

Sustainable Development of Drylands in Asia and the Middle East:

Jordan Component

Visit Report
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Prepared
by

Akram H. Tamimi, Ph.D.
Project Coordinator
International Arid Land Consortium
Office of Arid Lands Studies
The University of Arizona

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I. Introduction

Between the period extending from January 22, 2004 and January 30, 2004, Dr. Tamimi visited Jordan to follow up on the IALC/The University of Arizona Sustainable Development of Drylands project: Jordan Component.

The objectives of the visit are as follows:

- 1) Meet the Architect for Wadi Mousa Visitor's Center: discuss offer and contract.
- 2) Meet with Engr. Mohammed Shahbaz and Dr. Saad Al-Ayyash to discuss and update the project's activities.
- 3) Meet the Arab Center for Engineering Studies: discuss Wadi Mousa Visitor's Center's Geotechnical offer and contract.
- 4) Meet with Dr. Shatnawi, University of Jordan, and discuss research proposals for submittal to RADAC and other funding resources.
- 5) Meet with Dr. Manar Fayyad, University of Jordan Water and Environmental Research Studies Center, WERSC, for further discussion on advancing the preparation of the proposal for the monitoring of the recycled effluent at Wadi Mousa, Aqaba and later for Mafraq WWTPs.
- 6) Meet with Dr. Ziad Ghazawi, Jordan University for Science and Technology, JUST, for further discussion on advancing the preparation of the proposal for the monitoring of the recycled effluent at Wadi Mousa, Aqaba and later for Mafraq WWTPs in cooperation with WERSC.
- 7) Travel to Aqaba and visit the new Water Friendly Garden site. Meet with Dr. Bilal Bashir from ASEZA to define other activities and technical support for ASEZA.
- 8) Report on activities and project status to Dr. Amal Hijazi at USAID/Amman

II. Tender Documents for Wadi Mousa Visitor Center

1. Background

To develop tender documents for Wadi Mousa visitor Center, many meetings with the Architect, Mr. Sahel Al-Hiyari, Engr. Mohammed Shahbaz and Dr. Saad Al-Ayyash, BRDP, and with the Geotechnical firm took place during Dr. Tamimi's visit.

The following is a complete picture of the previous status of this activity, the current status and where this activity is heading.

The development of tender documents is an activity that was approved by IALC/The University of Arizona and USAID – Amman mission, through which, IALC, through their project subcontractor, would develop tender documents to be submitted to USAID – Amman mission for implementation.

In cooperation with Dr. Margaret Livingston from The University of Arizona's School of Landscape Architecture and her student Dr. Erin Addison a plan to design the center has been developed. A landscape architectural plan has been prepared with interpretive materials for the wastewater demonstration site at Wadi Mousa.

For further information, please consult Dr. Tamimi's visit report: December 15 to 19, 2003, dated January 05, 2004.

2. Design Concepts

Three concepts for visitor center, presented by the architect, were discussed during the different meetings. The first concept which requires the carving of the Visitor's Center horizontally would start from the entrance to the center. The visitor will be looking at the irrigation pond and the demo sites and then will walk into the Visitor's Center. So the entrance to the Visitor's Center will be on the opposite side of the irrigation pond which will transfer the visitor from looking at the demo site and the agricultural production fields to the interpretation of the site in the visitor center.

3. Architectural plans for the visitor's center

a. Offer

During the meeting with Mr. Sahel Al-Hiyari, the designated architect, Dr. Tamimi indicated to Sahel that IALC/The University of Arizona approves of his offer and a subcontract will be signed with BRDP to complete the architectural design.

b. Architectural Design

The architectural design will not start until a geotechnical report is established. The geotechnical report will show if the rocks are stable enough to be carved and if the rock is continuous and extends for enough depth below the surface.

c. Supervision

The supervision provided in the offer allows for a maximum of 25 visits. It is believed that if the first concept is selected and the carving of the rock will be performed to establish the Visitor's Center, then the number of visits should be increased to at least 35 visits. The architect will direct all activities in the carving and will modify the design based on the types of rocks encountered. It is better to budget for 35 visits so as not to run out of supervision money.

4. Geotechnical Offer

After going through the Geotechnical Offer mailed to Dr. Tamimi and to IALC/The University of Arizona from Dr. Saad Al-Ayyash, from BRDP, the following concerns were observed by Dr. Tamimi:

a. Type of Tests

The geotechnical offer does not indicate specifically the type of tests that will be conducted. The types of tests listed are soil tests performed when a foundation is going to be laid down on top of soil or rock.

If the foundation is laid down on top of soil, soil tests are provided and footings are sized based on the bearing capacity of the soil. However, when rock is encountered, rock core is obtained using an auger and tested as if it was concrete and the rock bearing capacity is determined to size the foundation footings.

In the Visitor's Center case, the rock will be excavated or carved horizontally until a cavity is formed underneath the top of the mountain. Now, are bearing capacity tests valid? It is believed that the type of tests that will be performed don't fit the situation. What we are trying to do is similar to closed pit mining and a determination of rock strength is required to make sure that when the cavity in the mountain is formed, the rocks will not cave in.

Since the area for the Visitor's Center is about 150 m², it is important to decide on the span that is allowed to be carved before leaving a rock column intact to support the ceiling. The minimum thickness of the ceiling needs to be decided upon to ensure the stability of the cavity.

b. Suggested plan of action

After discussing the above concerns with Mr. Shahbaz and Dr. Saad Al-Ayyash from BRDP, it was decided that Dr. Tamimi prepare a document that defines the terms of reference that include a Scope of Work for what is expected from an engineering firm to do to deliver a final set of tender documents. The architect would work closely with the designing engineering firm.

5. Tender Documents

Tender documents need to be prepared to be submitted to USAID – Amman for the implementation of the Visitor's Center. These will include:

- Architectural plans and drawings
- Detailed Drawings for implementation
- Methods and specifications for carving
- General conditions
- Special conditions
- Bill of quantities

The tender documents need to meet the same format and requirement as required by USAID. The architect will be greatly involved in developing the tender documents.

6. Mafraq future Visitor's Center

It was indicated to Sahel, the architect, that if work goes well in designing and preparing the tender documents for the Wadi Musa Visitor's Center, the same ideas and work will be done for Mafraq wastewater treatment plant.

III. Biosolids Characterization

Dr. Tamimi visited Dr. Bassam Hayek and Mr. Wael Suleiman from RSS/ERC. An update of the biosolids characterization was obtained to be used in the USAID February 12, 2004 presentation in Washington DC.

Dr. Tamimi encouraged RSS/ERC to start working on the 2nd phase of the biosolids proposal to be submitted to IALC/The University of Arizona for funding consideration. In addition, Dr. Tamimi asked Dr. Bassam Hayek to consider a continuation of the same work that is being done with biosolids in other sites.

Dr. Bassam Hayek requested information about the next laboratory workshop training and Dr. Tamimi promised an answer on this when and how long the training would be in one to two weeks.

Dr. Hayek indicated that the ad hoc committee for the biosolids characterization has been meeting every two months and an update through a presentation is given every time.

IV. Characterization of Effluent

During separate meetings between Dr. Tamimi and Dr. M. Shatnawi and Dr. Manar Fayyad at WERSC, University of Jordan, the idea of effluent characterization at few wastewater treatment plants was discussed.

The idea of initiating a proposal for the characterization and utilization of the recycled effluent at Wadi Mousa, Aqaba and later at Mafraq WWTPs and having split sampling tested at JUST and WAJ laboratories were presented and discussed.

The idea found a good response. The plan of action has been to have Dr. Ghazawi from JUST and Dr. Fayyad from WERSC prepare a comprehensive proposal with different phases. IALC/The University of Arizona will look into funding the first phase during 2004.

Dr. Tamimi promised to send this part of report to Dr. Shatnawi, Dr. Fayyad and Dr. Ghazawi for a follow up on the proposal idea.

The outline of the proposal developed by Dr. Tamimi and Dr. Fayyad during Dr. Tamimi's visit of December 15 to December 19 was emailed to all parties concerned.

It should be mentioned that the role of WAJ will be in assisting of collecting the samples and testing them for the different parameters that will be specified in the proposal.

V. University of Jordan Proposals

Dr. Tamimi met with Dr. Shatnawi twice during this visit to Jordan. Dr. Shatnawi indicated that he would like to take the role of a leader in originating and steering research and monitoring projects. Dr. Tamimi requested a team for the task of preparing proposals be formed.

A list of proposals was discussed:

1. Wadi Mousa

A rehabilitation and engineering of traditional water harvesting systems in the agricultural production area of the Wadi Mousa reuse site was proposed. The idea centers on combining water harvesting systems with supplemental irrigation from the recycled effluent due to the low inflow rate of wastewater into the wastewater treatment plant.

2. Mafraq

Dr. Tamimi discussed with Dr. Shatnawi a study to determine the affects of the reuse of treated effluent on soil, crop and the dairy and meat products of cattle feeding from the growing fields.

This research idea was brain stormed originally by Dr. Tamimi and Dr. Peter Waller from The University of Arizona. Collaboration between The University of Arizona and the University of Jordan can develop the proposal to be submitted for funding.

VI. BRDP Research Proposals

During his visit to Jordan, Dr. Tamimi had many opportunities to discuss different topics with Mr. Mohammed Shahbaz and Dr. Saad Al-Ayyash.

1. Visits of Technical Assistant Team Members to Jordan

It was indicated that a successful visit would be driven by a set of objectives. Those objectives need to be sent to Dr. Tamimi and BRDP as soon as the visiting idea is initiated to set a reasonable itinerary for the visitor. The length of the period a visitor can stay in Jordan would be according to the itinerary developed ahead of time to meet the objectives.

Dr. Tamimi indicated to BRDP that he will take their recommendations into account in the future Technical Assistant Team members' visits to Jordan.

2. Tal Hassan Research Station

Tal Hassan is a run down research station that has good facilities for researches. Mr. Shahbaz would like to develop the station further and run different applied and research projects in it. The type of projects can involve the following:

a. Eco Tourism

The idea of eco tourism would be developed to visit all sites surrounding the Tal Hassan research station that deals with water and plants.

b. Hydraulics and water flow of the neighboring wadi that runs southward from Syria

c. Water Harvesting Techniques

The water harvesting techniques and methods would include research, production, assessment and demonstration sites.

Dr. Tamimi stressed again the need to have a team from BRDP that would initiate research proposals to implement such great ideas.

VII. Conclusion

All but objectives 7 and 8 were accomplished during Dr. Tamimi's visit. Dr. Bilal Bashir was out of town and Dr. Amal Hijazi was traveling to Mecca to perform the pilgrimage.

Dr. Tamimi spoke with Dr. Hijazi the day he arrived in Amman, wished her well on her trip to Mecca and promised to visit her during February to update her on the project activities.

For Dr. Bilal Bashir, it was agreed that a visit to Dr. Bilal would take place on February 24 by Dr. Al-Ayyash and Dr. Tamimi, this being the best date for Dr. Al-Ayyash. The visit would concentrate on defining what IALC/BRDP can assist ASEZA with, in addition to the Water Friendly Garden Design.