Aral Sea Basin Program

Water and Environmental Management Project

(ASBP-WEMP)

Component D - Transboundary Monitoring Stations

Progress Report

Summary

This note reflects progress of the Component and outputs so far and intends to share lessons learned under the ASBP-WEMP Component D. The findings are based on the joint World Bank, USAID-NRMP and Swiss Aral Sea Mission's visits to the sites.

Based on the information obtained, it could be indicated that the development objectives of the Component have been achieved and the major outputs are objective oriented.

Background

One of the major problems which five states of the Aral Sea basin are facing is lack of proper water management caused by both objective and subjective reasons. One of these is lack of reliable and precise hydrological information concerning the quality and quantity of water available in the basin for agriculture, industry and drinking water supply. In the region's arid environment, river water is the single most important natural resource. The high dependency on this source, the difficulties related to equitable water sharing are potential threats to economic sustainability and political stability in the region. For future water management it is vital that the CA states have access to precise and reliable data concerning quantity and quality of the water resources.

The five National Hydromet Services (NHS) have no capacity to manage an impressive system of more than 560 hydrological measuring stations organized under the Moscow-based Hydro-Meteorological Service due to lack of funds to operate the system. The efforts to reach water allocation agreements have been unsuccessful because these need to be monitored in a manner agreed by all the states, while the means to adequately monitor implementation of these agreements are not available.

To overcome the above mentioned constrains the states agreed that a priority objective is to establish monitoring stations at certain sites and install measuring equipment which would allow to monitor water flow and quality. The ASBP Program 2.1 proposed to equip 65 TMSs to monitor water quality and quantity at certain points along the border between Central Asian countries with the following objectives to:

improve trans-boundary monitoring of water flow;
improve trans-boundary monitoring of water quality (mainly salt content); and
improve processing and dissemination of data.

Taking into consideration the willingness of the CA states to contribute to the TMSs rehabilitation and construction of new stations, it was agreed to procure and install equipment at 25 TMSs on Syr Darya and Amu Darya rivers.

According to the original Project Implementation Plan, 25 stations were supposed to be equipped and fully operational in two and a half years after effectiveness of the Grant Agreement, i.e. November 30, 2000.

Progress to date

A. *Equipment Installation*

The first five stations were equipped by technicians provided by the equipment supplier (SEBA). Equipment installation and operation training was provided to representatives of each of the NHMS by the SEBA technicians so that the remaining 20 GEF stations could be equipped by the respective NHMS.

The assessment of the equipment installation is based on the results of the site visits. To date, monitoring and supplementary equipment was installed at 19 TMSs out of 25. Equipment was fully installed at 5 stations in Kazakhstan (100%), 1- in Kyrgyzstan (50%), 4 - in Tajikistan (100%), 3 - in Turkmenistan (50%), 6 - in Uzbekistan (85%).

The delay in procurement of equipment and rehabilitation of the existing stations and construction of new stations caused a delay in equipment installation. New schedule to complete equipment installation was agreed in August 2002. According to the PMCU, the remaining equipment should be installed by November 1, 2002.

B. *Data Collection and Transmission*

Data Collection

TMSs collect data in accordance with the National Hydromet Services (NHSs) and World Meteorological Organization's standards. The newly equipped stations record water level constantly[1]. Observers check the status of the water level recorders twice a day. Water flow (velocity and discharge) is measured not less than 5 times a month and up to 15 times during flood period. Water quality is to be checked monthly.

Data Transmission

The existing data transmission system calls for the transmission of information from TMSs, through Regional Hydromet Centers (RHC) and finally to the National Hydromet Centers (NHC) mainly in a voice format. NHC collects and processes data.

NHC is responsible for the data transmission to the governments and such agencies as National Ministries of Agriculture/Water Resources (MAWR), the Basin Water

[1] The most of the stations equipped by two type of level recorders (pressure sensors and floating water level recorders). Both connected to data loggers which record the data

Organizations (BVOs), and other end-users. The BVOs and MAWR's departments use that information to assist in establishing daily operational targets.

To date, operators transmit data collected at TMSs to the Regional Center or to NHSs (according to the assignments) in a voce format. Hydromet Services of Kazakhstan receives data from the newly equipped stations mostly in a digital format.

C. *Training*

SEBA's[2] personnel provided on-the-job training for the installation of the equipment at five stations (one per country). The representatives of the participating countries - engineers responsible for installation and maintenance of equipment participated in the training. The total number of the "trainers" trained is 10. The objective of this training was to train the trainers so that these personnel can train other personnel in each country who will actually perform the installation of the remaining stations.

A training program was developed by PMCU jointly with SEBA and conducted in Germany at the manufacture's plant for Chief Engineers and Head of the NHSs. The objectives of the training were to: (i) study the technological specifics of the equipment to be installed and specify necessary organizational/managerial measures to be undertaken at the NHSs' level to train personnel to operate with the equipment to be supplied, (ii) familiarize themselves with the experience gained by the German's NHS operating the same equipment, and (iii) obtain information on the new hydro-meteorological equipment which SEBA is going to produce.

A comprehensive training program was coordinated with and provided by USAID-NRMP to accommodate the Project budget while meeting the NHSs training needs and putting TMSs into operation. More than 180 operators and engineers were trained under the training program consists of:

- PC literacy conducted in Tashkent, Almaty, and Ashgabat;
- Installation, operation and maintenance of Water Quality Stations and calorimeters in Chimkent;
- SEBA's electronic equipment in Tashkent;
- Equipment installation at the TMSs (Chardara, Kal, Uchterek, Kyzyl Kishlak, Darganata);
- Installation, operation and maintenance of Radio sets in Chimkent and Almaty.

Four training courses were delivered in July, 2002. Two training courses for DEMAS (data processing) in Tashkent and each one for data loggers and water quality station operation in Chimkent.

[2] SEBA Hydrometie – the supplier company for Germany which supplies monitoring equipment for TMSs.

D. *Budget*

The original budget of the Component was USD 2,220,000. According to the original PIP procurement of the following equipment was planned and corresponding funds were allocated to ($US):

Monitoring equipment –	1,408,000
Transmitters -	84,000
Boats –	139,000
Bicycles –	22,000
Data processing/Communication equipment –	142,000
Training Consultants –	110,000
Cars –	50,000
In-Service Training –	164,000
Incremental operating Cost –	101,000.

During Mid-term Review, it was discussed and agreed that savings under Component and uncommitted funds under the Project would be used to: (i) equip 12 additional stations, (ii) purchase Radio sets for the Regional Hydromet Centers, (iii) purchase cars for the TMSs. The additional funds which were allocated for the Component totaling USD 632,000.

To date $US 1,261,142 were disbursed under the Component.

Additional Stations

To utilize the savings of funds under the component and to meet the objectives of the ASBP, it was agreed to procure equipment for 12 additional stations.

The design of the 12 additional TMSs is completed in all five countries. Five TMSs (two stations in Kazakhstan, two stations out of three in Tajikistan, and one out of two in Turkmenistan) are rehabilitated and are ready to receive equipment. It is planned to equip two more stations in Kyrgyzstan and three stations in Uzbekistan. None of them is ready.

Amendments and new contracts to procure monitoring equipment, boats, radio, and cars are signed. The advance payments under the contracts are made. Offers for the procurement of generators are under consideration.

Lessons Learned

Though the Component objectives were realistic and the National Teams supported by their respective Governments made their best to achieve them, the Project failed to meet deadlines for the rehabilitation of existing stations and construction of new ones, procurement of equipment and its installation, and training of the local personnel. The reasons for the delay in the Component implementation were: (i) ambiguous design of the equipment sets to be installed at the stations, (ii) lack of experience in implementation of complex regional projects, (iii) lack of knowledge and experience in procurement, and (iv) delays in co-financing.

Some changes were introduced into the design of the Component while its being implemented. It has been originally planned to equip six TMSs with radio to transmit data collected in a voice format. At a later stage, it has been agreed that 19 additional radio sets would be procured and a digital format would be used to transmit data.

The SEBA's data logger equipment selected for the project also poses a problem with respect to the system design. The data logger itself was purchased complete with a modem and communications hardware which restricts communications to either radio or cellular systems. SEBA was unaware that either radio or a digital format of data transmission required. Loggers and the DEMAS software were designed to communicate via a public telecommunications network with DEMAS dialing up specific stations to collect information.

There was no radio path study conducted between the Hydromet stations and RHCs or RHCs and the various NHCs. For digital transmission, it is needed to determine signal strengths required, antenna heights and azimuths and whether repeaters would be required. Having radio voice communications between two places does not guarantee that digital data can be successfully transmitted.

The visits to the sites discovered that only a small proportion of the data collected was needed for real time forecasting or operations by the NHCs, RHCs, BVOs or MAWRs. Water level information (from which flows are derived) is the only data that needs to be transmitted at least daily. Remaining data collected, either manually or automatically, such as water quality or current measurements[3], while still important, does not need to be transmitted that often. This means that water level is the only information that needs to be conveyed electronically over the communications system. Other information could be placed on a floppy disk or other devices and sent to the NHC or RHC in the same way as logbooks. This would certainly help to eliminate the tedious and time-consuming data entry required to transpose logbook information into a computer.

Installation of PCs at the stations is unnecessary because local operators will be able to use only 5 to 15 percent of their capacity. Kyrgyzstan's experience showed that controllers could be used instead of the PCs at the first stage of the TMSs installation.

Conclusions and recommendations

Based on the information collected during the field visits and obtained from USAID-NRMP and Swiss Aral Sea Mission reports it could be concluded that the Component development objectives are achieved.

None of the problems outlined above are insurmountable. However, the identified problems signaled that the Component implementation faces certain difficulties. Given this situation and in light of recent developments (contracts signed, stations rehabilitated, Global Infrastructure Fund Research Foundation Japan (GIF Japan) expressed its interest in assisting the system expansion, Swiss government committed to support the Regional Hydromet Center and the Aral HYCOS) this may be a good time for the EC-IFAS to pause for a moment to react.

[3] Should be transmitted the same day.

Based on the above mentioned EC-IFAS should:

- review the ASBP's priorities and objectives related to further development of the National Hydromet Services network and strengthening of its capacity – if there is a need, these may be expanded and quantified;

- before engaging in further purchasing activities it would be good to develop a detailed plan to test the performance of the systems, the timeframe for the implementation and its cost.

Annexes:

Annex 1. Map - Location of the stations.
Annex 2. Brief description of the stations and their characteristics.
Annex 3. List of the equipment and its cost.
Annex 4. Status of the equipment installation.
Annex 5. Training Plan.
Annex 6. List of equipment to be installed at the 12 additional stations and its cost.
Annex 7. Schedule of the 12 additional stations rehabilitation/construction and equipment installation at the stations.