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WATER INFRASTRUCTURE SUPPORT AND ENHANCEMENT FOR LEBANON (WISE-LEBANON)

RAPID ASSESSMENT OF WATER SERVICE NEEDS OF
LEBANESE COMMUNITIES HOSTING SYRIAN REFUGEES
AND EMERGENCY PREPAREDNESS OF WATER
ESTABLISHMENTS

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Report No. 15

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The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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ACRONYMS

AWWA	American Water Works Association
BMLWE	Beirut/Mt. Lebanon Water Establishment
BWE	Bekaa Water Establishment
CB	Citizen Band Radio
CCTV	Closed Circuit Television
CDR	Council for Development and Relief
CISP	Comitato Internazionale per lo Sviluppo dei Popoli
COP	Chief of Party
COR	Contracting Officer's Representative
DG	Director General
DRC	Danish Refugee Council
EDL	Électricité Du Liban
ESIA	Economic and Social Impact Assessment
EU	European Union
GIZ	Gesellschaft für Internationale Zusammenarbeit
GOL	Government of Lebanon
HDPE	High-Density Polyethylene
HR	Human Resources
ICRC	International Committee of the Red Cross
IMF	International Monetary Fund
ITS	Informal Tented Settlement
KFAED	Kuwait Fund for Arab Economic Development
LWWSS	Lebanon Water & Wastewater Sector Support Program
MoEW	Ministry of Energy and Water
NLWE	North Lebanon Water Establishment
NRW	Non Revenue Water
O&M	Operations and Maintenance
OTI	Office of Transition Initiatives
PIP	Performance Improvement Plan
PM	Prime Minister
PMU	Project Management Unit
SLWE	South Lebanon Water Establishment
SOW	Scope of Work or Statement of Work
UN	United Nations
UNDP	United Nations Development Program
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WASH	Water, Sanitation, and Hygiene
WB	World Bank
WE	Water Establishment
WISE	Water Infrastructure Support and Enhancement for Lebanon
WTP	Water Treatment Plant
WW	Wastewater
WWTP	Wastewater Treatment Plant

1. EXECUTIVE SUMMARY

In August 2013, USAID requested the WISE-Lebanon program conduct a rapid assessment of the communities served by the Water Establishments (WE) and directly affected by the Syrian refugee influx in order to identify, develop, recommend, and potentially implement integrated interventions. The focus of the interventions would raise the capacity of the WEs to cope with the increase in water demands on local water resources due to the refugee influx and to address the recurring emergencies resulting from an overall volatile situation in the Middle East region. The assessment was implemented in two parts: (1) a quick response needs assessment in the water sector to identify potential interventions that, ideally, can be implemented within six months to one year; and (2) an emergency preparedness assessment of the WEs ability to respond to emergency and crisis situations that affect service delivery. It was coordinated with the WE senior management and associated branch managers, municipalities, and the current efforts of other donors in response to the crisis. The WISE-Lebanon rapid assessment team cooperated with donors such as UNHCR, UNICEF, UNDP, ICRC, GIZ, the World Bank, and the European Union to capitalize on their response activities and lessons learned to date, and leveraged their successes to further the objectives of the rapid assessment recommendations.

The recommended quick response activities were identified through a consultation process that started with meetings with the WE Director Generals (DG) and their senior staff and continued through meetings with the WE branch managers and municipal officials. The assessment team developed matrices to list the potential quick response interventions using discrete selection criteria, which prioritized the types of various interventions proposed by the WEs. The assessment team directed the WEs' senior management to focus on capital repair and replacement interventions that could be implemented in a relatively quick manner (between six months and one year). Major capital investment projects were not dismissed during the screening process due to the extensive needs of the WEs, but they received lower ratings in the prioritization process. At the request of USAID, the assessment team emphasized timeline of implementation and impact of host communities by percentage of Syrian refugees. Although cost estimates were not considered as criteria for prioritization, they were included for informational purposes.

Through the meetings with the Water Establishments, the assessment team documented both *existing needs before the Syrian refugee crisis* as well as *direct impacts as a result of the crisis*. Generally there is an average of 50% service coverage within the assessed WEs, and overall performance is poor. The team reviewed key performance indicators from the WE business plans to benchmark pre-crisis conditions, such as service coverage, percentage of non-revenue water (NRW), and collection rate percentage. The assessment of the WEs confirmed that many of the pre-crisis needs have become more urgent. For example, alternatives in domestic water supply through the private sector were common before the crisis, and the team observed an increasing reliance on these alternative systems due to the increase in water demands. However, one of the most common existing needs of the WEs is continuous electricity. Nearly all of the service areas of the WEs are experiencing electrical supply intermittency, which contributes to water supply intermittency. Other pre-crisis needs that are now more urgent include: insufficient numbers of permanent, skilled staff; basic repair tools and equipment to deliver the required level of service; commissioning complications due to unfinished capital investments by third parties; inadequate demand management including NRW; and some locations within the WEs service areas that are still controlled by a municipal committee.

The assessment team also noted several common direct impacts as a result of the Syrian refugee influx, which has led to an increase in domestic water demand in all four WEs. However, the NLWE

and BWE service areas have seen the largest increases in refugee populations within the Lebanon governorates. For the most part, the water service providers in Lebanon were already producing as much water as possible even before the refugee crisis. However, impacts in water demand increases are also being felt at the O&M level of the networks and pumps. Refugees are reportedly using existing household and other illegal connections, and many service areas are adopting more stringent water rationing measures to handle the increases in water demands.

The WISE-Lebanon assessment team approached each WE on behalf of USAID to examine their needs to help them cope with this increase in demand on local water resources with a specific focus on capital repair and replacement interventions. The resulting prioritized matrices for the potential interventions were based on the identified needs of each WE. The projects were evaluated based on three main criteria: the percentage of Syrian refugees in relation to the total population in the target service area, the estimated timeframe for implementation in months, and the strategic developmental criteria. The team helped the WEs identify the following types of projects:

- *Increase and/or secure production, new wells, pump replacements*
- *Transmission line repair and/or replacement*
- *Water supply network extension and/or replacement*
- *Procurement of pumps and pipes for warehouses*
- *Increase storage capacity; reservoirs*
- *Procurement and installation of chlorination units*
- *Procurement of repair tools and equipment*
- *O&M crew trucks and vehicles*

The assessment team also visited several host communities throughout the assessment period in order to understand the needs on the ground and how they compare to the needs reported by the WEs. The WE senior management agreed that the assessment team should meet with host communities represented by municipalities and union of municipalities whom in turn would have direct field experience of the impacts from the Syrian refugees. Similar issues were discussed with municipalities such as existing needs before the refugee crisis, impacts as a result of Syrian refugees, and response to crisis and water needs of host communities. Municipalities reported similar needs but often not aligned or coordinated with WEs; they often did not understand the WEs' operations and planning processes.

Since Lebanon has faced recurring crises over past decades, including wars, pollution, and natural disasters, the assessment team evaluated the level of emergency preparedness of WEs and municipalities. The team found that the WEs have only had responsive measures with limited preventive measures to mitigate impacts. Preventive measures, such as contingencies, are only being addressed at main production sites, and the WEs have no set strategic objectives, action plans, or budgets to address emergency preparedness. The assessment of emergency preparedness of the local municipalities and union of municipalities concluded that emergency preparedness is completely nonexistent. Municipalities usually perform only responsive measures to address emergencies.

Summary of Findings and Recommendations

The following section summarizes the findings and recommendations of the team based on information documented throughout the assessment.

Finding #1: The overall needs of the WEs remain the same as before the refugee crisis, but now they are more acute and urgent.

The WEs had poor overall performance and an average of 50% service coverage before the Syrian refugee influx began. Many of their overall needs remain the same, but there is now an increase in urgency to address these service gaps. For example, more stringent water rationing schedules in service areas with intermittent water supply are frequently now being implemented and breakdowns are also more frequent. Syrian refugees are tapping sources and networks directly, as in the case of Kfartoun, causing direct competition over resources with the host communities. The WEs are also faced with commissioning challenges due to partially completed capital investments by third parties. In order to cope with poor water service delivery, communities have used private sector alternatives such as regularly purchasing bottled water, private wells, and using tanker trucks to deliver water in areas receiving intermittent supply or not covered by distribution networks. It is observed that the population generally does not rely on water utility services as a sole source of domestic water supply. As a result of the crisis, the reliance on these practices have become more common. For the most part, the WEs are continually trying to produce the maximum amount of water that they can. With little attention to demand management, the quantity of water produced is always used and, essentially, the WEs are trying to fill an analogous sieve.

Finding #2: The scattered nature of the Syrian refugee distribution, private water supply systems, and the lack of demand management programs have made it difficult for the WEs to identify specific service areas impacted by the Syrian refugees.

Although there are reported increases in the intermittency of water distribution and the number of tanker trucks needed to deliver water, the alternative private water systems and the lack of demand management programs have made it difficult for the WEs to identify specific needs due to the increase in Syrian refugees. For example, the director at the Dbayeh water treatment plant which serves Beirut commented that he is pumping as much water that is available; he did not report an additional need due to the rising refugee population. Eng. Roula Samoura of the SLWE noted that many refugees in the South are living in Lebanese homes with access to water. “However, water shortages didn’t cover the water needs before the crisis. In the Saida service area, the main problem is electricity to operate pump stations; we have enough source water.” The WEs are not identifying many new projects specific to the refugees, but instead, they are recommending projects to increase service coverage to already underserved host communities. They are continuing to look at projects on strategic and commercial levels. Their approach is that donors should help them increase their revenues and operations performance and they can then better support these types of urgent demands and other emergencies.

Finding #3: Over the past 10 years, WEs have improved their organization and capacity to address water service needs in collaboration with development agencies. Moreover, USAID and other donors have jointly coordinated efforts with the WEs to further streamline the identification and prioritization process. The WISE-Lebanon assessment helped the establishments anchor their expected role and act as a focal point to

development and relief agencies under the current crisis since the GoL is not fulfilling this role.

A number of donor organizations are working to identify similar types of quick interventions (e.g. UNICEF, ICRC, UNHCR, UNDP, and the EU) to mitigate the impacts of the increase in refugees. Through the help of the USAID WISE-Lebanon program and the assessment team, the WEs have become a focal point to donors and have been able to better identify and prioritize overall needs and present them to the donor community. Until now, the GoL has not had an adequate response to the refugee crisis with respect to the size and nature of it. Since the Council of Ministers is still not convening and the GoL remains at an impasse, the WEs have been compelled to create their own role and initiate their own activities in order to survive the crisis.

Several of the WE/WISE-identified projects have been earmarked for implementation by other donors. In addition, donors are now mostly going through WEs when implementing water infrastructure interventions, which was influenced by the USAID/WISE program since early 2013. As a result of these efforts to promote the legal authority of the establishments, the WEs have taken the lead and organized coordinated efforts with donors as in the case of the BWE donor coordination meetings, which began in September 2013. In addition, GIZ embedded technical advisors in each of the water establishments to provide technical assistance in strategic planning and capacity building, especially focused on the business planning process. These advisors have helped the Establishments update their business plans and better manage the assets and resources available to the WEs. Donor coordination led by the embedded advisors within the WEs and WE senior management has increased the responsiveness and strategic focus of the Establishments.

Finding #4: Municipalities are often not coordinating with WEs to identify and implement water infrastructure projects, but there is a basic understanding on behalf of the municipalities to improve the commercial performance of the service areas.

Municipalities do not fully understand the mandate of the WEs. The assessment team observed that the municipalities often do not understand the necessary steps and channels that the WEs must follow internally and with MoEW and other government agencies to ensure sustainability of projects. Therefore many host communities do not want to work with the WEs, and several mentioned that donors should give financial support to them directly. The WISE assessment team stressed that the municipalities should reach out to the Establishments in order to help improve the WEs' services within their jurisdictions. The municipalities should work with the Establishments to plan infrastructure projects. This lack of coordination was previously exacerbated by development agencies including projects implemented by other Lebanese governmental intuitions. Some projects were not properly coordinated to align with the WEs' strategy and planning. Long-term O&M costs were often not sustained by these projects. Development agencies also supported municipality-owned infrastructure in the past, which became non-operational when the municipalities found that they did not have the funds or personnel to operate and maintain them. Based on the assessment team's knowledge of previous interventions under emergency conditions, funding agencies tended to bypass the role of the WEs in the sector and instead rely on local communities and local governments to assume responsibility of implemented interventions. Those actions jeopardized the sustainability aspects of the interventions and created conflicts over the commissioning and ownership of these systems. In addition, the affected communities were left without means to generate revenues to operate the newly installed systems.

In some cases, however, municipalities are working with the WEs and cost sharing the expenses for new infrastructure. The SLWE is coordinating with municipalities and leveraging what the municipalities can provide. DG Nizam mentioned that the SLWE coordinates with municipalities to co-implement capital investment projects because the WE sometimes has incomplete funding for full implementation. The two parties negotiate what materials each can provide to implement projects. Some of the municipalities interviewed acknowledged the need for collaboration in gaining customers and practicing water demand management. The municipalities can play an important role in this area. Low collection rates are a problem identified and understood by WEs and host communities.

Finding #5: Domestic water supply is not always a top priority for the host communities regarding the refugee crisis – security and socioeconomic pressures are often underlying concerns followed by overall community services such as solid waste removal, health, and electricity.

Host communities are facing challenges in several sectors because of the increase in Syrian refugees. Many of them are concerned about security and social impacts due to cultural and hosting tensions. Solid waste is piling up at increasing rates in municipalities and rent prices are nearly doubling in some areas. Although water and sanitation are important issues, communities are highlighting other needs and in some cases, prioritizing them over water needs. The recently published World Bank report, “Lebanon Roadmap of Priority Interventions for Stabilization from the Syrian Conflict,” promotes a preliminary set of prioritized immediate-, short- to medium-term recommendations in response to the crisis that focus on interventions in health, education, employment and livelihood, social cohesion as well as water and sanitation.

Finding #6: Electricity has and continues to affect water production and delivery capacities.

The lack of reliable electricity service impeded Lebanon’s water sector prior to the refugee crisis, and now its effects are even more pronounced. All of the interviewed WEs cited intermittency as a primary reason for reduced water service delivery. In many service areas water is pumped from wells and conveyed to water storage reservoirs (tanks). The volume of water pumped to these reservoirs is proportional to the hours of available electricity supplied to operate the pumps. However, the electricity supply from the Electricité Du Liban (EDL) is limited to only a few hours per day during certain periods of the year. Many pump stations and wells are not equipped with standby generators, or they have generators in various states of disrepair. For the majority of the other pump stations that are equipped with working standby generators, those generators are rarely operated as the WEs cannot afford the fuel expenses. The SLWE mentioned that donors should support increasing the level of electricity supply through the provision of diesel fuel for generators and getting dedicated connections to the grid for the pump stations. It believes these are necessary interventions to keep the pumps running as much as possible and help increase water production levels.

Finding #7: WEs are operating under a constant state of crisis. Minor attention and few resources have been dedicated to emergency preparedness.

It is evident that the WEs had been operating in a crisis management mode prior to the Syrian refugee influx to Lebanon. They are constantly implementing water supply scheduling in light of limited production capacity, reduced distribution efficiency, and limited control over

water consumption because of a lack in water demand management measures. The WEs are also understaffed and lack sufficient repair tools and equipment to deliver the required levels of service before and during the current crisis.

The assessment team found that minimal dedicated resources exist to address emergency planning and preparedness. The WEs are only responding to needs as they occur. The establishments have not yet set a strategic objective to raise emergency preparedness through specific action plans and budgets to address the capital investment needed to achieve such a goal. The extensive interviews with senior management at WEs and with branch managers further confirmed the need to introduce emergency preparedness concepts to key decision makers in order to be addressed in systematic manner.

Quick Response Intervention Recommendations

Recommendation #1: Fund quick impact projects identified by the WEs and the WISE-Lebanon assessment team with continued support to the water sector from a strategic level. (See Prioritization Matrices of potential interventions for each WE).

The purpose of quick impact projects is to secure the current level of service for existing customers while addressing the additional water needs of the refugees. USAID should consider funding some of these quick impact projects as identified on the matrices while continuing to provide technical support to the water sector from a strategic level. Implementing these projects should be coordinated closely with other donors and relief agencies so that efforts are not duplicated and the WEs can continue to strengthen their capacities to provide water supply in the service areas. USAID should continue to promote working through WEs with the other donor organizations.

Recommendation #2: Consider procuring tools and equipment for repairs (e.g. compressors, wrenches, safety equipment, sump pumps, asphalt cutters, tool boxes, etc.) and crew trucks for the WE branches, which are directly affected by the Syrian refugee influx.

The WEs reported a lack of equipment to sustain the existing level of service, and systems are now under more stress and pipe breaks are becoming more common. To ensure that network crews can respond to maintenance and repair needs in a timely manner and correct defects in the systems, the assessment team recommends providing these equipment and crew trucks where needed. These will help the WEs secure the current water supply to existing customers, and it will also address emergency preparedness by improving the WEs responsiveness to unforeseen events.

Medium to Long-term Intervention Recommendations

Recommendation #3: Consider providing assistance in completing and commissioning selected on-going projects, such as those implemented by third parties and development agencies.

The WEs are faced with commissioning complications due to unfinished capital investments by third parties and other development agencies. For example, the Beit Mellat water supply networks remained unfinished for 10 years before being commissioned through a joint technical and financial assistance of USAID LWSS, GIZ, and the NLWE. The assessment team believes that USAID can leverage existing infrastructure by assisting the WEs to commission these types of projects. As a

typical example, the BWE presented the case of the Fleoua WTP, which serves at least 10 villages in the eastern Baalbeck area. The WTP is supplied from the Yamouneh canal and is currently not operational due to a number of constraints. If operated, this WTP could supply treated water to all the villages by gravity, resulting in at least 10 boreholes located in the Bekaa plain to be placed on standby. Similar cases can be identified in the West Bekaa service area.

Recommendation #4: Increase technical assistance coupled with capital investment projects. Assist the WEs to improve overall utility management and increase revenues.

In light of the on-going efforts to address capital investment needs due to the Syrian refugee crisis, development agencies are planning to contribute significant funding to infrastructure investments in the water sector. However, capacity building should receive proportional attention. The assessment team recommends that proportional time and resources for technical assistance be allocated to improve the overall performance of the WEs to manage these new assets.

Recommendation #5: Support the WEs to incorporate emergency preparedness as a strategic objective in the upcoming business plan updates.

USAID and GIZ have recently supported the development and updates of business plans to define the WEs' strategic objectives and action plans for performance improvement and to serve as a "road map" in guiding the management in performing its duties. The assessment team believes that including emergency planning and preparedness as a strategic objective in the business plans will help sustain continued commitment from the WEs to address emergency preparedness beyond the current crisis. Consequently, the team also recommends that USAID further support business planning update activities to ensure continued effort in performance improvement. By sustaining a yearly update of the business plan, the WEs can transition to commercially-focused utility management.

2. INTRODUCTION AND BACKGROUND

2.1 Syrian Refugee Crisis in Lebanon

In March 2011 the crisis began in Syria, and as violence intensified and fighting continued throughout the country, many civilians started to flee to neighboring countries including Lebanon. The Government of Lebanon (GoL) has maintained an “open-border” policy, which has allowed Syrian refugees to settle all over the country. However, the GoL has been reluctant to support tented camps as found in Jordan and Turkey, and the refugees are now widely dispersed throughout Lebanon. They are residing in various places ranging from city apartments to increasingly common informal tented settlements (ITS) especially in northern Lebanon and the Bekaa plain. The number of registered refugees in Lebanon has risen drastically since the crisis began and has reached nearly 650,000 as of September 19, 2013, according to UNHCR. The World Bank and other relief agencies estimate that the total number of refugees in Lebanon to be approximately 1 million when including unregistered refugees. Although projections of future population influx are uncertain, the World Bank’s recent Economic and Social Impact Assessment (ESIA) of Lebanon states “a baseline refugee influx scenario forecasts 1.6 million refugees by end-2014 (37 percent of Lebanon’s pre-crisis population).”



Informal Tented Settlement (ITS) in Marj, Bekaa, Lebanon

Lebanon was already in a fragile state of economy and this influx of Syrians has resulted in substantial strains on financial and human resources in various services sectors such as electricity, water and sewer, medical facilities, and education. The World Bank ESIA of Lebanon estimates that, “Water supply and sanitation systems, already facing acute pre-crisis challenges in balancing supply augmentation with demand management, must now meet an additional estimated water demand of 26.1 million m³/year, equivalent to 7 percent of the pre-crisis demand.” The ESIA also states that in order to stabilize and return to pre-crisis levels of service, additional interventions are needed in humanitarian relief, additional capital and O&M costs, provision of urgent equipment and additional short-term infrastructure for restoring water supply, and acceleration of infrastructure investments such as storage and transfer infrastructure, distribution network rehabilitation and replacement, water and wastewater treatment, and irrigation improvement coupled with institutional reforms.

2.2 USAID WISE-Lebanon Program

The Water Infrastructure Support and Enhancement for Lebanon (WISE-Lebanon) program is a three-year activity, which started in September 2012 and is funded by the U.S. Agency for International Development (USAID) with the objective of improving Lebanon’s capacity in the management of water resources through water infrastructure upgrades and related management support. WISE-Lebanon comprises three components, including: (1) project identification and design – performing a focused analysis within potential areas of intervention and identifying specific projects and activities, developing architectural and engineering designs, and preparing bidding documents for the implementation of selected projects, (2) project implementation – providing engineering, construction, procurement, and construction supervision/management services for the

implementation of selected water infrastructure projects, and (3) capacity building on implemented capital investment to enhance the capacity of water establishments (WE) on the management of the implemented projects.

2.3 Rapid Assessment and Objectives

In August 2013, USAID requested that the WISE-Lebanon program conduct a rapid assessment of the communities served by the WEs and directly affected by the Syrian influx in order to identify, develop, recommend, and potentially implement integrated interventions. The focus of the interventions would raise the capacity of the Water Establishments to cope with the increase in demand on local water resources due to the refugee influx and address the recurring emergencies resulting from an overall volatile situation in the Middle East region. The assessment was implemented in two parts: (1) a quick response needs assessment in the water sector to identify potential interventions that can be implemented within six months to one year, and (2) an emergency preparedness assessment of the WEs ability to respond to emergency and crisis situations that affect service delivery. In order to share initial findings and build capacity on emergency preparedness, the assessment team also included an emergency preparedness workshop for the Water Establishments and invited other donor organizations and selected USAID COPs to attend.

The assessment team of the WISE-Lebanon project consisted of three members: Mr. Rick Albani (COP), Mr. Salah Saliba (Technical Advisor), and Mr. Zachary Borrenpohl (Assessment Engineer), hereafter referred to in this report as the “assessment team.” All three members participated extensively in the assessment coordination and recommendations discussed throughout this rapid assessment report. The assessment team schedule of meetings can be found in Annex A of this report.

The assessment team worked to complete the following objectives:

- Assist USAID/Lebanon to support emergency response strategy focused on enhancing and building emergency planning and preparedness capacities of the WEs for them to cope with a large population influx and future crises.
- Recommend options for effective interventions identified in coordination with key stakeholders including the WEs, municipalities that are affected, the EU, UNHCR, ICRC, and the World Bank. The focus was on *integrated quick implementation projects* with outcomes that would mitigate the effects of the influx of large numbers of Syrian refugees on Lebanese host communities, while keeping the identified activities and interventions within the overall *strategy of emergency preparedness and planning*. Those activities will secure and maintain medium to long-term benefits to the WEs, preserve basic levels of sustainability, and assign ownership and maintenance responsibilities for any assets installed or constructed.
- Propose methodologies and tools for technical assistance and capacity building in conjunction with integrated quick implementation projects.

2.4 Coordination with Water Establishments, Municipalities, and other Donor Organizations

The rapid assessment was coordinated with the WEs and associated branch managers, municipalities, and the current efforts of other donors in response to the crisis. The WISE-Lebanon rapid assessment team cooperated with donors such as UNHCR, UNICEF, UNDP, ICRC, GIZ, the World Bank, and the European Union to capitalize on their response activities and lessons learned to date, and leveraged their successes to further the objectives of the rapid assessment recommendations. The assessment team also attended the USAID/OTI Naseej Conference for communities in the Akkar region on October 31, 2013.

It is important to note that the World Bank, at the request of the GoL, and in collaboration with the UN, the EU, and the IMF, performed a rapid Economic and Social Impact Assessment (ESIA) of the Syrian conflict on Lebanon and produced its findings during the WISE-Lebanon rapid assessment. In addition, the World Bank/UN “Lebanon Roadmap of Priority Interventions for Stabilization” was produced in October 2013 to discuss with donors next steps to address the impact of the Syrian conflict on Lebanon’s economy and livelihood opportunities, access to basic services, social fabric, security, etc. The “Roadmap” of preliminary set of prioritized immediate-, short- to medium-term recommendations has been developed to focus on alleviating the impact on the government’s budget and deteriorating public services to host communities.



Meeting with Mr. Walid Atallah, UNDP, Zahleh, Lebanon

3. METHODOLOGY

3.1 Quick Response Assessment and Matrix

The assessment team met with various stakeholders to collect information and discuss the needs for potential quick impact interventions. Initial target villages to assess within each WE were identified from a list compiled by the UNHCR of registered Syrian refugees (see Annex B). The assessment team further identified communities to visit and interview by targeting the highly-impacted municipalities within each WE service area, identifying municipalities prioritized by the WEs, and through input from other donors and key stakeholders. The WEs in the North and in the Bekaa are being impacted more than the service areas of SLWE or BMLWE. Therefore, the assessment team had a greater focus to identify interventions in BWE and NLWE. The assessment team established contact with BMLWE, but the team was not able to meet with the WE. Annex A lists key meetings and site visits conducted by the assessment team between September 25, 2013 and November 01, 2013 to produce the results described in this report.

The recommended quick response activities were identified through a consultation process that started with meetings with the WE Director Generals (DG) and their senior staff and continued through meetings with the WE branch managers and municipal officials. The assessment team developed baseline questions for the WEs, branch managers, and host community officials, which



Meeting with branch managers, NLWE, Tripoli, Lebanon

led to discussions on challenges and needs of operating existing infrastructure under the current conditions. The questions can be found in Annex C, and results of the assessments are summarized in Section 3 of this report. The assessment team prioritized potential areas of intervention based on the needs of each WE and the USAID assessment objectives, which directly supported the WEs to improve their capacity to cope with the increase in water service demand from the refugees. Overall emergency preparedness and planning by the WEs were also taken into consideration when applicable.

The assessment team directed the WEs' senior management to focus on capital repair and replacement interventions that could be implemented in a relatively quick manner (between six months and one year). Major capital investments would require a much longer lead time to implement and do not fit within the scope of quick impact interventions. However, those types of major projects were not dismissed during the screening process due to the extensive needs of the WEs, but they received lower ratings in the prioritization process. Examples of projects discussed with the WEs that focus on aspects that could alleviate the added burdens of increased water demands while trying to cover as much service area population as possible are the following:

- Improve the production and delivery capacity of pump stations through repair and refurbishment of some existing pumps, installation of additional standby pumps, provision of spare parts for motors and pumps, and possible short-term O&M support.
- Construct new storage reservoirs or prefabricated polyethylene reservoirs in key locations to supplement existing storage capacity and balance out pressure differentials.

- Procure, install and operate chlorination equipment to improve disinfection and minimize water-borne diseases.
- Procure transport vehicles, other pre-selected equipment, and manual or power tools for crews / network repair and distribute this support equipment to specific water establishment branches serving the areas affected by the Syrian influx.

Interventions in the wastewater sector were not addressed by the WISE-Lebanon assessment team at length due to the extensive requirements of longer term assistance to the WEs for the commissioning and operation of existing wastewater infrastructure. Those types of interventions did not fit within the framework of quick impact interventions. Furthermore, and as per the aforementioned reasons, the WEs senior management did not propose any wastewater related interventions especially since the GoL represented by CDR has implemented a number of large wastewater treatment plants and currently is executing related sewage collection schemes within the framework of the national wastewater strategy.

The assessment team developed the following prioritization criteria to evaluate the types of various interventions proposed by the WEs, while keeping in mind the overall strategic criteria of USAID. At the request of USAID, the assessment team emphasized timeline of implementation and impact of host communities by percentage of Syrian refugees. The final prioritized matrices of potential interventions can be found in Annex D.

- Percent of Syrian refugees of total population
- Duration of implementation (months)
- Strategic Development Criteria
 - Reduction of NRW (Tech-Admin)
 - Improvement of service (supply time, quantity and quality)
 - Sustainability: ownership, show case of best practice
 - Contribution to O&M Cost Reduction (HR and financial resources)
 - Environmental: water conservation
 - Integrated and Comprehensive project
 - Reduce Health Risk

Although considering commercial criteria elements is a best practice, they were intentionally not considered when prioritizing the quick impact activities because under emergency interventions the impact on expected additional revenues would be almost negligible. In this case, the additional number of beneficiaries would be the Syrian refugees who, in principle, do not count as potential long-term customers under the current circumstances.

Finally, the assessment team also used published reports by the World Bank including the ESIA for Lebanon, the Lebanon Roadmap of Priority Interventions for Stabilization from the Syrian Conflict, and the 2010 Water Sector: Public Expenditure Review for further background information.

3.1.2 Other Donor Organizations

The assessment team cooperated with other donors and relief agencies such as UNICEF, ICRC, the European Union, UNHCR, UNDP, and GIZ to capitalize on their response activities and lessons learned to date, and the team is leveraging their successes to further the objective of the rapid assessment recommendations.

3.1.3 Cost Estimations for Potential Interventions

Although cost estimates were not considered as criteria for prioritization, they were included for informational purposes. The purpose of these estimates is to have an approximation of the cost needs, which can be used as an aggregate estimate for the WEs. The assessment team suggests that more detailed cost estimates and feasibility studies be completed for planned interventions. During the identification process, the assessment team estimated the implementation cost of a project based on the total length of the proposed network and the estimated number of connections. Available cost data included the average cost per household connection, the average construction cost per linear meter of network, and the market costs for storage tank construction and well drilling. Sources of data included:

- Average budgetary construction costs used by the WEs.
- Unit costs for construction materials used by Engineering Consultants, which prepare designs for MoEW, the CDR and other similar entities involved in infrastructure development.
- WISE-Lebanon's records including:
 - Cost estimates based on general estimates using construction costs average for network length and number of connections. This provided common ground for comparing projects to within $\pm 15-20\%$ accuracy, which is acceptable for the purpose of comparing projects and establishing an overall budget for implementation. Refined estimates to within $\pm 10\%$ can be provided using more detailed designs during the project feasibility stage.
 - Cost estimates based on historical data; actual local and regional market conditions affecting the labor and construction materials markets may influence the final actual construction costs of the projects.

3.2 Emergency Preparedness Assessment for Water Establishments

In order to determine the level of emergency preparedness of the WEs, the assessment team developed baseline questions to understand their overall needs to address emergency planning. The team also researched best practices and water sector standards including using the American Water Works Association's (AWWA) Manual M19 – *Emergency Planning for Water Utilities*. The questions can be found in Annex C. Results of the emergency preparedness assessment of the WEs are included in Section 4 of this report.

4. QUICK RESPONSE ASSESSMENT

The following section summarizes the outcomes of assessing the WEs and the host communities. These two sections are sub-divided to describe the existing needs before the Syrian refugee crisis, the impacts as a result of the crisis, and the resulting needs and donor responses. Detailed notes of all meetings are available upon request.

4.1 Water Establishments

The assessment team initially contacted all four WEs to assure continuous coordination in the assessment and emphasized USAID’s intent to assess potential interventions to support the WEs in coping with the increased water demands on host communities as a result of the Syrian influx. The assessment team used a matrix with specific criteria chosen, including the number of Syrians estimated to be temporarily residing in the service area when initially identifying and prioritizing infrastructure projects. The assessment team met with many of the WE branch managers and discussed in depth typical projects that fit under capital repair and replacement including: refurbishment of some existing pumps, installation of additional standby pumps, provision of spare parts for motors and pumps, and possible short-term O&M support. The following subsection is a summary of the meetings with WE staff.

4.1.1 Existing Needs Before the Refugee Crisis

Generally there is an average of 50% service coverage within the assessed WEs, and overall performance is poor. The assessment team reviewed key performance indicators from the business plans to benchmark pre-crisis conditions, such as service coverage, percentage of NRW, and percentage collection rate. The assessment of the WEs confirmed that many of the pre-crisis needs have become more urgent. As mentioned in Section 1, the staff members of the WISE-Lebanon program met with the WEs to assess needs and prioritize capital investment infrastructure projects in early 2013. The list of needs was extensive at that time, and now interventions to address those same needs are being requested again. In the NLWE for example, service coverage is approximately 50%, and the needs to increase this coverage will be time-consuming and costly (estimated at \$200 million USD). The assessment’s prioritized list of projects in NLWE includes a number of water supply and distribution networks, which were listed before the crisis. Similarly in the BWE, the DG developed a list of quick response needs, which had many projects as addressed in the business plan before the crisis including water supply network extensions and/or replacements in affected service areas. Although these types of projects do not necessarily fit within quick impact interventions, the BWE wanted to include them because it is experiencing increased water demands in areas where the level of service is already low due to limited coverage and infrastructure.

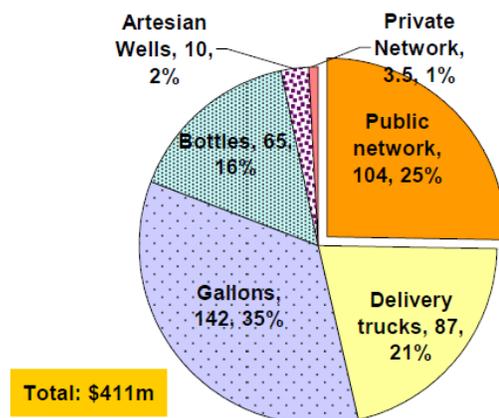


Figure 1 - Total Revenues by Source of Supply (\$m and Share of Total), Total Customer Base – PSIA Survey Data 2008, 2010 Water Sector: Public Expenditure Review, The World Bank

Alternatives with Private Water Suppliers -

Furthermore, alternatives in domestic water supply through the private sector were common before the crisis, and the assessment team observed an

increasing reliance on these alternative systems due to the increases in water demands. According to the Water Sector: Public Expenditure Review published by the World Bank in 2010 (Figure 1), “private water supply accounts for 75 percent of total household water expenditure” and noted that, “virtually all connected households rely on a combination of public and private water supply to meet their daily water needs.” The WB review stated that the most prominent sources of private water supply, in terms of expenditure share, are private bottled water (gallons) (35 percent), followed by delivery trucks (21 percent) and small water bottles (16 percent).

Lack of Continuous Electricity Supply - One of the most common existing needs of the WEs is continuous electricity. Nearly all of the service areas of the WEs are experiencing electrical supply intermittency. The SLWE is particularly sensitive to the intermittency since all sources use pumping for water conveyance and distribution, and there are relatively few gravity-fed distribution networks in the South. The SLWE uses electricity mostly from the main power grid so getting dedicated connections to the grid for the pump stations is important to keep them running as much as possible. The establishment does not use generators often because of the high costs of the fuel to operate them. Eng. Roula Samoura of the SLWE stated, “Shortage of electricity is the main problem – we have enough water in the Saida service area.” The DG of the BWE mentioned that the intermittent nature of the electricity supply to the Bekaa area has caused a reduction in the water supply delivery hours.



Non-operational Hydroelectric Plant, Jeita, Lebanon

However, he also mentioned that it has reduced some of the operating costs that would normally be incurred if there were 24 hours continuous electrical supply. The management of NLWE, BWE and SLWE decided, as a part of their business plans’ overall performance improvement programs, to improve the situation of the overdue energy bills by beginning to pay electrical energy expenses. They are starting to pay an increasing percentage of the total expense incurred in a given year and will eventually pay 100 percent of the electricity expenses within the 5-year timeframe of the business plans.

Missing Permanent Skilled Staff and Basic Repair Equipment - The WEs also reported a lack of skilled, permanent staff and basic equipment to deliver the required level of service. This was most prominently noted in the BWE. Mr. Talal Abdoun of the South Bekaa Branch stated that in Joub Jannine there are five laborers for 12,000 customers. “It’s not enough people; nor equipment.” In fact, the municipalities are operating several networks due to the lack of staff resources at the establishment level - although electricity is still being billed to the WE. The branch managers in the BWE expressed the need for O&M equipment and chlorination units. In the North Bekaa Branch there is one head of O&M and two teams of six technicians for the branch. Due to a lack of personnel, the branch has outsourced O&M of three pump stations to contractors in West Baalbeck, Ain, and Lebouneh. Consequently Mr. Salah Hammedeh of the North Bekaa Branch reported that the collection rate has suffered in West Baalbeck since the WE is not operating them. He went on to state that the WE is trying to take over these pump stations to collect more revenues. In the Rachaiyah area, there are 19 wells (one per village), and except for electricity costs, the O&M costs are covered by the municipalities. The municipality does not collect fees since they are paying the costs. The WE is also slowly starting to take over these wells.

Unfinished and Non-commissioned Capital Investments - The WEs are faced with commissioning complications due to unfinished capital investments by third parties or other development agencies. For example, the Beit Mellat water supply networks remained unfinished for 10 years before being commissioned through a joint technical and financial assistance by the USAID LWWSS project, GIZ, and the NLWE. In the BWE service area, Eng. Imad El Khazen from GIZ presented the case of Fleoua WTP which serves at least 10 villages in the eastern Baalbeck area. The WTP is supplied from the Yamouneh canal and is currently not operational due to a number of constraints. Two of the constraints highlighted by the WE are the lack of an electrical transformer, which has been ordered by EDL, and inaccessibility on the unpaved service road, which requires a 4 X 4 vehicle to travel the road. If operated, this WTP can supply treated water to all the villages by gravity, resulting in at least 10 boreholes located in the Bekaa plain to be placed on standby. Similarly, the newly executed Marj water supply network funded by KFAED is currently being operated and tested by the construction contractor. However, all households are being connected equally for both registered and unregistered customers. The BWE senior management mentioned that the commissioning process will only be completed if the contractor finalizes the “snag” list prepared by BWE and addressed to CDR.

Non-Revenue Water and Demand Management -

The WEs acknowledge that NRW is high, but it is generally thought that it will be too costly to repair the leaks and reduce the technical losses and also it will take too much time to try to reduce NRW especially in the middle of a crisis. Even though the effort to reduce the commercial (or administrative) losses is deemed economical, it is highly unpopular under such limited service operating conditions. In addition, Mr. Kamal Mawloud from the Tripoli Branch mentioned there is an increased lack of demand management due to the political and security instability in several service areas in and around Tripoli.



Pipe Burst, Fleoua, Bekaa, Lebanon

The establishment is unable to disconnect illegal connections and collect past due accrued bills. The assessment team noted that despite the documented hesitation to address demand management under current circumstances, it is clearly an important component of overall utility management. The WEs have extensively addressed the issue of NRW reduction through strategic objectives in the business plans and performance improvement action plans.

Areas Controlled by Committees - Finally, several places within the WEs service areas are still controlled by a municipal committee. Eng. Gaby Nasr mentioned that Wadi Khaled service area in Kobayat, for example, is currently not served by the WE and the cost of implementing the needed water supply network is estimated to be approximately \$12 million. This is also the case in Al Kaa village in Northern Bekaa, but local committees and/or municipalities illegally commissioned those networks. The BWE cannot address the water issues in those areas unless the municipalities’ committees turn over the assets to the WE as required by Law 221.

4.1.2 Impacts as a Result of Syrian Refugees

The recent influx in Syrian refugees in Lebanon has led to an increase in domestic water demand in all four WEs. However, the NLWE and BWE service areas have seen the largest increases in refugee populations within the Lebanon governorates. According to the population data provided by UNHCR in September 2013, the Northern governorate had 210,000 registered refugees and the Bekaa governorate had approximately 216,000 registered refugees. The numbers of *unregistered* are thought to be approximately the same. Based on the business plans, the BWE was expected to have a population growth of 9% in the next 5 years. However, if the number of registered Syrian refugees is counted in the total, the WE has already grown by as much as 40%. In Table 1.1 below, the WISE-Lebanon assessment team adopted the demand analysis module from the WEs' 5-year business workbooks in order to help quantify the impact of the Syrian influx on water production by assuming that all refugees are served through the existing water networks.

Table 1.1 – Impacts from Syrian Refugees

Water Establishment	BWE	NLWE	SLWE
Population in service area 2013	534,255	923,382	775,898
Number of registered refugees Sept 2013 (UNHCR)	216,000	210,000	84,800
Projected population growth over 5 years BP (1.75%,1.8%, 2% pop inc / year respectively)	9%	9%	10%
% population growth in one year due to Syrian refugees	40%	23%	10%
% Increase in water production to cover the needs of registered refugees*	49%	35%	8%
% reduction in service coverage*	From 68% to 46 %	From 57% to 46 %	From 84% to 76%

* assuming that all refugees are supposed to be served through the existing water networks

Through the team's observations during the assessment, it was noted that Lebanon has hosted Syrian migrant workers as seasonal laborers well before the current crisis. Therefore, the existing systems were already pressured before the crisis.

Breakdowns More Common; Equipment Used Continuously - For the most part, the water service providers in Lebanon were already producing as much water as possible even before the refugee crisis. The Dbayeh water treatment plant serving the Beirut area is currently pumping as much water as it can, which is the same amount as was being pumped before the refugee influx. In Tripoli, the WE is also currently producing its maximum capability (approximately 110,000 m³/d) to service the needs of approximately 53,000 Syrians along with the existing 55,000 customers. However, impacts in water demand increases are being felt at the O&M level of the networks and pumps. Eng. Simon Barakat, Head of O&M Tripoli Branch, mentioned that all pumps are being used to keep up with demand and breakdowns are more frequent. "The breakdown percentage has increased from 5%-10% to 15%-20% due to increased operation time and low voltage supply. A major problem for the

Branch is the current production capacity does not meet the current increase in water demand.” Mr. Abdoun in the South Bekaa Branch of the BWE commented that at the Chamsine Pump Station the electrical supply is continuous and pumps are operated continuously, but it was previously using only two of the four available pumps, and now it is using three of them with one standby pump.

Rationing Increased - Refugees are reportedly using existing household and other illegal connections, and many service areas are adopting more stringent water rationing measures to handle the increase in demand. Eng. Tarek Hammoud from the Minieh Branch (NLWE) reported that in some extreme cases the rationing schedule went from 12 hours per day to two hours every other day. Similarly, before the Syrian refugee influx, Maalaka in the Zahleh Branch of the BWE was able to provide water as long as there was electricity, but now water is provided three hours every other day. In the South Bekaa Branch, the branch manager noted that houses located on the network peripheries are sometimes no longer getting water due to refugees connecting to the network, and existing customers are reluctant to pay since the service is decreasing. The assessment team noted that water storage reservoirs are emptying at quicker rates. According to Mr. Salah Hammedeh, the reservoir in Hermel used to take 8 hours to drain, and now it is being drained in 5 hours. He estimates that water service delivery has dropped by 30% in all villages in the North Bekaa Branch of the BWE.

Impacts in the SLWE - Not all the WEs have felt this level of impact, though. In the SLWE, impacts of Syrian influx on water demands and the level of services provided has not been noticed on a wide-scale at this time. The head of O&M, Eng. Roula Samoura, explained that even though there are refugees in the South, many Lebanese have homes in Lebanon but are living and working abroad. Therefore, many vacant houses are occupied with Syrian families as rental units. “Refugees are living in Lebanese houses so they are generally getting water through existing connections, but shortages in water supply existed before the crisis”. Notably the SLWE has directly intervened in two cases where a high number of refugees were living in incomplete buildings without direct access to water. The WE constructed pipeline extensions from existing networks to service these locations at the request of the Saida municipality.

4.1.3 Response to Crisis and Needs of Water Establishments

The refugee crisis has raised substantial interest from donor and relief agencies especially in the NLWE and the BWE where the impacts are the most acute. In early and mid-2013, members of the WISE-Lebanon program met with several of these agencies to help them coordinate their efforts, and the team strongly encouraged them to work through and coordinate with the WEs especially as their work shifted from humanitarian assistance to stabilization. By doing so, the donors strengthen the WEs ability to manage the resources and planning activities in their service areas, and they do not further add infrastructure that the establishments cannot manage. During the early stages of the rapid assessment, WE senior management initially informed the assessment team that, like USAID, several donors such as ICRC and UNHCR had recently expressed interest in assessing and helping the WEs with small, quick response projects. Initially the WEs did not systematically organize their projects by priority nor did they have a complete list of what they need for these types of projects. The WISE-Lebanon rapid assessment team worked with the NLWE, SLWE, and BWE to help identify, organize, and prioritize their needs; the prioritized matrices are found in Annex A. The matrices are tools developed earlier under the WISE-Lebanon program that the WEs have used to analyze and prioritize projects and can be used for forecasted interventions from donors.

In addition, the WISE-Lebanon assessment team identified service areas highly impacted by the Syrian refugee influx where capital investments are being planned or are currently implemented such as the \$60 million KFAED fund program in the Western Bekaa area. As shown in Table 1.2 below, several of the most impacted villages in the BWE from refugees are being addressed by this KFAED program. Therefore these areas were not a priority for the BWE.

Table 1.2 – On-going Capital Investments in the BWE Service Areas Most Impacted

ACS NAME	CAD NAME	KADA	MOH	POP	%	COMMENTS
Baalbek	Baalbek	Baalbek	Bekaa	9378	3.508957633	WB completed network
Barr Elias	Bar-Elias	Zahleh	Bekaa	10713	3.448093361	WB completed network
Aarsal	Arsale	Baalbek	Bekaa	6979	3.351239779	Committee-run – recent CDR network
Majdel Aanjar	Mejdel-Anjar	Zahleh	Bekaa	6129	2.180528725	KFAED funded
Marj BG	Al-Marje	West Bekaa	Bekaa	5414	1.961946598	KFAED funded
Qaa Baalbek	Al-Qa El-Benjaki	Baalbek	Bekaa	3933	1.737542671	ICRC - transformer
Ghazzé	Ghazzé	West Bekaa	Bekaa	3621	1.197703035	KFAED funded
Hermel	Hermel	Hermel	Bekaa	2745	1.180766890	ICRC – rehab of PS and transmission line
Joubb Jannine	Jib Jénine	West Bekaa	Bekaa	3005	1.064860144	KFAED funded
Zahlé El-Midane	Zahlé Midan	Zahleh	Bekaa	3545	0.869035963	KFAED funded
Kfarzabad	Kfar Zabed	Zahleh	Bekaa	2994	0.860038636	KFAED funded
Souairi	Al-Sawiré	West Bekaa	Bekaa	2265	0.859509381	KFAED funded

Needs of Water Establishments - The WISE-Lebanon assessment team approached each WE on behalf of USAID to examine their needs that would raise the capacity of the Water Establishments to cope with this increase in demand on local water resources. As mentioned, the team focused on capital repair and replacement interventions, which can be implemented in a relatively quick manner (between six months and one year). However, some larger capital investment projects were also considered as they were pre-crisis needs of the WEs and addressed previously under the USAID/WISE-Lebanon program selection of projects. The general consensus by the WEs is to focus on increasing production as much as possible to strengthen existing water services provided by the WEs. USAID consultant Philip Giantris commented during the Bekaa Water Establishment donor coordination meeting that the focus should be to maximize water supply in areas that are serviced by the WEs in order to sustain the pre-crisis levels of service to meet current customer needs - even if the distribution systems are inefficient. By doing so, the WE will secure and maintain an acceptable level of service to existing customers, which is imperative since they are hard to regain once they are lost. In the NLWE, Eng. Gaby Nasr mentioned that there are two primary ways to help the WE cope with the Syrian refugee influx – increase distribution capacity and increase production capacity. He suggested that the assessment team recommend supporting expedited interventions that increase production capacity through provision and installation of standby equipment and provision of replacement equipment. He said that increasing distribution capacity at this stage of the crisis will take too much time and cost too much for quick impact interventions.

Selection Matrices for Identified Projects – As previously mentioned, the assessment team developed a selection matrix for the projects based on the identified needs of each WE. The projects were evaluated based on three main selection criteria: the percentage of Syrian refugees in relation to the total population in the target service area, the estimated timeframe for implementation in months, and the strategic developmental criteria. Furthermore, and in order to prioritize and rank the potential

interventions, the WISE-Lebanon assessment team assigned weights to each of these criteria. Accordingly, the percent of the Syrian refugee population impact was weighted at 40%; the timeframe to implement was weighted at 50%; and developmental criteria 10%. The scoring rationale of the strategic development criteria can be found in Annex E. The projects were then sorted using these three important factors based on the assigned weights. Furthermore, the matrix also included information on service area, project type and description, financial estimates, and case specific remarks. The assessment team helped the WEs identify the following types of projects: procurement of repair tools and equipment, O&M crew trucks and vehicles, standby pumps and pipes, installment of transmission line and distribution line replacements, pump replacements, development of new wells, and construction of network extensions. The table below summarizes these types of projects addressed by the WEs, which were prioritized using the matrices.

Table 1.3: General Overview of the Types of Projects Addressed Under Each WE Matrix:

Type of projects
1. Increase and/or secure production, new wells, pump replacement
2. Transmission lines repair and/or replacement
3. Water supply network extension and/or replacement
4. Procurement of pumps, pipes for stores/standby
5. Procurement of generators
6. Procurement of O&M equipment & related crew trucks
7. Reservoirs
8. Procurement and installation of Chlorination units

Repair tools and equipment - Nearly all of the interviewed WEs and branch managers requested tools and equipment to make repairs in order to better serve their customers. Systems are now under more stress and pipe breaks are more common. Eng. Simon Barakat of the Tripoli Branch mentioned that this type of intervention is supported by their business plan, and he confirmed that there is staff dedicated to O&M and network repairs. DG Krayem of the NLWE also stated that O&M equipment is among the priority interventions needed. Types of equipment requested consisted of compressors, wrenches, safety equipment, sump pumps, asphalt cutters, tool boxes, leak detection devices, CCTV for pipes, and communication CBs radios.

O&M Crew Trucks & Support Vehicles - Senior management and several branch managers in the NLWE indicated that there is a need for O&M crew trucks to make more timely maintenance and repairs. Eng. Louay Youssef from the Halba Branch said, “there are team members available to help with emergencies and repairs, but there is a lack of transportation. Sometimes they have to use personal vehicles to address emergencies.” The NLWE also mentioned a need for a mobile laboratory and water tanker trucks for areas not served. Eng. Tarek Hammoud from the Minieh Branch said that tankers would help cover larger areas that are not covered by the network. The DG of the BWE indicated that his branches need trucks for 11 network O&M teams. Conversely, the

SLWE stated that there was no need for vehicles in the south, but a backhoe and water tankers would help them.

Pump replacement; Standby pumps and pipes; Chlorination units - DG Nizam of the SLWE stated that existing pump repairs and replacements, procurement of standby pumps and pipes, and chlorination system repair and replacements are his first priority. These needs include procurement of HDPE pipes (20 mm – 110 mm) for the store and standby pumps, and the WE already has tender documents for procurement that calls for these materials. The DG would release them whenever funds are available but will provide them to WISE-Lebanon for consideration under the quick impact activities. Regarding chlorination systems, he said that even those that are optimally operated and maintained still only have a 5-year operational life. The NLWE senior management staff and branch managers also stated the needs of standby equipment (e.g. submersible pumps for production) for contingencies in order to sustain a continuous supply and increase production capacity, which is currently working at its maximum yield capacity. For example, Mr. Kamal Mawloud of the Tripoli Branch said that standby equipment in order to perform replacements and repairs of regularly used equipment are greatly needed, and Mr. Fathi Fatfat indicated a need for standby submersible pumps in Koboyat.

Transmission line and distribution line replacement - The replacement of transmission and distribution lines is a common need among all of the interviewed WEs, and it was most notable in the BWE. For example there is a need to replace 2 km of distribution mains from the Zahleh WTP to the Medane – Berbara service area because the existing line is 50-60 years old with at least 60% technical losses. The NLWE also listed several areas for new transmission and distribution lines as well as the SLWE. DG Nizam specifically mentioned the need for repair and replacement activities in Jezine, Ibl el Sakeh, and Hasbayah.

New wells, networks and network extensions - As mentioned above, many capital investment projects were identified due to pre-crisis needs especially in the NLWE and the BWE. In the Koura Branch of the NLWE for example, the Nakhle service area requires a new well to increase production. According to Eng. Tony Khair, the Koura Branch Manager, the service area is affected by the Syrian influx and by Tripoli citizens fleeing the latest security instabilities in the downtown area. Another example is a network in Hermel, which needs a 15 km extension due to urban expansion. The BWE identified several new wells and networks needed in Riyaq, Qabb Elias, Seriil, Tamnine El-Tahta, Ablah, and Aaqabe. Similarly, the NLWE identified new wells in Al Jisir Area, Bsatine, Meryata, and Rasskifa.

4.1.4 BMLWE

The assessment team established contact with the BMLWE, but the team was not able to meet with the Water Establishment during the assessment phase, due to the DG not being readily available.

4.2 Host Communities

The assessment team visited several host communities throughout the assessment period in order to understand the needs on the ground and how they compare to the needs reported by the WEs. The WE senior management agreed that the assessment team could meet with host communities represented by municipalities and union of municipalities whom in turn would have direct field experience of the impacts from the Syrian refugees. It is noteworthy that the WISE-Lebanon assessment team met with the union of municipalities that usually represent a large number of individual municipalities but also considered other single municipalities that are not affiliated to any unions. The following section is a summary of the outcomes from these meetings.

4.2.1 Existing Needs Before the Refugee Crisis

As discussed in the previous section, the host communities confirmed that there is generally low service coverage within the areas assessed, and overall performance of water delivery service is poor. The low performance level existed before the crisis, and the increase in refugees have now made it worse. In the Zgharta service area for example, smaller villages lack water supply networks, and many of them seek the support of the union of municipalities to help with supply needs except the large towns such as Ehden and the City of Zgharta. In addition, most of the villages have low storage capacity. All of the interviewed municipalities reported using tanker trucks to supplement their water supply.

Overall, the assessment team observed a gap in understanding regarding the level of services that the WEs can provide to municipalities' service areas. In Taalabaya, for example, the municipality reportedly requested engineering supervision from the WE for a network for which they proposed funding to construct. The mayor said that the community was willing to pay for everything including material costs and construction, but only needed the supervision. The WE informed them that it would first have to go through the proper channels of approvals in order to approve this contribution and provide this oversight, which would include an approval from the WE board of directors and an endorsement from the MoEW. The municipality said that this is a long process, and it already started to implement parts of the network and paid for it (although the branch manager of Zahleh later stated that the municipality only paid for the excavation). The community did not understand the WE's systems and planning process.

Several municipalities, including Halba and Kfartoun, said that the WEs (and development agencies) have also had delays in implementing new projects. They do not want to deal with the hassle of the bureaucracy, administration, and government approvals and stated that they only want help by expedited means or by receiving funds directly because they can implement projects much faster on their own. It was reported in some cases that the UNDP has been transferring funds directly to Mayors governed by a bilateral contract based on the "acceptance of unconditional funds" mechanism. The Halba Municipality indicated that they cover some repair costs and indicated that the municipality is willing to cost share 20% of project costs with the WE. Both WE and Municipality are covering costs as reported in the SLWE service areas. Municipalities often stated that they covered at least some of the costs for repairs and new infrastructure. Some host

communities also stated long repair times from the WEs. The Koura head of the union also mentioned that the WE / Branch office has limited equipment to perform repairs and quick responses, which often results in long response times and makeshift repairs. The needs of O&M equipment was specifically raised in Halba and Marj as well.

There were several areas of unfinished capital investments noted by host communities. The Beit Mellat water network in the NLWE service area was started in 2001 by CDR primarily through funds from the Islamic Development Bank. The project was fully commissioned four years after its presumed completion. However, the NLWE had to secure a total of \$6 million through GoL subsidies and development agencies funding to complete the household connections. In Minieh, also in the NLWE service area, new wells were requested to be used until the planned CDR project is implemented and completed. The Union of municipalities of Zgharta mentioned that the commissioning process of the Ehden water supply networks is very slow. The Marj village in the BWE service area has a newly completed water supply network implemented through CDR and funded by KFAED. However, the mayor confirmed that the network was poorly implemented and all households are currently connected with 80% illegal users and only 20% subscribed metered connections. In some areas, the secondary networks are not yet completed. The project was completed late 2012 and is not yet officially commissioned by BWE while the BWE is currently supplying water from the Chamsine source (Spring located in Anjar area) based on scheduled intermittent supply.

Water demand management is a problem in almost all municipalities visited. In Kfartoun, for example, there is a demand management issue despite the fact that CDR completed a new pump station, network and wells in 2007. Therefore, under current circumstances, the WE reverts to intermittent supply as a sole mean to control demand. The head of Union of Municipalities in the Koura Caza said there are abundant water resources, however water supply is not properly managed and efficiency is very low due to lack of water demand management. Infrastructure replacement and repairs along with metering would increase the water availability. According to the head of union of municipalities in Minieh, the intermittent supply of water and the overall bad performance of the water sector management have been constantly there even before the Syrian Crisis.



WISE Team Checking Meters, Kfartoun, Lebanon

Another common pre-crisis need is electricity, which is similar to what was listed by the WEs. The Mayor of Halba reported that electric supply is only 12 hours per day, and that the municipality receives electricity approximately 150 days per year. The Taalabaya Mayor in the Zahleh area also gave an example that his community faced an inconsistent electrical supply which is affecting service. He noted that water supply is only 12 hours every other day due to intermittent electrical supply.

4.2.2 Impacts as a Result of Syrian Refugees

Since the Syrian refugee influx, the host communities are experiencing an increase in domestic water demand. Common requests from the municipalities were new wells, networks and reservoirs to handle this increased demand. The Mayor of Kfartoun stated, “There isn’t enough supply for the current demand; we need to increase production for both Kfartoun and Akroum. There has been a large increase in demand since the Syrian influx. They are drawing from the main source through tankers, which is reducing the performance of the network.” He said that the intermittent supply is increasing, and thus more production is needed to increase the supply hours per day. In Minieh, the adoption of a more stringent water supply rationing schedule from six hours per day to six hours every other day is a direct impact identified as a post influx crisis condition imposed due to increased pressure on water supply.

Private water supply such as tankers and private well are commonly listed as sources for the Syrians refugees. The ITS’s are also using illegal connections to the public water network. However, refugees hosted in households are using the existing connection be it an illegal or a legal



Water Delivery Tankers Re-Filling, Kfartoun, Lebanon

metered/gauged connection. The team visited an ITS in Marj and confirmed that the refugees are using illegal connections for water supply and are, as well, being supplied through local tankers which fees are covered by World Vision - an implementing partner to UNHCR. Despite the reported demand increases, it appeared that there is sometimes a lack of understanding of the needs of the refugees on behalf of the municipal mayors and heads of unions of municipalities. Some of the mayors did not know where the Syrian refugees were living, and they focused addressing on the community needs and less on the refugees.

In addition to domestic water needs, the communities face concerns due to uncontrolled wastewater discharge, solid waste, security, cultural differences, and socio-economic pressure. Refugees are generating additional quantities of solid waste and wastewater, which is primarily managed through the limited capacity of the municipalities. Interviewed host communities highlighted the need for support at these levels as well. In Kfartoun, municipal waste has become a major expense for the city, and the mayor stated that waste collection and disposal costs have doubled. The mayor in Taalabaya hired a work crew of 15 Syrians to clean up the trash every day because of the large increase in solid waste generation. Security and theft is also a major concern reported by the municipalities. One mayor reported that there is more “chaos” in the town.

Economic problems and cultural problems were also reported. Syrian refugees are performing manual labor and are competing with local commerce by running small businesses, but they are not paying taxes. Rents appeared to have doubled in some cases. In Saida, rental prices were estimated to have increased from \$400 per month to \$700 per month. It was noted that several Syrian families are living together in one dwelling and paying a much higher sum than one Lebanese family.

On October 31, 2013, the assessment team attended the USAID/OTI Naseej Conference, which brought together communities with international donors and civil society organizations. It provided a forum for representatives of host communities from the Akkar region of northern Lebanon to share

information on the current refugee situation in their villages and how international organizations can support their needs. Communities that were represented included: Tall Abbas el Gharby, Bebnine, Tall Hayat, Mashha, Rahbe, Berkayel, Bhannine, Bire, Mohammara, Halba, Fnaydeq, Mechmech, and Tekrit. The community representatives raised issues related to solid waste, health, education, social cohesion, electricity, irrigation, and water and sanitation. Although water interventions were a common request, solid waste removal, electricity, and addressing tensions between the refugees and the host communities were also cited as top priorities. For example, Tall Hayat mentioned their highest priority is generators, which among many things could help power water pumps. Community representatives from Halba made a similar request. Bebnine host community representatives mentioned that mounting garbage is causing health problems, which is notably worse since the start of the refugee crisis.

Several communities requested support for water and wastewater networks, network extensions, reservoirs, wells, and tanker trucks. The mayor of Tall Abbas el Gharby, Eng. Walid Metri, said that refugees are mostly using existing wells to get water by filling jerry cans. He mentioned that Tall Abbas el Gharby had a water supply problem before the crisis, but it is now being felt much more. The community requested that wells and reservoirs are provided in order to increase the supply. The common concern regarding water was addressing increases to water supply and production.

4.2.3 Response to Crisis and Water Needs of Host Communities

As a result of the refugee influx, the needs of the host communities are focused mostly on increasing production capacity through new wells, networks and reservoirs. Support to increase electricity availability was also commonly mentioned in the municipalities visited. However, in some cases the communities highlighted management improvement including assistance to the operation and maintenance of the networks, metering and meter reading, customer data base update, and assistance in the completion of the “snag” list and commissioning. Finally, although the assessment focused on potable water, sewer network improvements were also mentioned. Although there is a communication and coordination gap between the WEs and the host communities, both focused on increasing production to address the impacts of the Syrian refugee crisis.

4.3 Donors

The rapid assessment was carefully coordinated with other donors in an effort to harmonize and leverage support in order to achieve as much impact as possible. The assessment team met with UNICEF, the World Bank, UNDP, ICRC, the European Union, and GIZ, as well as attended the 35th water sector donor coordination meeting hosted at the EU, and the second BWE donor coordination meeting in Zahleh. The quick impact project identification under the rapid assessment has been performed simultaneously with various donor-led activities to identify and pledge the allocation of budgets to project implementation. The WISE assessment team identified projects together with the senior management of the WEs and accordingly the projects that were pledged by donors during the assessment period were shown in the matrices remarks column. In some cases, such as the NLWE, the WISE assessment team did not include the projects that were already selected by donors. The quick impact interventions identification process is dynamic therefore the WISE assessment team will perform further due diligence on the prioritized projects once adopted for funding.

UNICEF and the World Bank

Due to the significant role that UNICEF is playing in the refugee crisis relief efforts, the assessment team continually met with representatives from the organization early on to discuss strategy and to gather the most up-to-date information regarding refugee population data. In a meeting with Mr. David Adams, the UNICEF WASH Sector Coordinator Lead, he stated that the other UN organizations are doing similar rapid assessments and are looking to fund quick response type projects that can be implemented in six months to one year through the WEs. UNICEF believes the level of coordination among the donors is productive and highlighted the BWE donor meetings in particular. Both the WISE-Lebanon assessment team and UNICEF have suggested to the other WEs to coordinate similar donor meetings. UNICEF received an initial list of projects from the BWE, which had since been updated and prioritized with the WISE-Lebanon assessment team's inputs. The assessment team also met with Ms. Joumana Nasser, WASH Officer, to follow up with their next steps for the remainder of 2013 and 2014. UNICEF recently received the prioritized matrices from the NLWE and BWE and an initial list from the SLWE and has adopted the same format to address the needs of BMLWE. UNICEF is expecting to select quick response projects to implement in the very near future with an approximate budget of \$2 million in 2013 and potentially \$10 million in 2014.

Mr. Adams stressed that donors should continue to include the MoEW as much as possible because they are legally overseeing the WEs and need to coordinate the relief efforts. He mentioned that currently donor agencies are leading the coordination efforts, which is not a best practice for sustainability. UNICEF believes that MoEW and CDR need to take ownership for the humanitarian portions of the UN efforts and identify committed focal points. CDR is a challenge for UNICEF since they are generally not accustomed to implementing relatively small relief projects compared to their planning efforts of multi-million dollar infrastructure projects. The WISE-Lebanon program and the rapid assessment team are including the MoEW as much as possible. The assessment team further emphasized the importance of continuing to coordinate all water infrastructure support through the WEs and concluded that the national-level meetings continue to be a useful venue to share information. The assessment team also met with Mr. Ken Maskall, a consultant from the World Bank and UNICEF. He discussed the Economic and Social Impact Assessment (ESIA) of the Syrian Crisis on Lebanon, which was completed in cooperation with other development partners, namely the United Nations agencies, the European Union and the International Monetary Fund. He mentioned that the President of Lebanon, Michel Suleiman, requested that the various Ministries put together their priority programs for stabilization after the UN General Assembly meetings that occurred at the end of September. This resulted in the recently published WB Roadmap, which is a common framework for implementing a set of interventions in response to the crisis. A similar approach was adopted with GoL specifically the PM office during the 2006 war recovery.

Mr. Maskall highlighted the need for donors to have a basic understanding of how costs for water infrastructure are calculated or else organizations might over-promise impacts based on limited funds. The assessment team explained that it will use generally accepted pricing for the current market as a rule of thumb and then that pricing is vetted with market research. For example, one linear meter of network pipe installed is approximately \$100. The assessment team also stated that the price estimation is a dynamic process; therefore local engineering design firms also use this estimate as a reliable benchmark.

ICRC

The assessment team also met with Mr. Thomas Batardy, a Water & Habitat Delegate from the ICRC, for additional coordination efforts. Mr. Batardy stated, to his knowledge, most donors are now coordinating with the WEs and not going to the communities directly. However, some other UNHCR implementing partners might be working directly with municipalities with relief efforts. ICRC questioned how donors should approach areas not serviced by the WEs, but where interventions are needed. The assessment team stated that WEs are knowledgeable about these areas and have long-term plans to serve them. Service coverage should be planned out and provided under normal operating conditions, and these needs do not fit under the classification of quick impact projects since currently underserved areas would require a full scale water supply network project. However, the WEs proposed large capital investment projects along with quick impact projects. Most projects in underserved areas will require time frames that are a minimum of two years. Donors should not implement projects that are a burden to the WE, but when quick impact projects are necessary, donors should communicate and coordinate with the WEs as much as possible so the WEs are aware.

ICRC is currently implementing the below listed projects in coordination with the WEs. ICRC is starting new assessments for 2014, and they will likely be working in the South in the near future.

- Infrastructure projects :
 - Hermel city:** rehabilitation of pumping station and construction of transmission line to put into service a new water supply network and new water storage reservoirs – *ongoing until early 2014*
 - Zahleh:** installation of equipment at Moustadirat Zahleh well and construction of transmission and distribution lines to supply Maalqa and Industrial area – *ongoing until May 2014*
 - Sultan Yacoub:** rehabilitation of a pump station supplying 13 villages – *ongoing until early 2014*
- Small quick response projects:
 - Tripoli:** replacement of pumps in Abou Halka pumping station - *ongoing*
 - Kousba:** procurement and installation of a standby generator for Kousba Water Treatment Plant - *finished*
 - Qobbe Tripoli:** replace or refurbish equipment at well for Hariri complex - *finished*
 - Ain Yacoub:** troubleshoot and study pump station electrical systems to resolve repeated electrical failures - *ongoing*
 - Qaa:** procurement of transformer on one of the two main wells of the village - *finished* (handed over to local committee operating the water supply networks, with a guarantee that the committee will not claim the ownership of assets)

When identifying projects, ICRC is first gathering the priorities and needs from the WEs and then cross-checking those projects with areas impacted by refugees using the latest refugee list by UNHCR. They then follow up with identified communities by reaching out to community contacts including mayors, leaders, technicians, and others, and then assess initial technical and economic feasibility of projects. ICRC decided not to work in some areas due to the large amount of efforts needed, mainly funding. For example, Majdel Aanjar requires an entirely new water supply network with at least 45 km of pipe and it was not selected.

Mr. Batardy noted that in some instances, there are gaps in the relationships between the WEs and municipalities, and covering these gaps are a challenge for donor agencies. He discussed the Hermel intervention example, which was selected for ICRC intervention despite needing household connections. The assessment team noted that social components of any infrastructure project are often marginalized despite their importance in the success of a project. The assessment team also noted that other areas heavily affected by the Syrian refugees recently had new infrastructure completed, such as the case in the West Bekaa service area, which was funded by a KFAED loan.

EU and SISSAF

The EU has been supporting development and relief agencies, such as the UN, to address the needs of the Syrian refugee crisis. UNHCR and others have been dealing with the refugees directly, but the focus is shifting to support host communities. The assessment team met with Mr. Cyril Dewaleyne, EU Program Manager, who agreed with the need for continued donor coordination and especially at the level of the WEs. Mr. Dewaleyne also mentioned that development agencies should address the post-humanitarian needs on a medium to long-term basis in order to secure stabilization. As such, the EU is re-orienting non-obligated funds toward post-humanitarian problems. They currently have 9,000,000 Euros obligated for water infrastructure support of wells, reservoirs, and pumps, which will be implemented by UNHCR. UNHCR is identifying these projects with the NLWE and BWE, which are meant to be rapid impact projects. There will likely be another 18,000,000 Euros obligated by the end of 2013 to help host communities with infrastructure, with the focus on water and solid waste. This second tranche of funding will be implemented starting in January 2014 through NGOs and municipalities.

The assessment team reiterated that water interventions should be closely coordinated with the WEs, even if only as an advisory role, to promote sustainability of the projects once they are finished. Mr. Dewaleyne noted that municipalities in the Bekaa governorate do not frequently work with the WE to resolve needs, and a common attitude is that the WE only comes to collect fees. In order to address this, the assessment team said that donors need to encourage the WEs to perform community outreach campaigns. Unfortunately many committee-run networks were supported by donors. The team noted that now is a good time to work with the WEs because more funds are coming, and it will be important for the WEs to take ownership. Regarding the refugees, the production is being increased, but there is no increase in the revenues of the WEs. The assessment team also noted that the WEs are asking for the same types of projects that they needed before the Syrian crisis. In 2010, they were asked to create lists of their needs and priority projects in light of the allocated government subsidy to support the WEs. Their needs were critical pre-crisis so the additional Syrians have not changed the overall nature of the needs, but they have further aggravated the poor performance of the water sector.

GIZ

The WISE team met with GIZ's principal advisor, Mr. Manfred Scheu and Technical Advisor, Ms. Amal Chammas. The GIZ team mentioned that BGR has developed a study on the Jeita Spring, which includes a vulnerability assessment and demonstrates the need for emergency planning and preparedness. The Jeita Spring Protection study proposes solutions for BMLWE's Jeita - Debayeh WTP conveyor and related supply systems; the estimated cost of the solutions range between \$30 – \$50 million USD. The teams discussed options of integrating emergency preparedness as a strategic

objective in each of the WE's business plans. Mr. Scheu agreed that this approach is logical and further explained that the WEs still require assistance in the annual business plan update process.

Regarding the identification and prioritization of quick impact project, Mr. Scheu pointed out that the selection process and related list of proposed projects should be further evaluated based on available asset documentation, such as existing pump stations in the BWE and SLWE and system efficiency mapping developed by GIZ. He further suggested financial support is needed to secure dedicated electrical supply circuits to the pump stations. Equally, the WEs should commit to pay their electricity bills in order to encourage Electricité du Liban (EDL) to expedite the process of installation. However, this type of intervention is lengthy and very expensive. WEs should also work on improving their collection rates and identifying all illegal users in order to legalize their connections. These activities are relatively inexpensive, but they require intense dedication of manpower and negotiating with customers and political leaders.

Mr. Scheu mentioned that production source metering and water storage reservoir metering activities are highly needed for the BWE; the SLWE is currently implementing a source metering project with USAID/LWWSS support. He stressed that dedicated staff should read and monitor those meters in order to initially quantify the production and demands of the service areas under consideration.

Mr. Scheu commented that providing O&M equipment for network repair to the WEs technical crews are viable interventions. However, the need for additional transport vehicles should be further identified and documented. Ms. Chammas mentioned that NLWE already has set procedures for use and storage of equipment, while other WEs still need assistance to develop asset inventory and related store management procedures. For instance, some WEs are still unable to readily monitor stock inventories.

UNDP – Bekaa Region

Due to the critical needs in the Bekaa plain, the team met with Mr. Walid Atallah, Project Manager for the UNDP in the Bekaa Region. He stated that although the UNDP is not working closely with the WE, he has the impression that most of the WEs projects are focused around the Zahleh area. He thinks that the WE should make an effort to cover other areas. The Bekaa has more than 3,000 artesian wells operating (including for irrigation). The groundwater is reported to be highly polluted with nitrates due to fertilizer runoff in some areas. Mr. Atallah recommends that more interventions focus on water quality improvement in addition to production increase.

Overall Mr. Atallah and UNDP – Bekaa Region is focusing in three areas: wastewater treatment, irrigation, and potable water. In wastewater, they are currently covering \$500,000 out of a total of \$2.2 million pilot project in Baalbeck to hookup household connections to the wastewater collection system. However, it was noted that many more sewage connections are needed, which is estimated to cost approximately \$10 million for the Baalbek and West Bekaa area. The average cost is estimated to be approximately \$400-\$500 per connection. The CDR implemented WWTP and lift station in Yammouneh are reported to have intermittent operations due to the lack of continuous electrical supply. This is causing wastewater overflows into the nearby lake, which is used as a domestic drinking water source for the Fleoua WTP. The Fleoua distribution network can supply water by gravity to 15 villages in the area, which are currently relying on groundwater and pumping.

Regarding irrigation, Mr. Atallah estimates that 40% of the population in the Bekaa directly and indirectly depends on agriculture for their livelihood. The main crops are fruits, grains, and

vineyards, which create a continuous need for irrigation. He estimates that the water table has decreased from 50 meters to 125-150 meters below the ground over the last few decades due to a large number of illegal artesian wells and about 65% of water consumed is ground water and the rest is surface water. UNDP – Bekaa Region is focused on creating natural catchment areas, hill lakes, to retain water surface water to be used for irrigation.

In domestic water supply the UNDP – Bekaa Region stated that there are still a lot of needs in the area despite the KFAED project in the West Bekaa. Municipalities are tapping into the existing networks and connecting them to the camps. The GoL initially resisted official camps, which is why more ITS are being established but that is changing – there are more and more camps, such as the case of the receiving area camp on the Lebanese – Syrian border in the Masnaa area.

Mr. Atallah mentioned that the municipality of Aرسال currently has more Syrians than Lebanese, who are mostly coming from Homs. He also said that focus should be placed on Saadynal, Taalabaya, Bar Elias, Ghazze, and Joub Janine municipalities. Even though approximately 200,000 Syrians are registered in the Bekaa area, he suspects the total number is double when unregistered Syrians are included. Mr. Atallah also noted that the area normally host approximately 300,000 Syrian migrant workers each summer. However, now they are staying with their families, and local farmers and landowners are charging these settled refugees on their land.



ITS Connected to Municipal Water Supply, Marj, Lebanon

5. EMERGENCY PREPAREDNESS ASSESSMENT

Lebanon has faced recurring crises over past decades, including human-caused disasters - mainly wars, pollution, and natural disasters. Public utility services have only had responsive measures with limited or no preventive measures to mitigate impacts of potential emergencies. The WISE-Lebanon team assessed the emergency preparedness and planning of WEs in order to measure their level of vulnerability and subsequently introduce the concepts of emergency planning and preparedness to WE senior management. As such, the WEs were encouraged to develop and adopt an emergency preparedness-related strategic objective supported by a performance improvement action plan (PIP) as an integral part of the annually updated business plan.



Reduced Number of Standby Pumps, Dbayeh WTP, Lebanon

The WEs had previously encountered and responded to emergencies such as the 2006 war and the subsequent internal displacement of Lebanese, which affected the services of the SLWE. Similarly, the NLWE faced pollution outbreaks in the lake at Ouyou el Samak in 2009, the Kfarhelda WTP due to hydrocarbon source contamination in the fall 2011, and a chlorine leakage at the Minyeh PS during the summer of 2010. In addition, the BWE faced significant flooding in Zahleh in 2009. These types of emergencies are commonly encountered and senior management of the WE take responsive measures to address the problems, but few preparedness actions are addressed.

Preventive measures such as contingencies are only being addressed at main production sites, mainly through the provision of dedicated electrical supply lines or standby generators to secure continuous water production and supply to large sections of the service area. The establishments have not yet set a strategic objective to raise emergency preparedness through specific action plans and budgets and address the capital investment needed to achieve such a goal. The extensive interviews with WE senior management and branch managers further confirmed the need to introduce emergency preparedness concepts to key decision makers in order to be addressed in systematic manner. The following paragraphs highlight a sample of the type of responses to the question on emergency preparedness:

In 2009, a flood of the Berdawni River destroyed a major water transmission line reaching the main WTP in Zahleh, which resulted in a complete shut down the water supply to the entire Zahleh service area for three days. The WE had to install a bypass to supply the WTP, and the water supply did not reach normal service levels for one month. The water transmission system that supplies half of the BWE customers is still highly vulnerable to floods. “More staff and equipment could help the branch better cope with and plan for emergencies.” (*Mr. Tony Bou Farah, Head of Zahleh Branch*)

“There are no contingencies or set procedures in place to address emergencies. As a common practice in case of a confirmed contamination, the branch management would inform the operators to discontinue the supply until further notice. The service area is supplied through one source and has no established alternatives.” The branch manager believes that O&M equipment, improved electrical

supply, and additional staff would help the WE respond better to emergencies. (*Mr. Salah Hamedeh, North Branch*)

“Preventive measures could include alternative sources, outsourcing staff, and having basic plans for emergencies. Staff and equipment are the crucial items to raise preparedness.” (*Mr. Talal Abdouni, South Bekaa Branch*)

The Saida service area O&M Manager, Eng. Roula Sammoura, is currently considering the development of a new source in Kfarfalouss in order to supply water by gravity to seven villages. Such a measure would allow SLWE to use the existing villages’ wells for contingencies. Vulnerable water supply sources should be addressed under the emergency preparedness planning. “The workshop is a good idea because we did not learn the lessons from the previous crises. No plans for emergency response have been put in place for the WE.” (*Eng. Roula Sammoura*)

The assessment of emergency preparedness of the local municipalities and union of municipalities concluded that emergency preparedness is completely nonexistent. Municipalities usually perform only responsive measures to address emergencies. The following are samples of the most common answers to questions related to emergency preparedness:

The municipality performs reactionary activities only to sustain a minimum level of services. (*Halba*)

There is nothing in place – when there is a problem the mayor is on-hand to try to solve it. (*Kfartoun*)

Public services utilities, be it municipalities or WE, are under crisis management 365 days a year. (*Koura*)

The responses are case specific, and the head of union deals with the emergency on case-by-case basis, but surely with no or limited capabilities. (*Minieh*)

The union of municipalities has very low financial means to implement any action plan for emergency preparedness, and similarly there are no subsidies from the central government, and overall municipal collection is very low. The union has been always working under crisis management mode. (*Zgharta*)

The municipality has no financial means to implement any action plan for emergency preparedness. (*Marj*)

6. SUMMARY OF FINDINGS AND RECOMMENDATIONS

The following section summarizes the findings and recommendations of the assessment team based on information documented throughout the assessment. It includes two subsections: 6.1 Summary of Findings and 6.2 Recommendations.

6.1 Summary of Findings

Finding #1: The overall needs of the WEs remain the same as before the refugee crisis, but now they are more acute and urgent.

The WEs had poor overall performance and an average of 50% service coverage before the Syrian refugee influx began. Many of their overall needs remain the same, but there is now an increase in urgency to address these service gaps. For example, more stringent water rationing schedules in service areas with intermittent water supply are frequently now being implemented, and breakdowns are also more frequent. Syrian refugees are tapping sources and networks directly, as in the case of Kfartoun, causing direct competition over resources with the host communities. The WEs are also faced with commissioning challenges due to partially completed capital investments by third parties or other donor agencies. In order to cope with poor water service delivery, communities have used private sector alternatives such as regularly purchasing bottled water, private wells, and using tanker trucks to deliver water in areas receiving intermittent supply or not covered by distribution networks. It is observed that the population generally does not rely on water utility services as a sole source of domestic water supply. As a result of the crisis, the reliance on these practices have become more common. For the most part, the WEs are continually trying to produce the maximum amount of water that they can. With little attention to demand management, the quantity of water produced is always used and, essentially, the WEs are trying to fill an analogous sieve.

Finding #2: The scattered nature of the Syrian refugee distribution, private water supply systems, and the lack of demand management programs have made it difficult for the WEs to identify specific service areas impacted by the Syrian refugees.

Although there are reported increases in the intermittency of water distribution and the number of tanker trucks needed to deliver water, the alternative private water systems and the lack of demand management programs have made it difficult for the WEs to identify specific needs due to the increase in Syrian refugees. For example, the director at the Dbayeh water treatment plant which serves Beirut commented that he is pumping as much water that is available; he did not report an additional need due to the rising refugee population. Eng. Roula Samoura of the SLWE noted that many refugees in the South are living in Lebanese homes with access to water. “However, water shortages didn’t cover the water needs before the crisis. In the Saida service area, the main problem is electricity to operate pump stations; we have enough source water.” The WEs are not identifying many new projects specific to the refugees, but instead, they are recommending projects to increase service coverage to already underserved host communities. They are continuing to look at projects on strategic and commercial levels. Their approach is that donors should help them increase their revenues and operations and they can then better support these types of urgent demands and other emergencies.

Finding #3: Over the past 10 years, WEs have improved their organization and capacity to address water service needs in collaboration with development agencies. Moreover, USAID and other donors have jointly coordinated efforts with the WEs to further streamline the identification and prioritization process. The WISE-Lebanon assessment helped the establishments anchor their expected role and act as a focal point to development and relief agencies under the current crisis since the GoL is not fulfilling this role.

A number of donor organizations are working to identify similar types of quick interventions (e.g. UNICEF, ICRC, UNHCR, UNDP, and the EU) to mitigate the impacts of the increase in refugees. Through the help of the USAID WISE-Lebanon program and the assessment team, the WEs have become a focal point to donors and have been able to better identify and prioritize overall needs and present them to the donor community. Until now, the GoL has not had an adequate response to the refugee crisis with respect to the size and nature of it. Since the Council of Ministers is still not convening and the GoL remains at an impasse, the WEs have been compelled to create their own role and initiate their own activities in order to survive the crisis.

Several of the WE/WISE-identified projects have been earmarked for implementation by other donors. In addition, donors are now mostly going through WEs when implementing water infrastructure interventions, which was influenced by the USAID/WISE program since early 2013. As a result of these efforts to promote the legal authority of the establishments, the WEs have taken the lead and organized coordinated efforts with donors as in the case of the BWE donor coordination meetings, which began in September 2013. In addition, GIZ embedded technical advisors in each of the water establishments to provide technical assistance in strategic planning and capacity building, especially focused on the business planning process. These advisors have helped the Establishments update their business plans and better manage the assets and resources available to the WEs. Donor coordination led by the embedded advisors within the WEs and WE senior management has increased the responsiveness and strategic focus of the Establishments.

Finding #4: Municipalities are often not coordinating with Water Establishments to identify and implement water infrastructure projects, but there is a basic understanding on behalf of the municipalities to improve the commercial performance of the service areas.

Municipalities do not fully understand the mandate of the WEs. The assessment team observed that the municipalities often do not understand the necessary steps and channels that the WEs must follow internally and with MoEW and other government agencies to ensure sustainability of projects. Therefore many host communities do not want to work with the WEs, and several mentioned that donors should give them money directly. The WISE assessment team stressed that the municipalities should reach out to the Establishments in order to help improve the WEs' services within their jurisdictions. The municipalities should work with the Establishments to plan infrastructure projects. This lack of coordination was previously exacerbated by development agencies including projects implemented by third parties. Some projects were not properly coordinated to align with the WEs' strategy and planning. Long-term O&M costs were often not sustained by these projects. Development agencies also supported municipality-owned infrastructure in the past, which became non-operational when the municipalities found that they did not have the funds or personnel to operate and maintain them. Based on the assessment team's knowledge of previous interventions under emergency conditions, funding agencies tended to bypass the role of the WEs in the sector and instead rely on local communities and local governments to assume responsibility of implemented interventions. Those actions jeopardized the sustainability aspects of the interventions and created

conflicts over the commissioning and ownership of these systems. In addition, the affected communities were left without means to generate revenues to operate the newly installed systems.

In some cases, however, municipalities are working with the WEs and cost sharing the expenses for new infrastructure. The SLWE is coordinating with municipalities and leveraging what the municipalities can provide. DG Nizam mentioned that the SLWE coordinates with municipalities to co-implement capital investment projects because the WE sometimes has incomplete funding for full implementation. The two parties negotiate what materials each can provide to implement projects. For example, the union of Jabel Amel is implementing a network extension project in collaboration with CISP and the WE. Some of the municipalities interviewed acknowledged the need for collaboration in gaining customers and practicing demand management. The municipalities can play an important role in this area. Low collection rates are a problem identified and understood by WEs and host communities.

Finding #5: Domestic water supply is not always a top priority for the host communities regarding the refugee crisis – security and socioeconomic pressures are often underlying concerns followed by overall community services such as solid waste removal, health, and electricity.

Host communities are facing challenges in several sectors because of the increase in Syrian refugees. Many of them are concerned about security and social impacts due to cultural and hosting tensions. Solid waste is piling up at increasing rates in municipalities and rent prices are nearly doubling in some areas. Although water and sanitation are important issues, communities are highlighting other needs and in some cases, prioritizing them over water needs. The recently published World Bank Roadmap promotes a preliminary set of prioritized immediate-, short- to medium-term recommendations in response to the crisis that focus on interventions in health, education, employment and livelihood, social cohesion as well as water and sanitation.

Finding #6: Electricity has and continues to affect water production and delivery capacities.

The lack of reliable electricity service impeded Lebanon's water sector prior to the refugee crisis, and now its effects are even more pronounced. All of the interviewed WEs cited intermittency as a primary reason for reduced water service delivery. In many service areas water is pumped from wells and conveyed to water storage reservoirs (tanks). The volume of water pumped to these reservoirs is proportional to the hours of available electricity supplied to operate the pumps. However, the electricity supply from the Electricité Du Liban (EDL) is limited to only a few hours per day during certain periods of the year. Many pump stations and wells are not equipped with standby generators, or they have generators in various states of disrepair. For the majority of the other pump stations that are equipped with working standby generators, those generators are rarely operated as the WEs cannot afford the fuel expenses. DG Nizam of the SLWE mentioned that donors should support increasing the level of electricity supply through the provision of diesel fuel for generators and getting dedicated connections to the grid for the pump stations. He believes these are necessary interventions to keep the pumps running as much as possible and help increase water production levels.

Finding #7: Water Establishments are operating under a constant state of crisis. Minor attention and few resources have been dedicated to emergency preparedness.

It is evident that the WEs had been operating in a crisis management mode prior to the Syrian refugee influx to Lebanon. They are constantly implementing water supply scheduling in light of limited production capacity, reduced distribution efficiency, and limited control over water consumption because of a lack in water demand management measures. The WEs are also understaffed and lack sufficient repair tools and equipment to deliver the required levels of service before and during the current crisis.

The assessment team found that minimal dedicated resources exist to address emergency planning and preparedness. The WEs are simply responding to needs as they occur. The establishments have not yet set a strategic objective to raise emergency preparedness through specific action plans and budgets to address the capital investment needed to achieve such a goal. The extensive interviews with senior management at WEs and with branch managers further confirmed the need to introduce emergency preparedness concepts to key decision makers in order to be addressed in systematic manner.

6.2 Recommendations

6.2.1 Quick Response Interventions

Recommendation #1: Fund quick impact projects on the prioritized matrices identified by the Water Establishments and WISE assessment team with continued support to the water sector from a strategic level. (See Prioritization Matrices of potential interventions for each WE in Annex D).

The purpose of quick impact projects is to secure the current level of service for existing customers while addressing the additional water needs of the refugees. USAID should consider funding some of these quick impact projects as identified on the matrices while continuing to provide technical support the water sector from a strategic level. Implementing these projects should be coordinated closely with other donors and relief agencies so that efforts are not duplicated and the WEs can continue to strengthen their capacities to provide water supply in the service areas. USAID should continue to promote working through WEs with the other donor organizations.

Recommendation #2: Consider procuring tools and equipment for repairs (e.g. compressors, wrenches, safety equipment, sump pumps, asphalt cutters, tool boxes, etc.) and crew trucks for the WE branches, which are directly affected by the Syrian refugee influx. This intervention would target large areas serviced by the branches; these tools and equipment would not be specific to one host community.

The WEs reported a lack of equipment to sustain the existing level of service, and systems are now under more stress and pipe breaks are becoming more common. To ensure that network crews can respond to maintenance and repair needs in a timely manner and correct defects in the systems, the assessment team recommends providing these equipment and crew trucks where needed. These will help the WEs secure the current water supply to existing customers, and it will also address emergency preparedness by improving the WEs responsiveness to unforeseen events.

6.2.2 Medium to Long-term Interventions

Recommendation #3: Consider providing assistance in completing and commissioning selected on-going projects, such as those implemented by CDR and development agencies.

The WEs are faced with commissioning complications due to unfinished capital investments by CDR and other development agencies. For example, the Beit Mellat water supply networks remained unfinished for 10 years before being commissioned through a joint technical and financial assistance of USAID LWWSS, GIZ, and the NLWE. The assessment team believes that USAID can leverage existing infrastructure by assisting the WEs to commission these types of projects. As a typical example, the BWE presented the case of the Fleoua WTP, which serves at least 10 villages in the eastern Baalbeck area. The WTP is supplied from the Yamouneh canal and is currently not operational due to a number of constraints. If operated, this WTP could supply treated water to all the villages by gravity, resulting in at least 10 boreholes located in the Bekaa plain to be placed on standby. Similar cases can be identified in the West Bekaa service area.

Recommendation #4: Increase technical assistance coupled with capital investment projects. Assist the WEs to improve overall utility management and increase revenues.

In light of the on-going efforts to address capital investment needs due to the Syrian refugee crisis, development agencies are planning to contribute significant funding to infrastructure investments in the water sector and capacity building should receive proportional attention. The assessment team recommends that proportional time and resources for technical assistance be allocated to improve the overall performance of the WEs to manage these new assets.

Recommendation #5: Support the WEs to incorporate emergency preparedness as a strategic objective in the upcoming business plan updates.

USAID and GIZ have recently supported the development and updates of business plans to define the WEs' strategic objectives and action plans for performance improvement and to serve as a "road map" in guiding the management in performing its duties. The assessment team believes that including emergency planning and preparedness as a strategic objective in the business plans will help sustain continued commitment from the WEs to address emergency preparedness beyond the current crisis. Consequently, the team also recommends that USAID further support business planning update activities to ensure continued effort in performance improvement. By sustaining a yearly update of the business plan, the WEs can transition to commercially-focused utility management.

ANNEX A – SCHEDULE OF RAPID ASSESSMENT

Task No.	Description of Task	September											October											November																												
		1	1	1	1	2	2	2	2	2	2	3	1	2	3	4	5	7	8	9	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	1	2	4	5	6	7	8	9	1	1	1	1	1	1
		6	7	8	9	0	1	3	4	5	6	7	8	0	1	2	3	4	5	7	8	9	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	1	2	4	5	6	7	8	9	1	1	1	1
Week 1			Week 2			Week 3			Week 4			Week 5			Week 6			Week 7			Week 8			Week 9																												
M	T	W	T	F	S	M	T	W	T	F	S	M	T	W	T	F	S	M	T	W	T	F	S	M	T	W	T	F	S	M	T	W	T	F	S	M	T	W	T	F	S											
1	Preparation; Coordination (Home Office/Field Office/USAID)																																																			
2	Inception Meetings with WEs and Follow up Meetings/Branch Mgrs																																																			
3	Meetings with Donors																																																			
4	Needs Assessment at Municipalities/Field Visits																																																			
5	Identification of List of Projects and Development of Matrix																																																			
6	Preparation and Implementation of Emergency Preparedness Workshop																																																			
7	Draft and Final Reports																																																			

Meetings/Activities by Week

HO/FO Prep (ZB/RA)	USAID (Rami) 9/24	SLWE DG 9/30	USAID (Rami) 10/8	Koura/Dedeth Mun. 10/14	Zgharta Municipality 10/21	USAID (Rami) 10/29	UNICEF (Joumana) 11/6	Workshop Prep 11/11
	NLWE (Gaby) 9/25	GIZ (Manfred) 9/30	OTI (Bilal) 10/8	Minieh Mayor 10/14	OTI Mtg (Elias) 10/21	Boudai Municipality 10/31	Workshop Prep	Workshop 11/12
	BWE DG (Imad; Roy) 9/26	USAID (Charbel) 10/1	Halba Mayor 10/9	EU (Cyril) 10/14	BWE Donor Mtg 10/22	Yamoune Muni. 10/31	Data/Matrix Analysis	Workshop Debrief 11/13
	OTI (Bilal Ayoubi) 9/27	BWE (Imad) 10/2	Kfartoun Mayor 10/9	SISSAF 10/14	USAID (Rami) 10/22	Fleoua WTP 10/31	Draft Report	Draft Report 11/13
	Layla Moubayed 9/27	ICRC (Thomas) 10/3	NLWE Branch Mgrs 10/11	BGR Jeita Springs 10/16	NLWE (Gaby) 10/23	W. Baalbeck Union 10/31	Presentation Slides	USAID (Rami) 11/14
	Draft Report 9/28	BGR (Armin) 10/3	NLWE (Gaby) 10/11	Dbayeh WTP Dir. 10/16	Water Donor Mtg 10/24	OTI/Naseej Conf 10/31		ZB Leaves 11/15
		NLWE DG 10/4	Draft Report 10/12	UNDP - Bekaa 10/18	Taalabaya Mayor 10/24	SLWE Rola Samoura 11/1		
		UNICEF (David) 10/4		Marj Mayor 10/18	BWE Branch Mgrs 10/25	Workshop Prep 11/1		
		WB (Ken) 10/4		Draft Report 10/19	Ghazze Mayor 10/25	Draft Report 11/2		
		Draft Report 10/5			Draft Report 10/26			

Legend

Dedicated Activity Day	
On-going Follow up for Activity	

ANNEX B – UNHCR REFUGEE POPULATION LIST (SEPTEMBER 2013)

(See Excel File)

ANNEX C – QUESTIONNAIRES

Questions for Lebanon Water Establishments

Section 1 – Quick Response Activities

1. Please confirm that the identified villages are served by the Water Establishment.

2. What Branches of the Water Establishment serve each village?

3. If confirmed, please describe what level of service they receive.

4. What are shortfalls in service delivery in these villages?

5. What are other donors (besides USAID) providing in response to these service delivery shortfalls?

6. Please describe quick response activities that could help improve these service delivery areas. Activities would be implemented within 6 months to 1 year and could include procurements of specialized equipment.

7. Are there any other service areas that you have identified not listed or not covered by donors?

Section 2 – Emergency Preparedness Capacity

1. How would you respond to an emergency situation that affects the level of service delivery to your customers?

2. What are identified gaps in the Water Establishment responding to emergency situations?

3. In your view, what are the issues or gaps that you consider most pressing that the WE has difficulty attending to, mainly at the level of responsiveness?

4. What are the basic criteria that senior management adopts to identify potential threats or vulnerable service areas? And are there any set or regular preventive measures or contingency plans to manage and mitigate such events. (alternative sources in cases of pollution, or depollution measures, quick response technical teams...)

5. Please provide activities (be it technical assistance or capital investment) that you consider crucial to raise the emergency preparedness of the WE and/or specifically branches.

6. What specific needs does the Water Establishment have with respect to addressing the increased water demands caused by the Syrian refugee influx?

Questions for Lebanon Water Establishment Branch Managers

1. What is the name of your branch? _____
2. For your branch, what are shortfalls in service delivery? Where are these shortfalls?

3. What are other donors (besides USAID) providing in response to these service delivery shortfalls?

4. How would you respond to an emergency situation that affects the level of service delivery to your customers?

5. What are identified highly vulnerable areas in the service area responding to emergency situations?

6. In your view, what are the issues or gaps that you consider most pressing that the branch has difficulty attending to, mainly at the level of responsiveness?

7. What are the basic criteria that you adopt to identify potential threats or vulnerable service areas? And are there any set or regular preventive measures or contingency plans to manage and mitigate such events. (Alternative sources in cases of pollution, or remediation measures, quick response technical teams, etc.)

8. What are the means that you consider crucial to raise the emergency preparedness of the WE and/or specifically branch?

9. What specific needs does the branch have with respect to addressing the increased water demands caused by the Syrian refugee influx?

Questions for Lebanon Host Communities

- 8. What challenges is the community facing regarding water supply?

- 9. What impacts have the Syrian refugees had on meeting water supply needs and challenges?

- 10. Does the community coordinate and work with the Water Establishment for meeting water service needs?

 a. If no, who manages, operates, and maintains the water supply network?

- 11. What are the challenges in water service delivery in these villages?

- 12. What activities are needed in your community to improve water supply?

- 13. Are there specific activities needed to improve water supply quantity and/or quality to meet the additional water demands as a result of the Refugees influx?

- 14. Are there any alternatives currently in use or under development to address these additional needs? And if there are, what are these alternatives and what is the source of funding?

- 15. How would you typically respond to a water related emergency at the level of the community? To what level you think you are prepared to deal with such emergencies.

16. See below (1 is poor, 2 is satisfactory, 3 is good, 4 is very good, 5 is excellent)

Please evaluate/assess the quality of overall service you receive from the WE for drinking water supply.	1	2	3	4	5
Please evaluate/assess the efficiency of technical maintenance services you receive from the WE when you do experience problems in the water supply network.	1	2	3	4	5
How long does it take the WE to respond and take action to resolve any problems you experience? Choose one answer.					
a. Same day ___ b. Next day ___ c. Same week ___ d. After 1 week ___ e. After 2 weeks ___					

17. Notes:

ANNEX D – PRIORITIZED MATRICES OF PROJECTS

(See Excel File)

ANNEX E – EXPLANATION OF MATRIX CRITERIA

The WISE team developed a selection matrix for the projects based on the identified needs of each of the WEs. The projects were evaluated based on three main selection criteria; the percentage of Syrian refugees in relation to the total population in the target service area, the estimated timeframe for implementation, and the USAID strategic developmental criteria. Furthermore, and in order to further prioritize and rank the potential interventions, WISE team assigned weights to each of these criteria. Accordingly, the percent Syrian refugees population impact was weighted at 40%, the timeframe 50% and developmental criteria 10%. The projects were then sorted based on the three important factors based on the assigned weights. Furthermore, the matrix encompassed equally important information focusing mainly around, service area, project type and description, financial and case specific remarks.

1. Village name / service area: highlights the name and branch serving this area
2. Project description: provides a brief description of the type of project mainly under capital repair and replacement be it network extension, network extension, well development, pump replacement, reservoir construction or rehabilitation, transmission replacement, equipment, etc.
3. Total network extension length or overall quantity or Volume: where applicable the total length of pipes to replaced was identified mainly in consultation with the WE's and whenever possible potential engineering consultants working or who worked on the designs / planning of the projects.
4. Total cost per project (X): this value is calculated based on the cost estimate exercise based on current market rates, benchmarks and similar projects implemented as described under section 2.1.3 above.
5. Number of apartments or dwellings in service areas (W): The numbers of apartments was provided by the WE's and when available through surveys performed by the WE's and the CAS (Central Administration of Statistics).
6. Total population in target service area: (Z) the total population in target areas was provided by the WE's and when available through surveys performed by the WE's and the CAS (Central Administration of Statistics). However, in some instances assumptions and estimations were used as the population numbers in Lebanon are subject to inaccuracies.
7. Total number of Syrian refugees in target service area: (S) the total population in target areas was extracted from the updated UNHCR Syrian refugee survey database of September 2013.
8. Specific investment cost: $B = X / (Z+S)$: the specific investment cost was calculated to highlight the unit cost per person be it of the host population or of the Syrian refugees and whereby each project estimated cost would be divided over the current host community population (Z) plus the total number of Syrian refugees in the target area(S). It is worth mentioning that this factor was not considered as one of the three main factors given the fact that the quick interventions are oriented mainly to attend to

additional water supply needs disregarding financial or commercial aspects at this stage.

9. Estimated duration of implementation: The timeframe for the implementation of the projects was estimated in consultation with the WE and based on the experience of the WISE assessment team in previous similar types of interventions.
10. Strategic developmental criteria:
 - a. Reduction of NRW (Technical & Commercial): each project was evaluated based on the forecasted impact on the reduction of NRW both on the commercial and technical level. A network replacement project coupled with customer metering targeting demand management aspects will eventually result in the reduction of network leakages and commercial losses through the identification and updating of the customer database. Such holistic projects would score a higher grade than interventions targeting one aspect of utility management.
 - b. Improvement of service (hours of service, quantity, & quality): The aspects of system performance improvement were evaluated based on the intervention's impact on improving hours of supply, and both quantity and quality supplied. Because the types of projects identified were mainly of the types of capital repair and replacement, a network replacement would have a weighted impact on improving hours of supply, quantity of water available and equity in water supply as well as quality. While pumping station rehabilitation would equally have an impact on service improvement, however, the quality and quantity can be still be compromised based on the conditions of related supply networks.
 - c. Sustainability: (Ownership, best practice): the sustainability aspect is usually addressed through the evaluation of the technical, commercial, financial, and developmental viability of the projects. However, in this case team relied mainly on signs of ownership throughout the consultations and discussions with the management of the WEs to assign a grade.
 - d. Contribution to O&M cost reduction (Human resources & Financial): Again, the project type has a major impact on this criterion. The improvement of the financial performance of the establishments is directly related to the use of metered consumption data and issue bills accordingly and the reduction of costs by decreasing the energy consumption. As a result of new investments in pumping station, efficiency is improved. Network improvement in turn leads to less interventions for water rationing processes and reduced consumption of chemicals involved in water treatment.
 - e. Environmental (Water conservation): aspects of NRW reduction, efficiency improvement, energy consumption reduction, demand management contribute in reducing the adverse impacts of human activity on the environment, by reducing the amount of water drawn from aquifer or river up to 50% and reducing the carbon foot print of the water supply services of the WEs.

- f. Integrated comprehensive projects: An identified project is considered comprehensive when it includes much of the aspects of utility management starting with the production and treatment to the conveyance and transmission to distribution and metering and billing and collection. Such projects would score better than activities with limited scope. In general, the quick impact projects scores would be lower since they have limited scopes.

- g. Reduction of health risks: the projects that proved to reduce intermittence in supply and increase hours of supply and reduce leaks would score better than projects with limited scope over the factors that would affect quality of supplied water.

ANNEX F – WORKSHOP PROCEEDINGS

Workshop Agenda Key Findings and Recommendations of Rapid Assessment of Water Service Needs of Lebanese Communities Hosting Syrian Refugees and Emergency Preparedness of Water Establishments

USAID/Water Infrastructure Support and Enhancement for Lebanon (WISE-Lebanon)

Date: November 12, 2013
Start Time: 8:45 am (Arrival and Registration); 9:30am (Workshop begins)
Location: Holiday Inn Hotel – Dunes Centre, Verdun, Beirut
Note: Simultaneous translation of Arabic and English provided.

I. Overview

The purpose of the workshop is to present an overview of the USAID/WISE rapid assessment and to introduce emergency planning awareness for Water Establishment (WE) senior personnel. The workshop aims at improving the overall understanding of preparedness and planning in order to cope with the recurring emergencies resulting from an overall dynamic environment in the Middle East region including refugee population influx and infrastructure vulnerability. The expected outcomes are to share findings and recommendations of the assessment and to initiate the awareness of best practices of emergency planning within each WE.

II. Schedule

8:45 am – 9:30 am:	Participant Arrival, Registration, Coffee & Tea
9:30 am – 9:45 am:	Welcome Remarks, Key Introductions (USAID, WISE COP/Rick Albani) <ul style="list-style-type: none">• Introduction• Workshop Objectives
9:45 am – 11:15 am:	Overview of WISE Rapid Assessment (USAID/WISE Rapid Assessment Team/Salah Saliba and Zachary Borrenpohl) <ul style="list-style-type: none">• Scope of Work and Objectives• Methodology• Key Findings• Recommendations• Q&A
11:15 am – 11:45 am:	Coffee Break (including pastries, fruit salad, beverages)
11:45 am – 1:30 pm:	Emergency Planning for Water Utilities (WISE COP/Rick Albani) <ul style="list-style-type: none">• Best Practices - AWWA M19 Manual• Moderated Discussion: What can water establishments do to address emergency preparedness?
1:30 pm:	Lunch

Minutes of Rapid Assessment Presentation Q&A and Discussion – 9:30 am, Tuesday, November 12, 2013

Participants: USAID, MoEW, WEs, UNICEF, ICRC, UNHCR, UNDP, EU – SISSAF, GIZ, BGR, OTI, LWWSS, WISE, WISE A/E, Litani River

Objective: Rapid Assessment Overview; Emergency Preparedness Workshop

- **Eric Viala (Litani River Basin Management Support)** - Assessment was done well and requested that we add a recommendation related to supporting communication and cooperation between the municipalities and the WEs. He further commented that sanitation needs to be addressed – especially at the level of refugee camps. Also, coordination needed with private suppliers.
- **DG Jamal Krayem (NLWE)** – Findings and recommendations of the assessment match the outcomes of the meetings held with senior management of the NLWE and the assessment team. Water resources are not sufficient anymore due to the population growth (refugees). He confirmed that the commercial criteria were not addressed by the projects identified and presented to donors. The WEs have not succeeded in addressing all challenges, but they have made progress addressing some of them. The latest challenge is the Syrian refugee crisis, and if not addressed it will be the final one. WEs need awareness campaigns to help people understand how to use water. WEs need to be able to mitigate political interference in their daily duties. WEs and their staff have limited time and LOE to contribute to technical assistance programs, and therefore a new approach should be adopted considering PPPs. Decisions and funding need to be expedited from donors to address the needs of the WE.
- **DG Ahmad Nizam (SLWE)** – Number of refugees addressed in presentation are only the registered refugees; he believes the overall number is closer to 1.3 million (including unregistered refugees and Syrian workers). This crisis is different from other recent crises felt in the SLWE. WEs are facing a water supply demand issue, and 85% of SLWE water is pumped from groundwater. The WEs mainly rely on generators fuel by diesel. “We can’t work under the AWWA books in such conditions.” If donors agree to support equipment such as pumps, pipes, the WE cannot wait until 2017 to get them. There should be a coordination unit (committee) between donors, USAID and the WEs.
- **Nadiyah Al Jouhari (SISSAF)** – There are monthly donor coordination meetings which she suggests all of the WEs attend. The next will be on January 16th, 2014.
- **Joumana Nasser (UNICEF)** – Water quality is an issue; water-borne diseases are increasing. Hygiene and health issues need to be addressed. How do the matrices address the three different perspectives of the WEs priorities (income generation), the municipalities priorities, and the donors priorities. Put in place a procedure for

coordination and cooperation between municipalities and WEs. Need community engagement programs. Can refugees be re-directed?

- **DG Ahmad Nizam (SLWE)** – Municipality coordination exists however they work under a political agenda. Committees are not a major concern and water quality is being addressed through chlorination at the source. However the camp conditions are unhygienic, which would result in the spread of diseases.
- **Ghassan Baydoun (Head of Exploitation, MoEW)** - Recommended to address the procurement of water pumps, O&M equipment, and fuel for generators. The assistance should be performed with reduced bureaucracy.
- **Manfred Scheu (GIZ)** – Proposed procurement of fuel for generators at the WEs to run the generators and the pumps as a temporary solution.
- **DG Ahmad Nizam (SLWE)** – 80%-85% of water produced by wells. When we used to continue to receive continuous water supply all service areas used to get water. Through the intermittent supply of electricity only the low lying areas would get water (at the expense of the high services).
- **DG Maroun Mousallem (BWE)** – The number of Syrian refugees in the Bekaa is estimate to be at around 300,000. The BWE has initiated coordination meetings, which started in September. The next meeting is December 3, 2013. The BWE has received support from ICRC - similarly with UNICEF. The main question – who should cover the bills incurred by the water consumed by the Syrian refugees and related O&M costs? Example: Palestinian refugees – UNRWA covers the water consumption bills. Find means to cover the cost of consumption of Syrian refugees.
- **DG Joseph Nseir (NLWE)** – The problem at BMLWE need to meet water demands. The crisis is very big, but the processes of interventions are very slow. Need to increase water supply hours through increased water production capacity. Municipalities are politically driven. If they ask for generators, this will be for operation of private wells with no means to collect revenues and cover the O&M costs of the generators. Main need is to provide fuel for generators; spare parts; repair equipments; and pipes for stores. Emergency interventions should be at the level of the main pump stations that serve areas with high number of Syrian refugees. As a result of the lack of electricity, the BMLWE has surpassed its LBP 7 billion in 2013. In order to increase production, fuel for generators should be provided by USAID (100 generators in BMLWE that require fuel). As a recommendation, hold coordination meetings between the WEs and donors .
- **DG Maroun Mousallem and DG Jamal Krayem** – They both agreed that donor coordination meetings should occur at the level of the WEs. Maroun mentioned that this approach is highly efficient and the donors understand the needs of the BWE

thanks to these meetings. The WEs must play a coordinated role but also they need TA and capital investments from donors.

- **Rami Wehbeh (COR, USAID)** – The purpose of this workshop is to address the needs and discuss them among the WEs and donors. Then, we will further incorporate them into the assessment and decide how to move forward. USAID budgets can be reshuffled based on priorities and answers will be presented soon.

ANNEX G – ANALYSIS OF FUEL SUPPORT

The WISE assessment team performed an analysis of a potential fuel procurement intervention from USAID following the discussions and continued requests from the senior WE management for direct provision of diesel fuel. The requested fuel would cover the consumption of the generators operated at the various pumping stations in lieu of the EDL electricity supply intermittence. The following table highlights the advantages and disadvantages of such interventions:

Advantages	Disadvantages
<ul style="list-style-type: none"> • Fits within the quick response / intervention timeframe • Addresses immediate water supply deficits through increased hours of production • Cross-subsidizes the deficit in uncollected revenues from “illegal” users (Syrian refugees and unregistered customers) • Helps in capital reserve build-up • Alleviates financial burden on WEs through reduced OpEx • Secures water supply hours in the short term 	<ul style="list-style-type: none"> • Not sustainable • Lack of demand management • Inefficient and not integrated in overall utility management best practices in light of the high NRW • Unknown time frame of intervention in case of extended crisis • No means to secure return on investment • Increased environmental adverse impacts on water resources • Upon discontinuity of support, the crisis conditions return • Partial solution water supply hours temporarily secured

The pre-crisis poor performance of the WEs, mainly at the level of demand management in water supply networks, has resulted in large deficit in covering water supply needs of existing customers. The Syrian refugees influx has widened the gap, resulting in an increased pressure on the operations of the existing water supply infrastructure working initially at its limits. The provision of fuel to secure and improve water supply hours will not guarantee an equitable water supply to all beneficiaries, in light of the lack of demand management measures. Therefore, the WISE assessment team recommends the following options:

Option #1: Conditional supply of fuel for limited period of time.

The direct procurement of fuel should be focused to operate existing generators at the main pump stations serving large service areas in order to cover the needs of a large numbers of beneficiaries. The support should also be conditioned with a commitment from the WEs’ senior management to perform prompt actions to improve the overall efficiency of water supply, mainly through simple demand management measures. Furthermore, the fuel provision should be monitored in order to assess the potential impacts/improvements.

Option #2: Provide fuel through O&M service contracts.

This option proposes an indirect provision of fuel, through an integrated O&M service contract for the provision of services for the operation of the generators.

Option #3: Provision of fuel storage and transport equipment.

The provision of fuel related transport and storage equipment such as fuel transport tanker trucks and double layer large reservoirs could support the establishments with procurement and distribution of fuel without intermediaries. The WEs could also store large bulk fuel quantities which would reduce overhead on price and price fluctuations.

Option #4: Rehabilitation of the Hrache hydroelectric plant located in Jeita

The assessment team visited the Hrache hydroelectric plant in Jeita that has been out of operation since 1995. The plant is owned by BMLWE, a large consumer of energy, who can use this plant to reduce the annual energy bill. The plant rehabilitation represents a good example of renewable energy production, and its location is 500 meters from the main Jeita–Upper Maten Pumping Station.

The UNDP-CEDRO (Country Energy Efficiency and Renewable Energy Demonstration Project for the Recovery of Lebanon) have studied the status of the Hrache–Jeita hydroelectric plant and found that the existing electromechanical and control equipment, as well as the penstock pipe, require a full replacement at an estimated cost of 2.5 Million USD with an expected return on investment over 3 years. The new plant of Hrache would be able to produce 5.4 GWh that would cover the needs of an estimated 310 households with an average consumption of 2KW/h. The MoEW has developed a full design and tender document for the rehabilitation of the plant and has not been able to secure funds. The plant will save an estimated average of \$288,000 USD of electricity per year assuming the average unit price of 1kw/h is \$0.53 USD.

The team recommends that USAID consider funding the rehabilitation of this hydroelectric plant using all the documentation and studies already developed. The location of the plant is ideal and would be supporting the energy needs of the Jeita–Upper Maten pumping station, recently rehabilitated by the USAID/LWWSS program as well as the energy needs of the submersible pumps and wells located around the area.