

Quarterly Program Performance
Report 2 of 2001

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Project Title: Appropriate Technology for Wastewater Treatment and Reuse in Rural Middle East Areas

Organization I.D.: 10287

Organization Name: The Galilee Society

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Summary:

- **USAID Evaluation:** USAID evaluation team visited ATC project partners in Sadat City, Egypt and Shefa' Amr, Israel, June 3-9.
- **Workshop for Galilee Farmers at Sakhnin Pilot Site:** On April 27-28, the GS hosted a workshop on *Wastewater Treatment and Reuse in Irrigation* for area farmers and agricultural technicians.
- **Technion Technical Progress Report:** Quarterly technical evaluation of the Sakhnin pilot system.
- **PHG - Beny Zaid Site:** First phase of implementation for full-scale system underway.
- **ECOIA - Sadat City Site:** Workshop for project technicians in association with Sadat City municipality.

1. USAID Evaluation

A USAID evaluation team met with ATC partners during June 3rd – 9th in Egypt and Israel. The evaluation visit included tours of the pilot sites, conferences with staff members, discussion of progress, results and development plans thus far. The Galilee Society R&D Center partner prepared technical and narrative documentation and facilitated meetings between the partners and USAID.

Sessions and participants are as follows:

June 3-4, Sadat City, Egypt	ECO staff, Project Manager Isam Sabbah, USAID team
June 6-7, Sakhnin, Israel	Regional R&D Center staff, ATC staff, Technion staff
June 9, Shefa'Amr, Israel	ATC staff, PGH Project Manager Ayman Rabi

The USAID evaluation team and ATC partners addressed issues including: original work plan, challenges and outcomes; monitoring and operation; research and design; and the current political situation. Official results of the evaluation are expected shortly.

2. Workshop for Farmers and Agricultural Technicians – Sakhnin Pilot Site, Israel

On the 27th and 28th of April, 2001, the ATC coordinating partner, The Galilee Society R&D Center, hosted a workshop for farmers, scientists and agricultural technicians on emerging technologies in wastewater treatment and its reuse for agricultural purposes. The workshop was held at the ATC pilot site in Sakhnin. The workshop was presented in collaboration with the Towns Association for Environmental Quality (TAEQ) and the Al Ahali Center.

The program of lectures, tours, discussion groups and informational sessions was an opportunity for area farmers to acquire a general knowledge of wastewater and its treatment as well as an understanding of treated wastewater irrigation models and associated issues. The two-day workshop included: an introduction by the Mayor of Sakhnin, tour of the Sakhnin pilot site, tour of a local farm and discussion of organic agriculture issues, and a panel session on financial feasibility and farmer organizations, among other activities.

Over 25 farmers, researchers and technicians attended the event. Participants received and discussed reference materials which addressed: the importance of wastewater treatment and reuse for the environment, the economic benefits of irrigation with treated waste-water, water quality assessment testing information, laws and standards for safe reuse, and guidelines related to the establishment of farmers organizations and options for wastewater reuse on regional farms.

Local television, newspaper and radio media covered the event and interviewed several of the program participants and hosts. It is expected that this workshop

will serve as example for future educational events to take place among the partner organizations involved in the *Appropriate Technology for Wastewater Treatment and Reuse in Rural Middle East Areas* project.

Collaboration between the ATC, Al Ahali Center and TAEQ encouraged participation by farmers and technicians from a variety of backgrounds, regional areas and levels of expertise. Al Ahali Center is a regional community development organization, while TAEQ is an environmental organization affiliated with the regional municipality. Attached please find the workshop invitation and agenda, which was made available in both English and Arabic.

3. Technion Quarterly Progress Report: April – June 2000

During the period of April through June 2001, the UASB operated continuously with pre-settled raw sewage and its effluent was subsequently fed to the horizontal wetland. The three vertical beds were run in the regeneration mode.

UASB

UASB performance recuperated after the low winter activities and by mid-May the COD removal efficiencies were 65%-70% (Figure 1, COD_t). On June 11th, the retention time was reduced from 18-20 hours to 14 hours. Concomitantly, sludge washout was observed. The washout sludge, which was flocculant, contributed to high TSS concentrations in the effluent (300-700mg/L), hindering estimation of COD removal efficiencies, which seemed to decrease to 50% (Figure 1). In order to estimate COD removal efficiencies during the lower retention times, soluble COD (COD_{sol}) in the effluent was compared to the total influent COD. The result of this analysis indicated that the removal efficiency was in the range of 80%-90% in contrast to the 50% obtained when considering the total COD (which include sludge TSS after June 11th) (Figure 1). For comparison purposes, results for COD removal based on COD_{sol} of the effluent relative to COD total of the influent are also given for the last 30 days before decreasing the retention time (May 13 - June 11) The results show an average removal efficiency of 85%, suggesting that there was no deterioration in the removal activity.

An additional way to exclude the sludge washout in the effluent is to take the wetland influent as the value for the UASB effluent. During the intermittent feeding of the wetland, settling occurs in the feeding tank, thus any washout sludge settles in the tank before the feeding. When this calculation is done, the COD removal efficiency after the decrease in retention time is still in the range of 70%. In any case, the sludge mass in the reactor was not reduced but stayed constant during most of the year (Figure 2). During the following summer months, the retention time in the UASB is planned to be reduced to the designed time of 8 hours and even lower, in order to determine the shortest operation retention time resulting in good COD removal efficiencies.

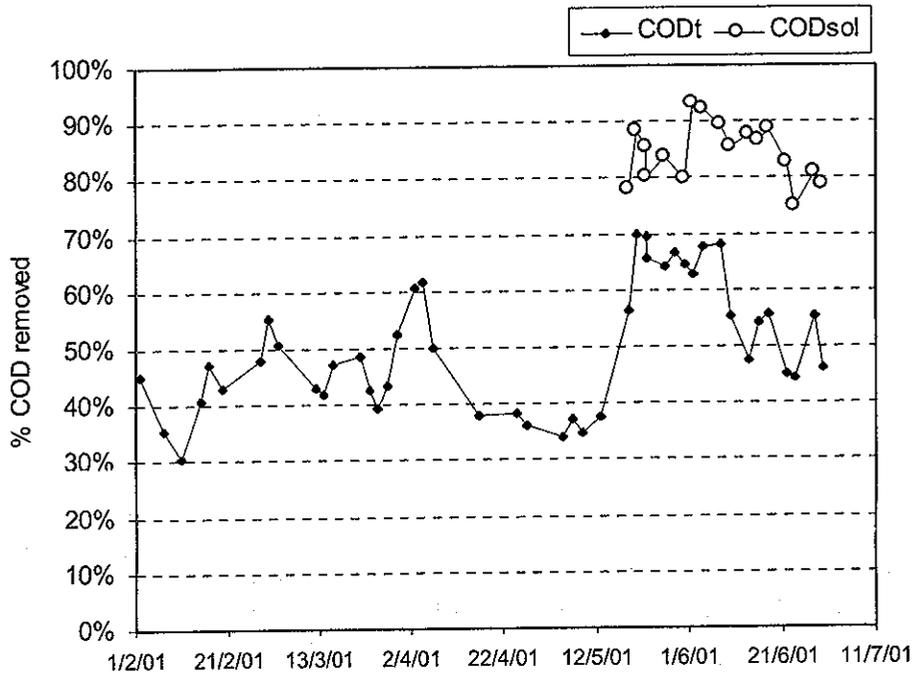


Figure 1: UASB performance February 2001 - June 2001

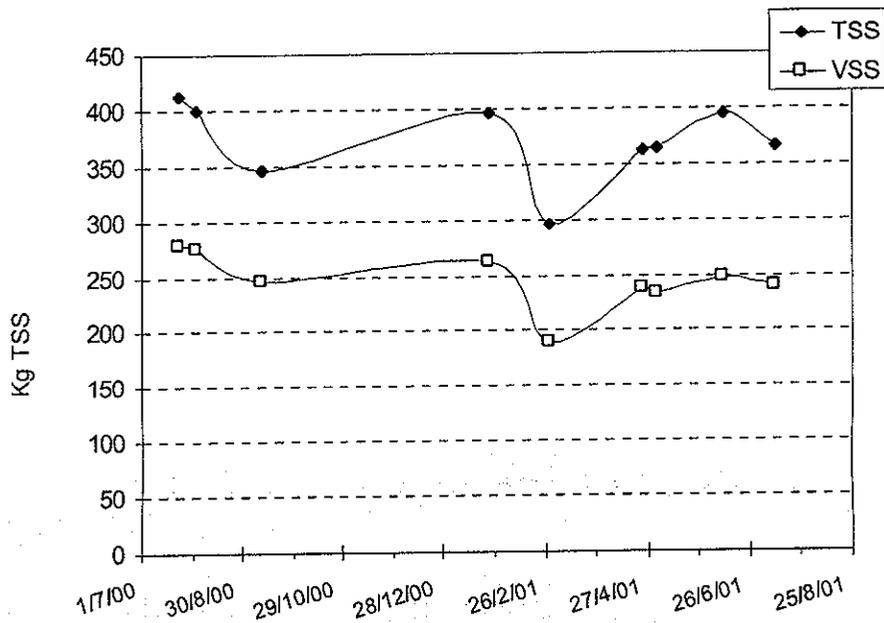


Figure 2: Sludge mass

Vertical Beds

During the last months, the three vertical beds operated in regeneration mode, preparing them for the next operation cycle. After two months of regeneration the available volume in the three beds are: VB1 = 50%, VB2 = 70%, VB3 =

75%. In the next few months, the three sequential beds will be used to treat UASB effluent. The 'long cycle' mode will be used for that purpose as the 'short cycle' had no significant advantage over the 'long cycle' (see yearly report 2000).

Subsurface Horizontal Wetland

The subsurface horizontal wetland continued to operate downstream from the UASB. As a consequence, the load was usually higher than designed. The average load during the last three months was 15gCOD/m².day and the removal rate was on average 10gCOD/m².day. A tracer experiment confirmed that the retention time was close to the one expected, 5-7 days. In order to test the wetland at lower loading rates the wetland will be fed during the following months with effluent from the Sakhnin reservoir (BOD~100mg/L).

4. Palestinian Hydrology Group (PHG)

PHG activities during the last period focused on the completion of the requirements of the first phase of implementation. In addition, the full-scale collection system was finalized and all the profiles and maps are ready for tendering. Key accomplishments can be summarized as follows:

1) First Phase Implementation

Two kilometers of the sewerage network in Bany Zaid area is to be implemented. Accordingly, all necessary tender documents and technical designs have been prepared. The bidding documents that were prepared are:

- 1-Tender data: project components (transmission line, septic tank, UASB, wetland and collection reservoir)
- 2-Scope of work (Guidelines for contractors)
- 3-All the necessary drawings and details for cross sections of the conveyance line, manholes, cross section of the treatment facilities and storage tanks complete
- 4-Bill of quantities
- 5-Contractor's bid
- 6-Qualification information
- 7-Contractor's declaration
- 8-Specifications as defined by PWA

PHG has been working with the Municipality of Bany Zaid to finalize the location for the treatment plant. It was agreed earlier that the plant will take place at the same place of the large-scale plant. Therefore, the Municipality finalized purchasing the land required for the project. Almost 8 dunams were purchased. The land was surveyed and ready for implementation. The PHG and Bany Zaid Municipality announced the bid in the local newspapers.

An official letter was sent to PWA informing them that the research project will start in Bany Zaid and that they will be updated on the results.

2) Evaluation Meeting

PHG attended the USAID project evaluation meeting in Shefa' Amr, at the Galilee Society R&D Center. PHG presented the work that had been accomplished thus far and highlighted their involvement in the project.

3) Fund Raising

PHG has been actively engaged in securing additional funds for the project. However, due to the fact that there were no complete documents, it was difficult to raise funds properly. PHG succeeded in introducing part of the collection system for funding under some small scale funding projects. Almost \$35,000 will likely be secured for the project shortly.

4) Planned Activities for next 3 Months

PHG has devoted the months of July, August & September for construction. Key activities are as follows:

- 1-Evaluating bid documents and announcing the winning contractors.
- 2-Start implementation within one week of signing the contract with the contractor.
- 3-Start implementation from the old center of Deir Ghassaneh village and include schools, extend the conveyance line to the treatment site.
- 4-Supervise implementation

5. Egyptian Center for Organic Agriculture (ECO A)

1) Training Workshop

On the 31st of May 2001, a training workshop for project staff and involved personnel from the Sadat municipality was held at ECOA. The program included the following speakers and topics:

1. Mr. Mahmoud Abd El Latif, Vice-Chairman of Sadat City: Welcome and introduction of the project;
2. Prof. Ahmed El-Araby, project manager: Project activities & environmental impact on Sadat area, the needs for project scheme;
3. Prof. Abd El Ghany El-Gindy: Suitable irrigation methods for wastewater reuse in agriculture;
4. Dr. Essam Wasif: Pilot site preparation & activities of the project at the pilot site;
5. Prof. Mamdouh Fawzy Abd Allah: Safe recycling and reuse of environmental wastes - agriculture application;
6. Eng. Hazem Mehawed: Field tour - project pilot site.

Over 25 participants took part in the program, including five technical and administration officers from Sadat Authority of Development, eleven agronomists, chemist, and three civil engineers from Sadat Environmental Authority, plus the ECOA project staff.

2) First Egyptian French Conference of Water Resources and Future Changes, 25-26 June, 2001.

Dr. Ahmed El-Araby and Dr. Essam Wassif presented a paper entitled: "Appropriate Technology for Wastewater Treatment and Reuse in Agriculture", describing the aims and developments of the project.

3) Completion of the earth works for excavation of polishing pond, wetland and disinfection pond. Lining of the polishing pond with polyethylene sheets, bankments fixed with cement and sand bags.

4) Installation of the piping system to the polishing pond.

5) Two booster pumps purchased. Installation of electric generator to operate the booster pumps. Out building for housing generator complete.

6) Completion of two man holes for the two booster pumps at the outlets of polishing pond and wetland units.