.

In this ITS, Solidarité built:

- 1 collective kitchen pit for each two or three tents (a total of 3 or 4 kitchen pits for 9 tents)
- 3 toilet pits connected through underground pipes to the tents
- Two filter pits for kitchen and toilet pits.

Suppliers of Solidarite International come every month to discharge both kitchen and toilet pits. According to the HP CM Activity manager of Solidarité International, this model worked better in the North (Akkar), since in most places in Zaheh, the water table is high which causes its penetration in the drain field and the leach of waste above the ground. In this case, Solidarité International are committed to dislodging septic tanks more frequently.

As for camp 031, the landlady agreed to build a shared toilet pit for the whole camp to avoid discharging black water (from toilets) to her agricultural land. This camp

is 16 meters away from the public sewer network. Camp dwellers built this shared pit which is not technically well-built compared to other toilet pits built by NGOs. Informal suppliers hired by Solidarité International come every month to discharge the shared toilet pit. Gray water is discharged everyday by Syrians in the agricultural land, as it doesn't lead to fecal contamination.

To engage refugees in the policy-making process, UNICEF and INGOs established focal points in several ITSs in the form of committees[19] responsible for coordinating with dwellers of ITSs. For every 10-15 ITSs, these committees consist of 5-6 members (mainly men) of camp dwellers who mostly work voluntarily. Committee members are responsible for hygiene, maintenance and technical functions of basic services, such as wastewater pits. They receive training sessions and maintenance toolkits from NGOs.

c. Wastewater Connected to the sewage network of Zahleh (Type 3):

Camp 001 Haouch el-Oumara Aradi (Allawi camp) is the only informal tented settlement among the 10 surveyed ITSs that is connected to the Zahleh sewage network. Dwellers used to live and work in agriculture in this ITS since 1976. By 2000, 45 tents were established, and currently, the Allawi camp houses 120 tents. All the 120 families have at least one member (mainly women) working in farming and harvesting. They work

[19] An Interview with the HP CM Activity manager of Solidarité International in May 2018 showed that early in 2018, UNICEF brought forward in one of the meetings with its partners a suggestion to set direct contact between NGOs and community mobilisers, who would be paid $3/hour for 55 hours/month, and who would perform as focal points that connect NGOs and committees, as an alternative to the direct liaison already in place between NGOs and committees in camps. As such, community mobilizers, who are expected to be literate, would be responsible to report and monitor all details regarding the WASH sector in several camps. Solidarité International turned down this proposal and required the work to be done through committees only in order for it to be sustainable, considering the current financial shortage which might cause the suspension of work at any moment, and hence the NGOs would not have the resources needed to fund this project and pay community mobilizers.

in exchange of rent and they get paid 10,000 LBP/day which are distributed by the shaweesh who receives the money every month from the landowner. Dwellers of the Allawi camp perceive themselves as workers and not refugees as most of them used to live here prior to the crisis and they work in farming the land.

The land is owned by Mr. Emile Abdo Skaff who owns the Emile Abdo Skaff & Sons sarl company which is a grower and wholesaler of fruits and vegetables in Zahle. He is the cousin of the late Elias Skaff (a former minister of agriculture and head of the parliamentary Popular Bloc). The Skaff family owns around 10,000 donoum of agricultural lands in Zahleh of which 1,200 is used to grow grapes, 3,000 for potato and 5,000 for wheat.

In 2016, Mr. Emile Abdo Skaff approved the project proposed by NRC[20] to connect the Allawi camp to Zahleh sewage network since dwellers are expected to still be working in the land even after the Syrian war comes to an end. In addition, Mr. Skaff intends to protect his agricultural land from wastewater generated by dwellers.

[20] The Norwegian Refugee Council (NRC) is an International Civil Society Organisation that has worked in Lebanon since 2006 and provided humanitarian aid to refugees from Syria, Palestine, and vulnerable Lebanese communities. It has offices in Beirut, Tyre, Tal Abbas and Zahle. NRC works in education, shelter, community management and coordination, water and sanitation, and information, counselling and legal assistance services.

3. Formal and Informal Practices of Wastewater Services in Zahleh

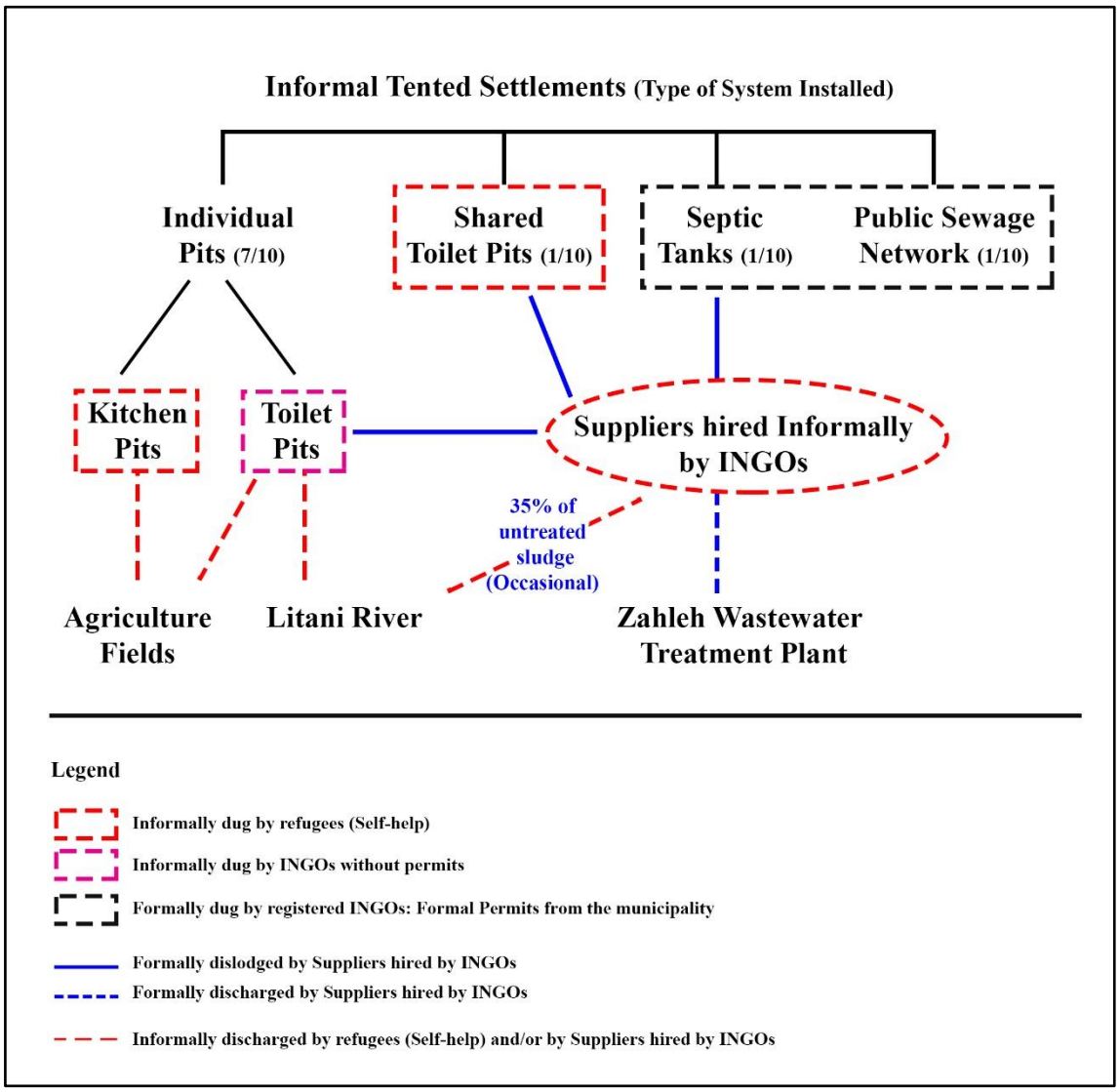


Figure 12: Hybrid system of formal and informal practices of wastewater service supply in Zahleh ITSs

(Source: Author)

The valley of Zahleh has been excluded from infrastructure developments largely because it does not fall within the jurisdiction of the more central and urbanized municipality. It is a challenge that the municipality of Zahleh is not willing to intervene in delivering electricity, water and wastewater services for Syrian refugees in ITSs. As I

will describe in this section, providing wastewater services in Zahleh ITSs is fragmented with a multitude of actors present (Figure 12).

From the start of the crisis, simple pits (shared and individual) were the predominant sewage system type in all ITSs settings. They are all dug by refugees themselves (self-help) without permits (Figure 12). When humanitarian organizations took over the management of ITSs, they adopted an interim wastewater management solution: NRC, Mercy Corps and Save the Children upgraded the existing pits by replacing them with plastic sewer tanks that could be removed later. However, as the crisis became protracted, some humanitarian organizations such as Solidarité International, shifted towards longer-term, sustainable WASH solutions, and provided refugees with shared and individual septic tanks[21].

In contrast, Lebanese residents in the agricultural and industrial areas had a sewer system installed and connected currently to the Zahleh treatment plant.

A mix of self-help/self-purchased and self-help installation of supplies provided by INGOs are used in simple pits system in ITSs.

In ITSs where there is no proper plumbing, humanitarian organizations provided refugees with around 11 shared latrines (every 15 persons share one latrine)[22]. Besides shared latrines, most refugees have installed private toilets in their tents and connected them to wastewater collection tanks, to private pits, and/or in rare cases to the wastewater public network.

Overall, the most commonly disposal method for wastewater was via transporting them by trucks to the Zahleh wastewater treatment plant. INGOS are required to transport

[21] Interview with the HP CM Activity Manager at Solidarite International (SI), April 2018
[22] Interview with the Water Sector Field Coordinator at UNICEF in April 2018.

the wastewater from the camps to the Zahleh Wastewater Treatment Plant. Prior to 2017, INGOs used to discharge wastewater in Joub Jennine Treatment Plant. This is required because of the risk of polluting the Litani River and the agricultural areas in Zahleh and the Bekaa valleys. Draining water into rivers and agricultural areas were also among the popular methods of disposal. In order to avoid the overflow of septic tanks or pits and the outbreak of diseases in cases where there is a delay in dislodging, refugees dig sewage canals that empty into rivers or agricultural areas.

Solidarite International and Mercy Corps have hired suppliers to collect wastewater from the shared wastewater storages and from private pits by tankers every 2-3 weeks[23]. Both INGOs have a GPS tracking system that tracks suppliers' trucks in order to make sure that the latter are dislodging pits from Zahle ITSs. Simultaneously, they have data assuring that SI and Mercy Corps are dislodging wastewater from ITSs on time. However, any failure in dislodging pits in camps is due to setback in management from suppliers[24].

Suppliers transport the sewer sludge to the Zahleh wastewater treatment station. Suppliers are usually Syrians residing in Zahleh ITSs, and they get selected through a bidding system operated by INGOs. The winning bid is chosen based on the following criteria: (1) number of trucks; (2) costs and wage per month; (3) work experience; (4) accessibility to the wastewater treatment stations.

These suppliers are informal as they not registered, and hence they are unlikely to be paying taxes. Even though they are required to dislodge wastewater from Zahleh ITSs

[23] In some cases, when pits are filled, refugees call the hotline of INGOs which send trucks to discharge these pits upon referrals. Interview with the HP CM Activity Manager at Solidarite International (SI) in April 2018.

[24] Interview with the HP CM Activity Manager at Solidarite International (SI) in April 2018.

and discharge them in the treatment plant, many suppliers discharge wastewater in the Litani River and some ITSs are found to have irregular frequency of dislodging (Figure 11 and 12).

These suppliers get permission from the municipality to discharge wastewater from ITSs in the Zahleh treatment plant in which they pay the municipality 11$/m3[25]. "As such, they function on the itinerant frontier between the formal and informal… for profit margins to remain outside of public scrutiny, it may be in the suppliers interest to remain outside the state's regulatory mechanisms" (Ahlers et.al, 2014).

The formal system for wastewater provision in Zahleh is thus limited to issuing permits to suppliers to discharge in the Zahleh treatment plant, in addition to giving approval to connect some ITSs to the sewage network. The HP CM Activity Manager at Solidarite International (SI) explained in an interview that NGOs need the approval of the municipality, the landlord and the shaweesh to implement a sanitation project in an informal tented settlement.

C. Conclusion

In the 10 cases, only one informal tented settlement (001 Haouch el-Oumara Aradi), which is located within a close range from the main sewer lines (3 meters), is connected to the underground sewerage network. Most of the ITSs have to rely on simple pits and septic tanks, provided and operated mainly by UNICEF, with the support of Mercy Corps and Solidarités International.

The ITSs that are doing the most harm for the environment are the ones that have pits (one or two) dug and dislodged either by INGOs or by Syrians, mainly because of the irregular dislodging. Only two camps, the Saker camp and camp 031, which house around

[25] Interview with the HP CM Activity Manager at Solidarite International (SI) in April 2018.

50 families, are less impactful on the environment due to the regular and timely frequency of pit dislodging. Only one out of the 10 ITSs is doing minimal impact on the environment since it has a wastewater system of septic tanks. The one camp that is not impacting the environment is camp 001 Haouch el-Oumara Aradi. Although this camp is considered as one of the biggest camps in Zahleh as it houses around 120 Syrian families, and it is 45 meters away from the sewer network, it is the only one among the 10 visited camps that is connected to the sewer network.

Moving forward to consider possible recommendations, it is important to analyze the options available for reducing the environmental harm caused by these ITSs while also improving the livelihood of their dwellers. To this end, I consider in the coming section the possible options (e.g. recognizing the informal system in place, and hooking up to the network) and look at the costs and benefits of each of these options in relation to the existing ad-hoc, informal system in place.

Chapter IV

URBAN POLICY RECOMMENDATIONS FOR A BETTER SANITATION SUPPLY TO SYRIAN REFUGEES IN ITSS

This thesis set out to answer three main questions (1) what are formal and informal mechanisms of access to sanitation services in the informal tented settlements of Zahleh? Who are the actors, what is the governance process, and what are the modalities and performance of this service, (2) how can the provision of wastewater services in Zahleh's refugee ITSs be improved to achieve more effective, equitable and sustainable systems of service provision? And (3) how has the influx of Syrian refugees impacted Zahleh's urban structure and infrastructure and especially its environment?

The thesis found that Informal Tented Settlements in the Zahleh area have set in place a hybrid system of service provision that responds to the dire needs of refugees. The system is "hybrid" in that it relies, as described in Chapter 5, on a combination of formal and informal arrangements between a reluctant local public authority, international organizations typically operating in "crisis/relief" mode, local entrepreneurs, refugees, and local landowners. Although far from perfect, it is undeniable that the system in place has managed to improve considerably the livelihoods of the refugees by setting in place a mode of handling sewage. The system has the additional advantage of creating employment for some of the refugees who are hired by INGOs to operate it. Yet, the informal system in place suffers from many shortcomings, the most prominent of which is dangerous environmental pollution that results from sewage seeping in the underground water table and the disposal of untreated sludge in the rivers. Based on these findings,

the thesis concludes with recommendations that highlight the importance of acknowledging the role played by the informal system while needing to mitigate their heavy environmental costs.

Before stating these recommendations, I discuss in the following section the advantages and disadvantages of a hybrid system of service provision by analyzing five case studies. I argue as well that failing to recognize informal practices of service provision leads to the failure of formal systems of service delivery.

A. Costs and Benefits of a Hybrid System of Service Provision

1. Impacts of the Formal and Informal Sanitation Provision in Today's Cities

Rapid population growth in most countries is frequently considered a reason behind the increased need for basic infrastructure in cities and more specifically in low-income and informal areas where "infrastructure development lags behind the population growth" (Schouten & R.W., 2010). Governments have a history in failing to provide development plans and effective municipal services in low-income areas (Schouten & R.W., 2010) mainly due to the high population density, and unplanned and crowded housing (World Bank, 2005). Non-state actors, such as non-governmental actors and community based organizations have stepped into the void left by the state and provided these areas with enhanced services (Schouten & R.W., 2010). In addition, this gap in meeting service demands are filled in unserved areas by informal small-scale service providers. These entrepreneurs are not usually authorized but are tolerated as they provide effective but temporary and short-term water and sanitation service solutions (World Bank, 2005). While they are present in many areas of the city, they are particularly available in informal settlements which are rarely connected to underground sewer networks due to the cost of connection and maintenance fees, in addition to the haphazard

layout of these areas which presents a challenge in implementing conventional sanitation systems (Schouten & R.W, 2010). Additionally, issues of legal land tenure and the possible imminent displacement of residents renders water and wastewater authorities more reluctant to "invest in areas where there are forthcoming land use changes" (Samsom, 2006 & Cheng, 2014). Most of these neighborhoods rely on non-state provision which is semi-formal or informal and it operates at the small scale. Non-state actors thus provide alternative sanitation solutions that are appropriate for such conditions.

The debate regarding 'non-state provision' has become part of the development discourse. There, the consensus shifted from recognizing informal service provision as alternative to state-led services to integrating it into state systems for the long-term (Cheng, 2014). "Privatization has not eliminated small-scale water provision, but has led to the reconfiguration of its usage, blurring the boundaries between formal and informal" (Cheng, 2014, p.54).

In this section, I discuss different types of water and sanitation service providers that I identified in the literature while considering the advantages and disadvantages of formal and informal service provision. I focus on the non-state service providers who have emerged to fill the different market niches in the case studies that I have identified in the cities of Manila, Philippines (Cheng, 2014), Jakarta, Indonisia (Kooy, 2014), Bangalore, India (Ranganathan, 2014), Harare, Zimbabwe (Manzungu et. al, 2016), and Cape Town, South Africa (Mels et.al, 2009) (Figure 14).

In the city of Manila in Philippines, community-based organizations extended the water network into low-income communities mainly because the water utility was unable to provide water beyond the community's edge. This is what Cheng (2014) calls a micro-

network. Thus in order to control low-income communities, the utility partnered with micro-network operators and gave them the responsibility for collecting monthly payments and monitor communities that can present difficulties in cost recovery. Resettlements with uncertain land tenure that may cause displacement of residents are among these communities. In these areas of imminent land use changes, Manila's water utility does not invest and bulk connections are the only options available. Although the micro-network set-up seems like the most suitable solution, however it presents several disadvantages such as costing more (up to eight times higher) than the utilities' tariffs. This is mainly because small-scale water providers buy water from the utilities at an average rate or higher, and they add on costs for staff and materials. In addition, the increased surveillance of costumers requires consumers to coordinate with each other to pay monthly bills to avoid the risk of disconnection of the entire community.

Similar to the case of Manila, Bangalore water supply covers only 'authorized' areas in India. People thus at the periphery depends on water wells and water tanker mafias since in order to expand the grid, peripheral residents have to pay high capital contributions and "wait several years for bulk supply to be augmented on the Cauvery River" (Ranganathan, 2014). Dependence on water well and the excessive use of groundwater pumps have drained water table and increased environmental degradation.

However, the water trucking market presented some advantages as it created jobs opportunities for low-income groups. In addition, water tanker operators rewarded customers who remain with a particular tanker for one year by decreasing the price to $1 per tanker load.

In the case of Jakarta (Indonesia), partnership between the water utility and informal vendors was in a form of granting licenses to public hydrant operators who distributed water through vendors. This partnership generated financial incentives for water utility employees, however, it created disadvantages for residents who could not connect to the centralized water system. “Household connection fees were often much higher than the official charge, and household water meters were misread based on bribes to the meter readers” (Kooy, 2014, p.43). Furthermore, the illegal profits and informally regulated access to public hydrant licenses, and the loss of bulk water within the system impeded the extension of the centralized piped system (Kooy, 2014).

In the city of Harare in Zimbabwe, there is no form of informal water vendors. However, ZINWA, a private bulk water company, is the designated regulatory authority that provides water to unserved areas. Although this company charged higher prices than the water authority, it remains a cheaper option compared to drilling of water wells and boreholes in the face of shortages of municipal water. This decrease in digging new wells further led to the decrease in environmental degradation.

In this light, NGOs in the city of Manila, Philippines, and the water authority in Cape Town in South Africa in partnership with INGOs, have created alternative more sustainable solution to water and wastewater services to alleviate the impact on the environment. In the case of Cape Town, a mobile ecological sanitation unit was introduced to “increase services flexibility, reduce servicing costs, improve the delivery of emergency services, enhance user satisfaction and release some pressure from water resources and wastewater treatment works” (Mels et.al, 2009).

	Water/Sanitation providers	Advantages	Disadvantages
Formal	**Public water utility** Manila, Philippine - Jakarta, Indonesia Bangalore, India - Harare, Zimbabwe Cape Town, South Africa	- Cheaper cost - Better quality of services and materials - Higher cost on low-income communities	- Limited service provision - Physical challenges in areas of illegal land tenure - Higher costs on low-income communities due to illegal profits which creates disincentives to invest
	Selective partnerships with micro-network operators Manila, Philippine	- Higher costs than the public utilities - Facilitates the management of informal communities - Non-state providers are more flexible in operations & responsive to consumer needs - Lower cost than tanker trucks	- Higher costs than the public utilities - Increase of social hierarchies between consumers who have to pressure each other to pay monthly bills to avoid the risk of disconnection of the entire community
	INGOs and NGOs Manila, Philippine **Partnership between INGOs and Water Authority:** Cape Town, South Africa	- Potential employment opportunities - introduction of innovative systems - the mobility of the new systems facilitates a settlement's relocations - Protects the environment	- High cost of the frequent emptying of new sanitation systems - Exclusion of newcomers from sanitation facilities
	Private bulk water companies Harare, Zimbabwe	- Higher costs than the public utilities - Cheaper option compared to driling new wells when there is shortage in municipal water - Decreases the drain of underground water	- Higher costs than the public utilities (due to acquiring vehicles and tankers, paying drivers, transporting water over great distances, and acquiring permits and registration papers that were charged by different institutions
Informal	**Intermediate Water Service Providers; such as small-scale community based organizations/Micro-network operators** Manila, Philippine	- Installation of network extensions in unserved areas - Facilitates the management of informal communities - Makes communities more self-reliant - Financial incentives for operators - Helps enforce bill collection f- Minimizes the risks involved in service extension	- Higher cost; cheaper and lesser quality of materials than the authorities' - Often needs on-going support & subsidy
	Water trucks or tankers managed by private water sellers/community groups to sell water by containers Jakarta, Indonesia Bangalore, India	- Serves the unserved areas - Financial incentive for operators & water utility employees - Profitable business - In Nigeria, Malawi & Harare: cheaper option	- Higher costs - Environmental degradation
	Self-help: households Manila, Philippine	- Convenient option for non-connected - Create sjob opportunities - Financial incentive for operators	- Environmental degradation

Figure 13: formal and informal service provision in Manila in Philippines, Jakarta in Indonisia, Bangalore in India, Harare in Zimbabwe and Cape Town in South Africa (Source: Author)

The review of the five case studies (Figure 13) highlights these sets of findings: Informal service providers are more demand responsive to users than the state since they provide services when and where needed. They are flexible as they can accommodate to changes in the environment and can operate under different conditions. Although they are characterized by high prices, which I explain below, dwellers of low-income areas in Enugu State in Nigeria and Malawi seem to resort to services provided by non-state actors as they are affordable, more convenient and considerate than the public sector (Batley, 2006). For instance, in the city of Harare in Zimbabwe, water tankers are a cheaper option for residents who can't afford to dig their own borehole which costs approximately USD 6,000 (Manzungu et. al, 2016).

In many contexts, non-state providers (NSPs) introduce technological facilities that are successfully carried out in other similar contexts (Schouten & R.W, 2010). These innovative solutions in turn create job opportunities for some poor dwellers in informal settlements who opt to work in water tanking and sludge emptying. "Sludge emptying is a key activity for non-state actors since pits need to be emptied every 10 months" and the demand for emptying sludge is particularly high during the rainy season (World Bank, 2005). Independent providers thus have advantage over the public sector as they charge higher tariffs in order to ensure cost recovery, which may be better as it ensures financial sustainability (World Bank, 2005). Their business is not affected by issues of illegal tenure, population density nor the income level of dwellers (World Bank, 2005).

As mentioned above, informal provision of water and sanitation in informal settlements is usually more costly for poor people than those provided by the public sector

since dwellers have to pay more for NSPs to transport the water to them (Sansom, 2006). "Average water prices from SWEs in four African cities are $4 to 6/m3, whereas the prices charged by water utilities in the same cities are $0.5 to 1.4/m3" (Sansom, 2006). In case of public-private community partnerships, such as the case of Manila (2014), even though prices got lower than those offered by water tankers, they remained significantly higher than the utilities tariffs (up to eight times higher) (Cheng, 2014). This is due to the added costs (staff and materials) that the micro-network operators have to add in addition to the water they buy from Manila's Water Utility (Cheng, 2014). Low-income communities that use the micro-network set-up have to pay their monthly bills or they risk the disconnection of the entire community (Cheng, 2014).

Water tankers usually charge a higher tariffs than those charged by the public utilities and PPPs since they need to recover the cost they incur in acquiring "vehicles and tankers, paying drivers and transporting water over great distances…and acquiring permits and registration papers charged by different institutions" (Manzungu et. al, 2016).

In terms of innovative solutions that are adopted by NSPs, the new toilet systems present additional financial costs on low-income people since the cost for emptying these systems, which have high service and maintenance, are relatively high. In this case, and to prevent the overflow of sanitation systems, people discharge the wastewater in water streams, such as the case of slums in Kibera, leading to several environmental hazards (Schouten & R.W, 2010 & Mels et.al, 2009). In the case of low-income areas in Manila, people do not have their own utility piped water connection since Manila water utility only provides water "as far as the community's edge" (Cheng, 2014). They instead rely on water obtained from

small-scale community based water providers who are usually unregistered and get water from alternative sources such as digging their own boreholes (Cheng, 2014). Ultimately, groundwater is threatened by contamination and rapid depletion. In Bangalore, the intensified pumping of aquifer rendered the city's water table to fell below 1500 feet (Ranganathan, 2014). In this city, environmental degradation results also from the shift from agriculture to selling water as the latter is more profitable (Ranganathan, 2014).

2. Impacts of the Formal and Informal Sanitation Provision in Zahleh

The inability and the unwillingness of the municipality to meet water and wastewater demands to ITSs in the agricultural areas of Zahleh have led to the creation of a hybrid system of wastewater management. This system is operated by non-state providers who resorted to their entrepreneurial shrewdness to develop alternative wastewater systems, including distribution and sludge emptying (Ahlers et.al, 2014). The informal system, which is decentralized, unregulated and operates at the small-scale (Ahlers et.al, 2014), exists in parallel to the formal system, as illustrated in Figure 4. This system presents numerous impacts on the social, economic and mainly the environmental aspects of ITSs and the city of Zahleh. It consists of a hybrid system of formal and informal systems and actors which presents some advantages and disadvantages.

In line with the literature, it appears that this service provision system provides wastewater for Syrian refugees by connecting them to pits, septic tanks and to the public network. Additionally, it offers them job opportunities by creating jobs, such as digging pits, dislodging them and trucking of sludge. These jobs are regulated via the INGOs.

However, the informal system of service delivery presents several disadvantages. The installed sanitation systems along with the exceeding population density in ITSs increases the frequency of dislodging and ultimately increases the cost of these services. INGOs pay the municipality 11$/$m^3$ to discharge wastewater in the plant. However, an approved permit is required to discharge wastewater in the station and often these licenses are not obtained in times. As a result, costs are considerably increased because of the municipal restrictions that leads to increase the frequency of dislodging.

The difficulties of obtaining permits for discharging the sludge in the treatment plant result in discharging wastewater in the Litani River. The negative impacts on the environment is likely the most noteworthy disadvantage for this hybrid system. Additionally, and since irregular dislodging is very common in the ITSs, Syrian refugees have resorted to emptying the sludge in the agricultural areas and the nearest water streams, leading to the contamination of water tables and exposing the community to waterborne diseases.

In 2016, the national wastewater amounts to 310 million m3/year; 250 million were urban wastewater and 60 million were industrial wastewater. The Syrian presence has increased wastewater generation between 34 and 56 Million Cubic Meters in the various Lebanese regions (The Lebanese Ministry of Environment, the European Union & UNDP; 2014).

The above mentioned challenges renders managing wastewater services in Lebanon a hard task for both the Lebanese and Syrian populations. Upgrading infrastructure in ITSs is a challenging task on humanitarian agencies who have to get the landowners' approval which is complicated, and settlements may be built on flood-prone areas (UNHCR, 2013).

3. Conclusion

This section presented a situation where wastewater service provision operates outside the formal system, and thrives on social networks, and non-governmental assistance. It concludes that ITSs in Zahleh are sustained by a hybrid network of formal and informal non-state providers that are recruited by INGOs. Thus, as has been argued in the literature, policies that focus on formal practices of service delivery are bound to fail by failing to recognize informal means.

However, in addition to the deficient infrastructure of water and wastewater services in ITSs in the city of Zahleh, what commands the most attention is the extension of the urban growth towards the agricultural areas. To this effect, the final section will conclude with a set of policy recommendations that aim to use the hybrid system of service provision as a means of facilitating a discussion about upgrading the wastewater network in Zahleh ITSs.

B. Policy Recommendations

1. Recognize the importance of the informal system

The first recommendation that the thesis makes is to recognize the presence of ITSs, in lieu of the ongoing ad-hoc, turn-a-blind-eye strategy adopted by various national and regional public agencies and authorities. This imperative is informed by the dangers posed by the current policy that locks ITSs in path-dependent negative modes of sewer disposal that generate long-term negative externalities for their residents and other members of the local population.

The recommendation builds on experiences in other national contexts where the integration of informal systems within hybrid systems proved beneficial.

For example, a review of five cities (Manila in Philippines, Jakarta in Indonisia, Bangalore in India, Harare in Zimbabwe, and Cape Town in South Africa), shows that when the state stops seeing hybrid system of service delivery as opponents and dysfunctional, and instead looks at them as 'arrangements that work' and embraces their informality, it helps create a bridge "between development imperatives and local practices" (Ahlers et.al, 2014, p. 10). Thus, in Manila's post-privatization era, Cheng (2014) described the formation of what she termed 'grey spaces', areas managed between formal and informal institutions where the state have partnered with the informal service provider to manage low-income neighborhoods that lack access to water. In this case study, even though the informal sector results in higher tariffs and uncertain terms of operations, and despite the expansion of the water utility, informal water providers persisted and the state allowed such practices to continue. This is mainly because the formal network grows in stages and in a fragmented way. Therefore, the inability of the water agency to extend the network led it to partner with the informal service provider through the so-called 'creative partnership' between utilities and community-based agents (Cheng, 2014). This partnership consists of enhancing the distribution of tasks between the water utility and informal service providers. The utility thus becomes responsible of installing infrastructure whereas informal water providers are allocated with "collecting payments and monitoring for leaks and theft" (Cheng, 2014, p. 63). In addition, this partnership prompts Manila Water Utility to convert bulk meters into individual metering, and thus maximize payment recovery (Cheng, 2014).

These examples indicate that a partnership between the formal and informal can serve well in the case of Zahleh, where a municipal intervention is direly needed to complement

the systems in place. This model has the potential to create some kind of trust between the municipality of Zahleh and refugees in ITSs and generate incentives to actively engage Lebanese and Syrian communities together in an attempt to reduce pollution and improve livelihoods by reducing barriers to connecting ITSs to the sewer network.

2. Distinguish between ITSs

The second recommendation that the thesis makes is to distinguish between ITSs on the basis of their geographic location, given that the latter determines largely both the health hazards posed for refugees and the dangerous environmental repercussions of the settlements. With the help of a team of urban planners and environmental and civil engineers, interventions should be devised based on the location of ITSs in relation to natural risks, and on the type of sewage system installed. This is depicted in chapter 4 which shows that a large number of ITSs in Zahleh are located on areas of medium seismic hazards and almost half of the ITSs are prone to flood. A small number of ITSs are subject to damage from severe soil erosion, and the largest number are located in medium to low erosion areas (South of Haouch el-Oumara Aradi and Maalaqa Aradi, Dalhamieh and Terbol).

Furthermore, chapter 5 shows that the ITSs that are greatly impacting the environment are those that depend on pits. Whereas the ones that have a wastewater system of septic tanks and/or are connected to the sewer network are either slightly impacting or not causing any harm to the environment.

The thesis suggests to further distinguish between settlements across size and social organization, and articulate a nuanced set of interventions that reflect the differences between the settlements. More specifically, the thesis suggests classifying settlements based on their

position in relation to the existing radius of urbanization (Figure 15), analyzed in relation to the current and projected map of sewer extension, and those scattered in agricultural land (Figure 16). As shown in chapter 5, most ITSs are very close to the sewer network (they are located within a proximity of 20 meters range). The distance between these ITSs and the sewer network varies between a 20 meters range [camp 020 (12 meters), camp 019 (23 meters), camp 003 (12 meters), Saker camp (12 meters), camp 015 (20 meters), and camp 031 (16 meters)] and a 45 meters range [camp 098 (44 meters) and camp 001 Haouch El-Oumara Aradi (45 meters)]. Only one ITS is located very far from a sewer network [workers camp (100 meters)]. While the possibility of connecting these camps to the sewer network remains politically challenging and technically demanding, the closed proximity of these camps to the network should be considered when considering strategies to alleviate the environment costs of these ITS. I am aware that the recommendation of connecting ITSs to the sewer lines can be a tricky process as it presents challenges related to the difficulty of connecting each tent to the sewer lines due to the great number of ITSs doubled by the number of tents.

Additionally, another challenge is characterized by the topography[26]: the surface of agricultural fields is usually lower than the surface of the roads, and sewer pipes are implemented near the roads, therefore, connecting ITSs to the sewer lines necessitates pumps and generators to pump the sewage to the pipes, which will add further cost. Furthermore, ITSs are informal and the municipality will have to issue a special permission, and it will

[26] An interview with Dr. Ibrahim Alameddine, assistant professor at the Department of Civil and Environmental Engineering at AUB, on October 9, 2018.

face challenges when charging and collecting taxes imposed on the sanitation services. These challenges should be taken into consideration when recommending policies for alleviating the impact of ITSs on the environment. In this case, hybrid and ad-hoc solutions between the formal and informal mechanisms (Zahleh sewer network and septic tanks) can be introduced.

However, and since the municipality only intervenes in collecting the waste in ITSs, looking at the streets in the agricultural areas of Zahleh and the projects that the municipality is currently studying, and looking at expanding the wastewater network project that the CDR is implementing in coordination with the Water Authority and the municipality, it becomes clear that the municipality has the capacity and the know-how, however lacks the will to intervene in Zahleh ITSs. But if the municipality acknowledges that there are strategies that can alleviate the impact of ITSs on Zahleh's environment, it would hopefully consider getting involved.

3. Connect ITSs in Immediate Proximity to the Sewer Lines and to Urban Expansion in the Valley of Zahleh

In this section, I explain the planning recommendations that can be adapted by the municipality to deal with the scattered ITSs and the environmental impact of the sanitation service provision to them.

The municipality justifies the lack of service delivery to ITSs by the fact that settlements were established illegally and in haphazard manner. As mentioned before, I am aware that underground piped systems are very difficult to install, however, in this situation, the existing and proposed sewer network of the city of Zahleh extends in the agricultural area of Haouch el-Oumara Aradi and Maalaqa Aradi where a great number of ITSs are located.

Therefore, these ITSs can be hooked up to the city sewer network as this is the most environmentally viable solution. In this case, the case of 001 Haouch el-Oumara Aradi informal tented settlement (Allawi camp) should be taken as a prototype. This can only happen through mediation and consultations with landlords and the municipality to seek to get their approval.

In addition, since 2008[27], the agricultural area of the city of Zahleh has been characterized by rapid urban expansion which reached its peak after the 2011 crisis (Figure 14). The pace of the sewer network development that started in 2015 did not match the rate of urban growth and unplanned informal tented settlements that arose in the city and consequently, many houses are currently left without sanitation services, especially in the southern part of Maalaqa Aradi, in Terbol and Taanayel (Figure 14). As mentioned above when analyzing the 10 ITSs in Zahleh, water-borne diseases in many ITSs are a reminder of the environmental degradation caused by the untreated discharge of settlements' wastewater as a result of the unwillingness of the municipality to implement permanent sanitation solution for refugees. Stressing on the environmental hazards and on the fact that the sewer network will anyway reach the newly urbanized areas, I am recommending that ITSs that are in immediate proximity to the zones of urban expansion to be connected to the sewer network which will eventually reach these urban areas. I am aware of the fact that this suggestion will be countered by many challenges such as cost recovery and financing, however, grant financing from INGOs could help in this situation.

[27] Analyzing data in google earth.

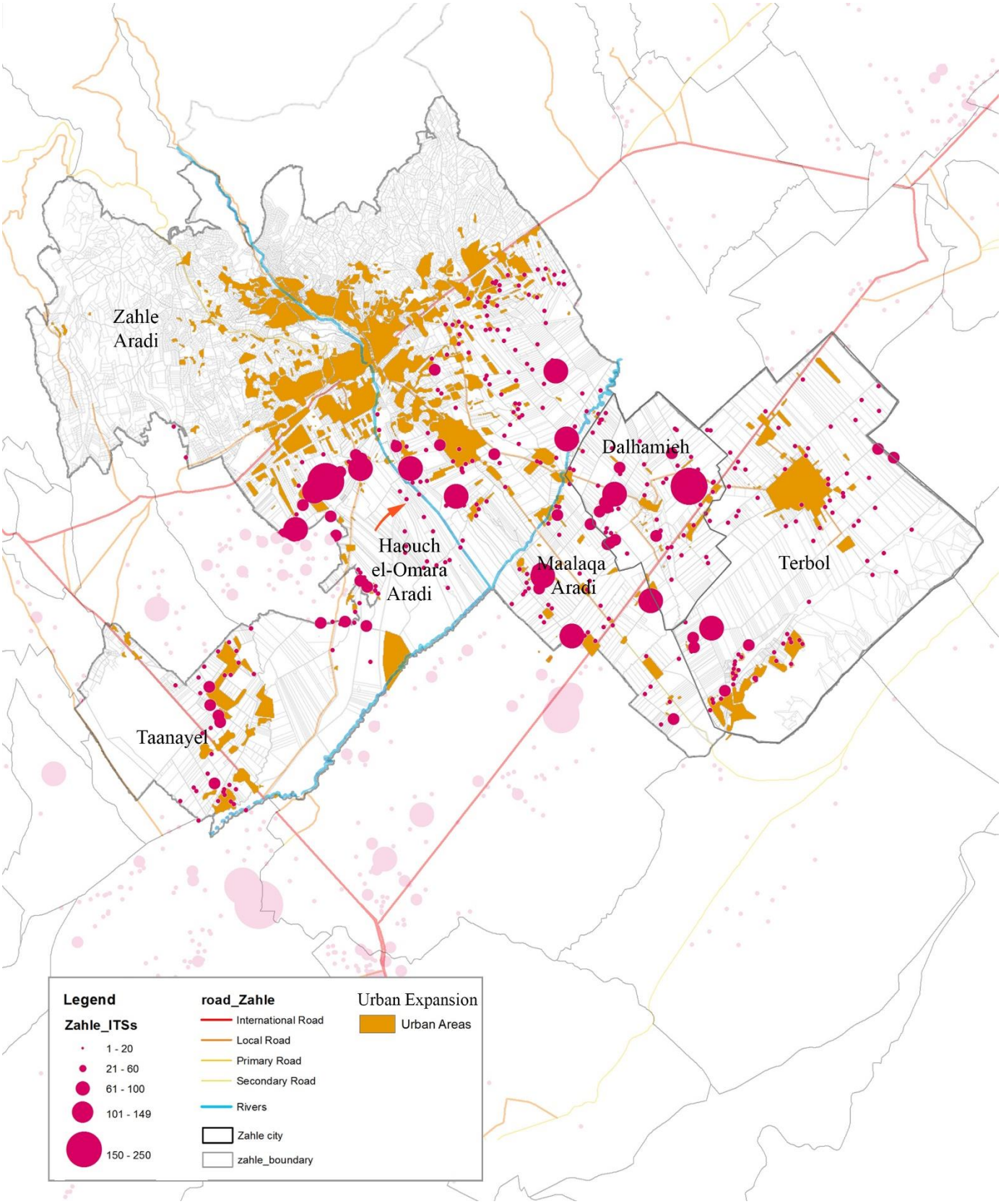


Figure 14: Urban Expansion and ITSs in the city of Zahleh after 2011 (Source: UNHCR & GIS Data from Dr. Ibrahim Alameddine. Adapted by Author. Date: November 2018)

4. Relocate isolated ITSs in agricultural fields to ITSs near the sewer network or within urbanized areas

In the middle of the agricultural land and where ITSs are scattered and causing negative environmental damage, my findings recommend that these ITSs, erected after 2011, should be relocated to ITSs located near the sewer network (in Haouch el-Oumara Aradi and Maalaqa Aradi) and to the city of Zahleh (Figure 15). In these areas of densification, incentives will be given to landowners to negotiate comprehensive solutions that meet both the needs of landowners and Syrian refugees in ITSs. In this case, the 001 Haouch el-Oumara Aradi ITS, which houses 120 tents and is connected to the sewer network, will be taken as a model to generate incentives, such as collecting rent from newcomers, connecting them to the sewer network, having more workers to cultivate lands, and protecting agricultural areas.

I am proposing to keep Syrians who lived in the tents prior to the war, which are usually 5-8 tents, as most of them work in farming and guarding the land. They have limited negative impact on the environment, and can have septic tanks that have a regular system of dislodging and discharging.

Further control needs to be operated by the municipal police for permitting the dislodging of the sludge in the Litani River.

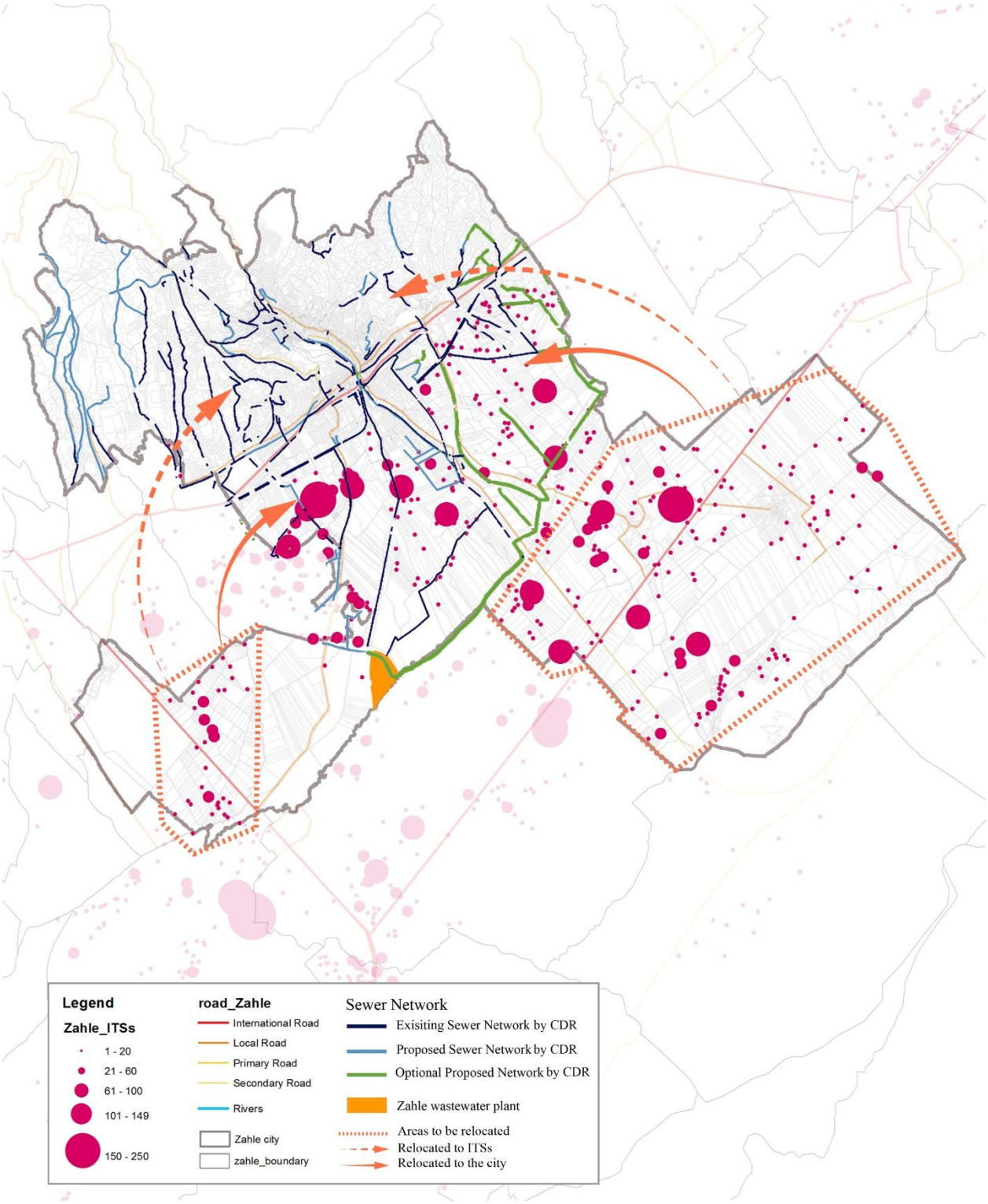


Figure 15: Relocation of scattered ITSs in agricultural areas to ITSs near the sewer network and to the city of Zahleh (Source: UNHCR & CDR. Adapted by Author. Date: November 2018)

From the analysis of the findings in Zahleh ITSs, self-built pits that are dislodged by sewage trucks frequently and/or by manual methods are not an option to consider because the health and environmental problems resulting from this system are dire. However, alternative solutions that are environmentally responsible, damage controlling, can be implemented in these ITSs, by a team of urban planners and engineers (environmental and civil).

Examples of alternative solutions are cesspools[28] and tiger worm toilets. The tiger worm toilets was tested in Breeh in Chouf, Lebanon, by LiPattern[29], which is a natural lab. They organized a two-day workshop in June in to implement system[30] which is based on a flush toilet, a worm[31] composting system for a conventional flush toilet[32] that turns human excreta into fertilizer (Figure 16).

Landowners of private agricultural areas, camp site managers, perma-culturists and many more participated in this workshop (Figure 17). People accepted the worms systems as it works the same as the typical flushing toilets, only here the flushing goes to the worm tank.

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[28] "Cesspools (or leaching pools) are pits into which concrete, brick or cement block walls have been placed. Wastewater flows into the cesspool and drains or "percolates" into the soil through perforated walls. Cesspools which serve only as "overflow" pits from septic tanks are much more efficient than the older systems because they receive much less solid material. However, where there is no septic tank to hold the solids, the cesspool will require much more maintenance. Over time, when the drainage area around the leaching pool becomes saturated, additional pools may have to be dug to handle the volume" (Source: https://abccesspoolandsepticpumping.com/septic-tank-cesspool/).

[29] Li is a natural lab inspired by the spirit and techniques of permaculture to provide an educational space where people can reconnect to nature, learn sustainable farming and living techniques, and further propagate this knowledge into their communities.

[30] When participants implemented this system, one of the tanks did not function correctly but this is because worms needed to adjust to the new environment.

[31] Earthworms or Eisenia Foetida were used for this system, as they can be found easily near the river in Chouf, additionally, some farms in Lebanon grow them.

[32] According to an interview with Nayla Kahwaji, the founder of LiPattern, and Farah Jaroudi and Berna Daou, Interior Architects and environmental activists with specialty in earth construction and eco life.

Additionally, this system[33] requires minimal maintenance compared to dry toilets (it can be left for two years without maintenance), however, toilets should be used regularly in order to keep the worms alive. After two weeks of testing this model in Breeh, this system was replicated in two other areas in Chouf.

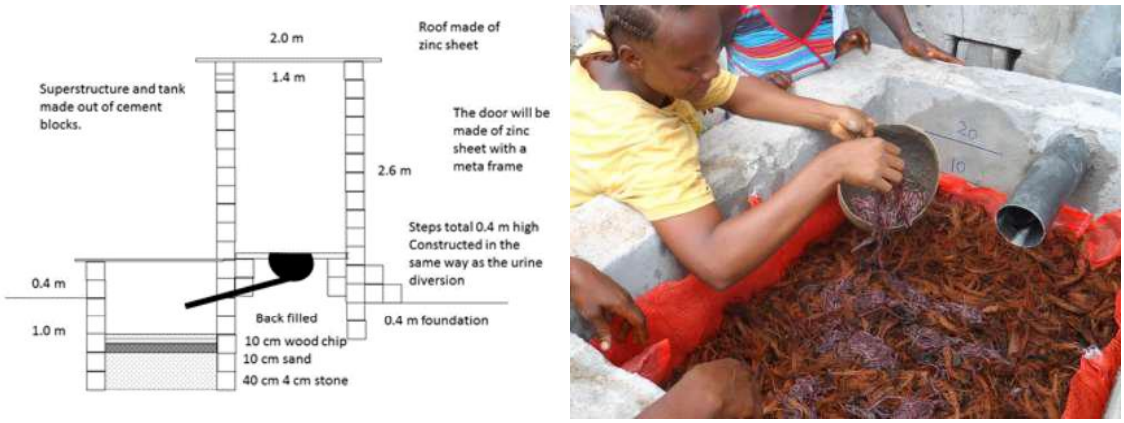

Figure 16: Design of Tiger Worm Toilets (Source: Furlong, Lamb & Bastable, 2017; Oxfam, 2015a)

Figure 17: DIY vermicomposting sewerage system based on a flush toilet in Chouf, Lebanon (Source: LiPattern)

[33] One tank of 2000-3000 liters of capacity service around 10 people and cost around $1500. These tanks should be implemented above the ground and not buried as it causes several problems such as creating difficulties for maintenance and access for refilling.

5. Locate the refugee presence within a larger policy framework

During my fieldwork, I found that when Syrian refugees secure a regular employment, they tend to leave ITSs and rent houses inside the city of Zahleh. Thus, and taking into consideration the limitations of the Lebanese state, I recommend to rethink the refugee presence within a larger policy framework which places refugees in relation to labor opportunities and paper regulations that insure decent access to services. The formal integration of Syrian refugees in the labor market will make them more self-sufficient and resilient, less dependent on international assistance, and will de-densify ITSs and alleviate the impact of wastewater generated by refugees in the agricultural areas. Through securing job opportunities for Syrian refugees, I thus recommend to relocate them to decent housing in rental houses inside the city of Zahleh or near urbanized areas (Figure 15).

In order to do this, I recommend to reformulate the legal requirements needed for work permits for Syrian refugees in order to integrate them in the labor market. Considering entrepreneurship opportunities that can re-engage refugees as dwellers who pay for the services provided for them. Given that Zahleh has a master plan for the sewer network, Syrian refugees can be employed in the development of this network, such as installing the sewer pipes and collecting tariffs.

C. Conclusion

While recognizing the deteriorated environmental situation in ITSs, the scope of this thesis did not merely cover the tools required to upgrade their access to basic sanitation services. It rather calls for recognizing informality, which along with "the state of exception that it embodies, is produced by the state" (Roy, 2005, p.155). When diagnosing the problem

of informality as merely illegal and looking to eliminate it and/or turning the blind eye towards it, it will grow and impact the environment as we have seen in the case of Zahleh agricultural areas. Instead, case studies on informality has provided valuable lessons on how people build their own communities that are adapted to their needs. Additionally, these case studies showed the several benefits of the hybrid system and called to consider the elements of informality that are working well and use them through an integration strategy.

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