

Regional Platform for Excellence in Decentralized Wastewater Management

Demonstration, Education, Research and Training

Draft Concept Note

by

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1. Rational

Substantial increase in population growth in Jordan, mainly due to fluxes of immigrants in the last decade, resulted in significant increase in water resources demand for all sectors in Jordan. The Jordanian Government is committed to the sustainable goals of United Nations to “Ensure access to water and sanitation for all” (Goal 6). Treated wastewater is a major component of the water budget in Jordan and as such an important contributor to addressing water scarcity. It is reliably utilized, in conjunction with surface water, for agriculture as a substitute source to preserve and protect groundwater resources. Government of Jordan takes serious measures to meet the increased water demand. One important strategy is to maximize the efficiency of wastewater collection and treatment, including rehabilitation of existing centralized wastewater treatment plants. The Government also facilitated the implementation of decentralized wastewater treatment (DWWT), especially in unserved rural areas, to protect groundwater resources from the evident leakage of raw wastewater from cesspits to underneath aquifers. This effort toward the promotion of DWWT is continuously supported by the Jordanian Ministry of Water and Irrigation (MWI) in collaboration with several international entities and donors. For example, in collaboration with the German Ministry of Education and Research (BMBF), MWI established and activated NICE (National Implementation Committee for Effective Decentralized Wastewater Management in Jordan). Moreover, the society is increasingly accepting DWWT as an innovative approach toward treating and using wastewater on-site.

DWWT can potentially reduce water scarcity in Jordan and the MENA region significantly. However, at present DWWT faces challenges which prevent it from being scaled up. These challenges are firstly a lack of to develop proper operation and maintenance (O&M) strategies. Secondly, scientific research on the performance of innovative technologies under local conditions in terms of climate, raw wastewater characteristics, re-use standards, and food

security is progressing slowly only. Thirdly, DWWT concept is not fully integrated into the university education system or vocational training programs and technical education. Therefore, there is some weakness toward up scaling DWWT concept in Jordan and in the region. Raising awareness on DWWT among water users, media and youth. Focusing on water users well, but there is great opportunity too.

2. Objective

The proposed Regional Platform for Excellence in Decentralized Wastewater Management will address the above mentioned challenges by providing a space for exchange of knowledge and expertise through demonstration, education, research and training. The platform builds on an existing facility for decentralized wastewater management

(<http://smart.bau.edu.jo/index.html>).

The platform will cater to research, policy making and implementation in a unique combination. The platform will raise awareness on DWWT among water experts and policy makers, academics, private sector, water users, media and youth. The existing facility has the basic requirements to be up scaled to become a **regional platform** for all interested parties, which they can use for testing, implementing, and promoting their initiatives and sustainable solutions in wastewater and environmental management. The platform will link to others for exchange of knowledge and best practices and will reach out to other institutes, implementing agencies and donors, who can use the site as a meeting place for their events as described in more detail below.

3. Current Situation

This existing facility is jointly established by Al-Balqa Applied University (BAU) and Helmholtz Centre for Environmental Research (UFZ), in collaboration with MWI through SMART Project (**Sustainable Management of Available Water Resources with Innovative Technologies for Integrated Water Resources Management in the Lower Jordan Rift Valley**). The facility is financially supported through SMART Project until the end of June 2018. The facility is located in central location and easily accessible, and has enough land for further development. Partial support from BAU is planned including staff and minor maintenance. There is no tangible financial income generated by the facility at this stage.

The facility is owned by Al-Balqa Applied University and used for demonstration, education, research, and training. The infrastructure available is well developed in terms of technologies, but it is temporary caravans in terms of laboratories, offices, and other facilities. Also, there is no training rooms. The facility is currently open to all parties interested in implementing sustainable wastewater solutions including education and research institutes, industry, and environmental entities, individual farmers, farmer's societies, farmer's association, and international researchers and students. The existing facility is based on four pillars, as described below. The

regional platform will build on and expand these pillars to include a broader range of target groups and participants from outside Jordan. The **four pillars** are:

A. Demonstration

The facility provides demonstration opportunity where interested parties from Jordan and the region can visualize and experience real technologies. The facility receive in average two groups of visitors every month for the last the last three years. Further, development and research projects use the facility as a tool to introduce the concept of DWWT to interested groups for technical and social aspects

B. Research

The facility accommodates a range of DWWT technologies. These technologies are tested, optimized and evaluated with regard to their efficiency and potential to provide suitable irrigation water according to Jordanian water quality standards for irrigation. For these purposes, a monitoring program is implemented on a monthly basis. The collected data effectively contributed to the development of decentralized wastewater management strategy in Jordan.

C. Education



The facility effectively contributed as a field laboratory where university students registered in related course in water and environment frequently visits the facility, practice sampling and analysis of raw and treated wastewater, and identify different technologies. Students use the facility to conduct graduation projects and to develop their master thesis as well.



D. Training

The facility forms a unique environment for training on DWWT and management including operation and maintenance, technology selection, monitoring, and water reuse too. A number of training courses are offered in collaboration with different institutions in Jordan, the region, and in Europe. The trainees are operators from water utilities, researchers from public and private sectors, fresh graduate to prepare them to the market and increase their employability, and also for graduate students.



4. Future Plan

This concept is intended to invest in the existing situation and make use of the available opportunity including the above four pillars. **Five years'** plan is needed to establish a sustainable Regional Platform. Establishment of the Regional Platform will be done by a consortium of Al Balqa University and IHE Delft, and possibly by a third party who is willing to fund infrastructure. For onward activities such as research, education and training other research institutes, donors and implementing agencies will be asked to join.

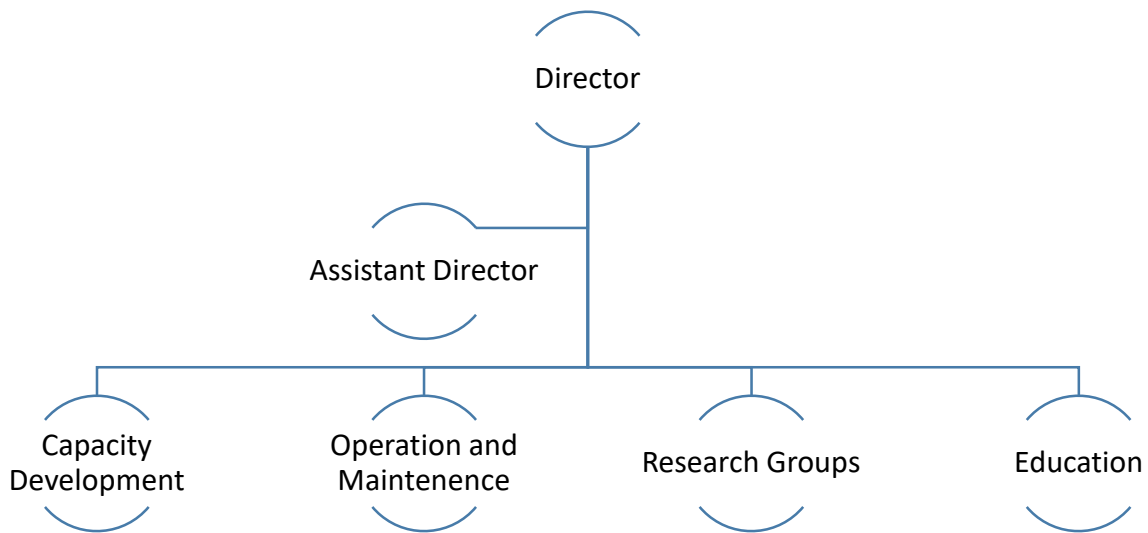
The current situation is analyzed. This analysis provided the basis for planning a number of strategies to promote the facility's internal strengths, minimize its internal weaknesses, maximize its external opportunities, and limit its external threats. The organizational, financial, and educational strategies consist of a compendium of actions to be implemented in order to achieve the desired state of the Regional Platform for Integrated Wastewater Management in the near future. These actions include

A. Infrastructure

The existing infrastructure needs development, including buildings to accommodate laboratory, training room, offices, and sanitation services. This task can be a local or international tender in any future proposal related to this concept. A new laboratory is needed and can be purchased and imported as part of the Regional Platform development plan. This work package requires training lab technicians and qualify them to use the new equipment. Further, soft components need to be built too such as organizing the existing data base and develop it to teaching tool. The infrastructure part can be fully achieved by the end of the first year of the project

B. Administrative

To implement a sustainable concept for the Proposed Regional Platform, it requires implementation of new functional organizational structure, which will enable the development of financial and educational strategies. To further institutionalize the Regional Platform, the following simplified structure is proposed. The proposed positions can be part-time positions. But, the director needs to dedicate his or her full time to this work. Also this structure involves converting the existing facility to a legal entity so that it is able to administer its own resources. The administrative part and full integration to the university system can be achieved in the end of the first year of the project.



The Director is the legal representative of the Regional Platform. Example main tasks of the Director include:

- Development of activities to ensure the financial sustainability of the Regional Platform
- Public relations, networking, promotion and marketing
- Supporting and supervising activities carried out by the staff, research, and students
- Defining and adaption of training content
- Supporting and supervision of adequate operation of the site

C. Capacity Development

Introduce a portfolio of services, mainly capacity development plan to design and offer a set of training modules to contribute in various ways, but also to generate its own income. Regarding the portfolio of services, a basic package of services is recommended. The study of the needs, and the development of a list of training modules, and train the staff (training of trainees) can be a work package in any future proposal linked to this concept. Also, this step requires publishing description of all training modules on the website, and building on the existing network to further promote the concept. These additional tasks can be part of the same work package too. Partner with qualified international institutions will be also a need at this stage to jointly issue certificates that is widely recognized. This work package will be implemented over the entire period of the project. However, the training modules can be finalized by the end of the second year of the project.

D. Operation and Maintenance

The proposed Regional Platform as a whole, and the existing functional technologies requires operation and maintenance. This effort arranges cost that is need to be secured. The Proposed Regional Platform is expected to generate enough income during after the five years' project time. Hence, it is necessary to allocate budget to support the operation and maintenance cost during the five years. Standard operation and maintenance will be utilized as training module too. Power bills can be cut if the project introduced solar energy to have self-sustained energy. Sludge management can be part of the operation and maintenance as well.

E. Research

To develop quality research that can effectively contribute to the development and promotion of DWWT as innovative and environmentally friendly solutions, this concept will propose a number of research projects in collaboration with partner national and international institutions to exchange and transfer knowledge and to dedicate the culture of joint-efforts research programs and activities. If future proposal prepared, work packages can be arranged with the Al Balqa Applied University and IHE Delft, being the primary consortium. Interested parties can be involved as well. But, basic funding will be required to implement monthly monitoring for the existing technologies. The data will be shared among partners to conduct activities, research, contribute to national and international strategies, and other useful applications of the existing and future data. National and international researcher exchange programs can be introduced in a work package under mobility to exchange researchers and experts, students too. Dissemination plan will be added to disseminate research results, and use it to promote for the concept. Reuse component can be also introduced to evaluate the potential in using treated wastewater for sustainable agriculture under new innovative technologies. Partnership with well-known institutes internationally will be considered in any future proposal linked to this concept.

F. Education

In this package, partner institution(s) can help develop curriculum related to water and environment, but specifically in wastewater engineering and management and related topics. Also, help integrate these curricula to the university system and work on providing the necessary means in terms of training professors and providing laboratory equipment to prepare university to effectively teach these courses. This package can include student exchange as well.

G. Training

Existing training modalities can be expanded to work with other actors, such as water user associations, innovative water technology start-ups, media and youth. International institutes might want to host a regional water diplomacy training at the site, or a workshop for journalists to build their capacity to report on water and environment. The site could be the venue to host award ceremonies for students from the region doing research on climate change and water scarcity. The platform could be used as a 'community of practice' for sustainable water use.

5. Financial Strategy

Based on a simplified calculation of future costs and possible sources of income, a combination of funding sources is identified as the most feasible option for achieving the financial sustainability of the proposed Regional Platform. First, core funding is needed for developing the infrastructure and estimated at 250 thousand Euro including basic laboratory, four small offices, one training room, medium size vehicle, and sanitation facilities with a fence and gate. In addition to core funding, annual cost of operation and maintenance, personnel, part time researchers, transportation are estimated at 50 thousand Euro per year, that is 250 thousand for the five years. The total is estimated at 500 thousand, and this is the minimum required to have the basic version of the Regional Platform and maintain it for five years until it is self-sustained afterwards. Yet, it needs the soft components including capacity building, research and educational interventions.

To implement the other activities such as developing virtual platform, capacity development, research activities, educational interventions and training as described above, all by international partners in collaboration with BAU and national partners at least another 500 thousand Euro is needed. This number can be less but also can be bigger depending on the proposal objectives, and work packages. Finally, detailed budget can be presented based on the final shape of the business model, which is a decision will be made by all interested parties, with Al Balqa Applied University as owner and lead partner

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Naser Almanaseer, March 7, 2018