WRIC News Letter March 2007

Study tour in Morocco

From Feb. 25th to March 6th, Mr. Mori (Chief Advisor), 2 WRIC counterparts and 2 Syrian officials of MoI conducted the study tour in Morocco. In this newsletter, we would like to report the outline, findings and recommendations as following.

1. Introduction

The economic and social development which has been taking place in Morocco during the last decades allowed to set up the basic infrastructures of the national economy and answer the socio-educational needs of the population. Several sectors grew considerably such as tourism, industry, fishing, water, housing, etc … This development brought about an increasing exploitation of natural resources and a degradation of the environment due to the emission of liquid, gas and solid discharges in the absence of technical and statutory measures which can face this degradation (the cost of the environment degradation exceeded 8 % of the GDP). Due to the high environmental stress caused by the economic development, water issue such as deficit of water resources, flood disasters, river and sea water pollution have become serious in Morocco in the past several decades.

*Due to the copy right, the map of Morocco can not be uploaded on the website. Thank you for your understanding.

Location of visited sites in Morocco

To deal with such problems, Moroccan government has conducted many projects in the water sector and foreign donors including JICA have supported such challenges by the government. As result of the projects and activities in the past, Moroccan government has obtained much experience and knowledge on water resources management.

In Morocco, they have many similarities with Syria not only in terms of physical and scientific aspects such as meteorology, climate, geography, hydrology and geology etc, but also in terms of cultural ,religious and social aspects such as Arab and Muslims countries. On the other hand, due to the recent rapid economic development of Morocco, they have already faced many issues and problems on water management such as ‘too much water’ and ‘too little water’. At the same time, there is very big economic gap between urban areas and rural areas in Morocco, which caused the serious disparity of expansion and security of water supply, waste water treatment etc. To deal with such problems, Moroccan government is now trying many challenges and projects, which seem more advanced and sophisticated than that of Syria. Therefore, it is very useful and helpful for our Syrian counterparts to visit Morocco to see the actual situation, problems, measures to deal with the problems and projects in Morocco.

More specifically, in the Atlas mountain area, JICA project established flood warning

system in 2002, which has automatic hydrological observation system to predict the flood. In April 2006, the waning system worked effectively to prevent the flood disaster in the area. This experience seems a good practice in terms of the effective utilization of hydrological observation system, as well as the appropriate maintenance of the system even after the completion of JICA project.

Moreover, besides this project in Atlas area, other water projects are on going now such as Domestic Water Supply Project in rural area, Rehabilitation Project of Traditional Domestic Water Supply System (Hattara) in Eastern Atlas area, Development Study of Master Plan for Water Resources Management in House plain and so on.

It should also be very useful for Syrian counterparts to visit and share the experience at the water projects in Morocco. Therefore, this study tour was planed and implemented. In this study tour, we were provided with great cooperation and assistance of Mr. Uemura, JICA expert for Ministry of land management, water and environment of Morocco (hereinafter it is called 'MATEE'), many officials of MATEE and Moroccan governmental officials in water sector, JICA Morocco Office and JICA Syria Office. I would to appreciate all of them for their great cooperation and contribution to this study tour in Morocco.

2. Main sites visited

Our objectives are basically to visit and view the following sites of water sector in Morocco. Needless to say, through the discussion and general review with Moroccan government officials, lesson learnt should be obtained as well by the participants in this study tour.

① Flood Prediction and Warning System in Atlas mountain area
② Domestic Water Supply Project in rural area
③ Rehabilitation Project of Traditional Domestic Water Supply System (Hattara) in Eastern Atlas area
④ Development Study of Master Plan for Water Resources Management in House plain

3. Participants

Mr. Noriyuki MORI (JICA expert / Chief Advisor of WRIC in Syria)
Mr. Fahim Assad (Director of WRIC Lattakia Center)
Mr. Abdel Ghani Ajjan (Engineer, Technical Support Section of WRIC DRD Center)
Mr. Amar Qndqgy (Engineer, General Company of Hydraulic Study)
Mr. Samir Moura (Director of Water Resources Section, Water Resources Directorate of Hassake)
*fully accompanied by Mr. Mitsuro Uemura (JICA expert for water resources management), with special thanks from all participants.

4. Summary of findings

4.1 Situation of water resources in Morocco

Morocco is a relatively water poor country with sporadic rainfall and unequal distributaries of surface and groundwater resources. The water resources have been

evaluated at about 30,000 million m³/year, out of which 16,000 million m³ of surface water and 5,000 million m³ of groundwater are considered to represent water development potential. The most important rivers are equipped with dams, allowing surface water to be stored for use during the dry seasons

Al Waheda dam in Sebou river basin, the biggest dam in Morocco,(Capa. = 3.8 billion m3)

Agriculture, including forestry and fisheries, accounted for 14.3% of GDP, employing about 47% of the labour force, as of 2001. Agricultural production in the region is highly dependent on irrigation. The irrigated areas represent 17% of the cultivated areas, but contribute about 45% to agricultural earnings. Water for irrigation is mainly drawn from the Drâa River (northern Morocco) and its tributaries. But due to decreasing rainfall in the Higher Atlas and the following decrease in river flows, the exploitation of groundwater has become an increasing source for irrigation water, as surface water is not sufficiently available and is primarily used by the upstream oases. The overuse of groundwater is about to lead to increasing salinity problems for agricultural and household use. In addition to this, the inter-sectoral competition for water is increasing. Agriculture is still the largest user of the resource, but tourism and the growing population especially in urban areas will demand a higher share.

Historically in Morocco, people have always tried to effectively manage water supply in order to survive times of drought and famine. Traditional collectives were formed in the late 14th century for water management purposes, and have continued to this day in some areas, in spite of modernization efforts undertaken by administrations during the French protectorate years and after independence.

Traditional water resource management system are called "Khattara", over a 300 km network of khettara subsurface irrigation channels were constructed. More than 75 of these channels provided perennial water and continued to function for much of the northern oasis until the early 1970s, when new technologies and government policies forced changes. Nowadays the function of Khattara is much positively appreciated again, because the tradition water conveyance system seems very sustainable in terms of operation and maintenance by local people in the rural area. Therefore, JICA conducted a development study to prepare a master plan for rehabilitation of Khattara in Er Rachidia region. Grass roots grant aid projects for Khattara rehabilitation by Japanese government are on-going as well, and about five sites have been accepted every year in the past five years.

4.2 Comparison of Syria and Morocco

4.2.1 Similarity

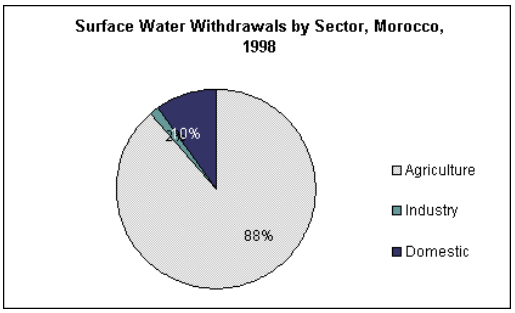
1) Variety of climate

In Morocco, annual average precipitation is about *300(mm/year),* which is relatively low and majority of its territory is classified as arid and semi arid area. However, its climate is very varied according to its geographical condition. In the coastal area along the Atlantic Ocean and Mediterranean sea, they have considerable amount of precipitation to the

extent of approx. 500-700 (mm/year) and the precipitation (rainfall and snowfall) happens mainly in winter season. On the other hand, especially inland area which is south beyond Atlas mountains, it is dry and precipitation is less than 200 (mm/year). However, even in such dry area, melting snow on Atlas mountains provides it with fresh water and groundwater recharge. Therefore, mainly along with wadis which run from Atlas mountains, we can find many oasis with green palm trees and so on. Such variety of climate and importance of snow fall in mountainous areas are very similar to that of Syria.

2) Water use for irrigation

In Morocco, 90% of water resources is used for irrigation. Agriculture is most important economic sector for Morocco and about 17% of the cultivated area is irrigated by surface water and groundwater. Such domination of irrigation water in water usage is also very similar in Syria, in which 90% of water resources for irrigation is consumed for irrigation.



3) Concentration of population to urban areas and trans-basin conveyance of fresh water

In Morocco, population is highly concentrated in the urban areas including coastal areas such as Casablanca, Rabat, Mohamedia etc, inland area such as Marrakech, Fez etc. In these urban areas, due to large amount of domestic water, they suffer the shortage of potable water. To deal with such problems they are now conducting and planning the fresh water conveyance especially from Sebou river basin to coastal urban areas including Rabat and Casablanca, which has relatively rich water resources in Morocco. For such water conveyance, many dams have been constructed and operated especially I Sebou river basin and coastal area near Rabat.

Such inequality and gap of water balance among sub-basins is also found in Syria. Syrian government also has considered water transmission projects from coastal basin to Damascus, or from Euphrates river to Damascus or Homs. As for the consideration and planning of trans-basin water conveyance project, the experience of Morocco will be useful for Syria.

4) Deficit of water balance and drop of groundwater level

Deficit of water balance is very serious especially in Hous plain, which includes Marrakech, very ancient and third biggest city as well in Morocco. This deficit of water balance is caused mainly by irrigation water consumption. Groundwater system has been affected especially by over pumping of groundwater, which has caused serious drop of groundwater level in this area. According to Mr. Uemura's explanation, 10-20m drop of groundwater level has been observed. To cope with such critical situation, JICA has launched a development study in Haus plain. The development study is in the preliminary stage yet, however according to the experts' overview of its water resources situation, it is the most important issue how to save irrigation water which dominates the water usage even in this area to the extent of more than 80% of total water use.

In addition, deficit of water balance has caused the degradation of many sites of oasis. It is supposed to be caused by over pumping of surface water and groundwater, as well as by decreasing precipitation especially in Atlas mountains. The degradation of oasis affect economy in rural area, in which they depends considerably on agricultural products grown by oasis.

Degrading oasis
(near Ouarzazate)

The situation mentioned above is also very similar especially to that of Barada-Awaj basin in Syria. Now Moroccan government is trying the technical, subsidy and legislative approach for the water demand control in irrigation.

5) Water pollution of river and sea

Water pollution is very serious problems in Morocco, which is caused mainly by the discharge of domestic waste water to rivers and sea area. Unfortunately in Morocco, there is no waste water treatment plant so far. However, water pollution is critical issue not only in terms of environment protection and security of drinking water, but also in terms of promotion of tourism which is one of major industry contributing for the acquisition of foreign currency in Morocco. Therefore ONEP. a public agency for water supply and sewerage system, is planning to construct urgently waste water treatment plants in coming years.

4.2.2 Differences of Syria and Morocco

1) Governmental organization and employing system

As for the government employees in Morocco, they are not allowed to work for another job (prohibition of second job), which is very effective and efficient employing system to develop professionalism, dedication for work and so on. Such regulation is adopted in many advanced countries in all over the world. At the same time, government guarantee sufficient level of salary for their employees including the fringe benefits such as official residence etc. According to Mr. Uemura's explanation, the director level of government employees receive about 2,000 USD per month, which surprisingly high compared to the salary of Syrian government employees. On the other hand, the unemployment rate of Morocco is quite high, and economic gap between employed and unemployed and gap between urban area and rural area is very large. Morocco seems much more free competitive society than Syria.

2) Operation and maintenance of observation equipment

In this tour, the operation and maintenance of automatic equipment of food warning system provided by JICA development study in Urika valley of High Atlas mountains was one of our main interests. In general, the equipment was appropriately operated and maintained by the staff, and as the result, the system greatly contributed to the disaster prevention in Urika valley in April and August, 2006. The following reason is supposed to be the main reason for such good achievement.

- very limited number of automatic equipment

In this project, only 5 automatic stations were installed on ground. Such limitation of number of equipment makes the Moroccan counterparts much easy to take care of each equipment. On the other hand in Syria, 248 automatic stations were provided, which seems to exceed the capacity of counterparts. Careful and gradual provision of new equipment is appropriate way to establish the sustainable and cost efficient achievement.

- non-contact observation system for hydrological observation

As for the sensor of river water level, ultra sonic sensor was installed. (Yokogawa co.) According to the explanation of staff, there have been almost no troubles with the sensor. Non-contact system may be more reliable for the observation in developing countries. However, ultra sonic system is much expensive than water pressure gauge system which was adopted in WRIC in Syria. Therefore careful consideration and comparison of these methods should be done in a future similar project.

Ultra sonic river water level observatory(Urika valley)

- budget preparation for repair of equipment

Moroccan government has prepared about 2 million USD for the maintenance of the warning system including 5 automatic stations in Urika valley. Fortunately so far, they have not experienced major damage or trouble of the equipment, however, the preparation of considerably large amount of budget should be highly appreciated.

Village in Urika valley, with view of High Atlas mountains

3) Maintenance of office

In Morocco, all the governmental offices we visited were immaculately clean and beautifully maintained in any places. Such matter seems not essential, however, I believe that it actually affects the work efficiency, motivation and attitude of staff very much.

HQ of Water Supply Agency in Rabat (How beautiful and clean it is!)

4) Information disclosure and public involvement

Moroccan government seems willing to disclose their information and to discuss with public. On the first day of our visit to MATEE H.Q., almost all of the high officials were out of office, because they held “National Debate on Water Management”. Needless to say, each governmental agencies is operating website, to publish their organization, plan and achievement.

On the other hand in Syria, MOI had had website which was prepared by JICA JOCV about 7 or 8 years ago. However after JOCV left MOI, no revise was done and abandoned completely by MOI. Now the website address is used by another irrigation

equipment merchant. In fact, there is very significant difference about such matter between these two countries.

4.3 Recommendations and suggestions for Syrian government

1) Continuation of exchange of information and experience between Morocco

Moroccan government seems to have much sophisticated and advanced experience in terms of water resources management, hydraulic technology, organization, public relation and so on. At the same time, their idea is more internationally acceptable in general. Syrian government should keep contact with Moroccan officials to learn their knowledge and experience.

2) Measures and incentives to increase the motivation of staff

In Syria, there is no effective and efficient working system especially in public sector. In Morocco, they have modified their organization and system to increase the proficiency, efficiency, and quality of public sector. Such experience will be useful for Syrian future reform.

3) Careful consideration of project selection and contents of equipment

Selection of projects and equipment should be done, in accordance with the average technical level, budget, quality of staff and so on. Sustainability is especially important matter to be considered. To keep the sustainability, in some case, utilization of conventional or traditional system should be considered. Rehabilitation of Khattara is one of good example of such idea. As for the budge of maintenance and replacement of equipment, this matter should be carefully discussed and the preparation of budget should be done in advance.

4) Promotion of public involvement

Syrian officials frequently use the wording of “Integrated Water Resources Management”. However no Syrian officials have any concrete idea and have implemented the concept of IWRM so far. IWRM is basically a concept to plan and implement water resources management with the discussion among all stake holders in a basin. Therefore, disclosure of information and discussion with public is the first step for IWRM. In Syria, however, information disclosure and public involvement is not taken cared at all. Abandonment of MOI website is one of the typical examples of such problems.

@JICA Morocco Office

@MATEE HQ Office

(End)

Contact
WRIC Web Site: http://www.wric-sy.org, E-mail: wric_moi@yahoo.com
Tel : +963+11+31399023-4, Fax: +963+11+3127831
***Back Numbers of WRIC News Letter are uploaded to our Web Site.**