Assessment of Water Demand Management in Wadi Hadhramaut Using IWRM Perspective

Case study : Tarim area

By

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Background

- Since the 1970s, Yemen and Wadi Hadhrmout particular have witnessed rapid social and economic changes, often outpacing the government's ability to control or manage them. Many of these changes have had a profound effect on water use.
- There are many studies from 1952 to 2007, all of which emphasize the continuing increase in water demand for agriculture and domestic use, Poor water quality exacerbated by abstraction of brackish groundwater ,decline of groundwater levels due to increasing abstraction, and Poor flood control.
- Tarim was selected as case study because it is considered the largest population, and exposed to drain a large water and groundwater pollution.

Main findings

- Through this thesis indicate the continuing increase in water demand, it has been identified on the increase of the previous studies, the data from NWARA-BH ,LWSSC, and Agriculture offices, also through field visits to farmers which have been identify the causes of deepening wells, which demonstrates the low water level to increase the continuous water demand.
- There are a lot of water source in Tarim like water wells, water rain and water springs. Water wells are main source, then water rain and using in season, and water springs didn't use because they are far away.
- The important users for water in Tarim are distributed in domestic use, agriculture use, livestock use, houses of worship, and commercial sector.
- The agricultural sector more users of the water because of flood irrigation.

- There are a lot of legal violations such as drilling wells and random linkage of water this led to increase water demand.
- Despite, there are water administrative in Wadi Hadhramaut, but it did not adopt the actual water management, but it is managed just like any other administrative in the government and this has led to the weakness of their role in society as well as the weakness of its role. institutions and authorizes will not succeed unless the adopt an effective water management, including IWRM.
- Government water Authority didn't have monitor commercial and social projects of water through a commitment to periodic water inspection, the application of the water Law, and the application water rules management.
- Lack of confidence citizens to water supply government sectors in Hadramout in general and in particular Trim.
- There are many local and international organizations working in the water sector in Yemen, but it has weak role in Hadramout. Through field visits to many farmers, They are suffered from lack of support for the agricultural sector, such as agricultural extension or methods to raise the water use efficiency. Although Hadramout is a tributary essential for food security in Yemen, especially if exploited water and land as required.
- Water value economic in our study can be divided into four sectors which are as follows:
    - Water value economic in LWSSC is not efficient because the water of sold by LWSSC for the domestic sector, houses of worship and commercial is cheap. This led to the exhaustion of large quantities of water and losses in water sector. There is other problem of government support unattended led to the financial and administrative corruption and weak institutional work with LWSSC.
    - Water sold by Water community projects are highly efficient because of the participatory work and supervision by people on the returns of the project. These revenues to cover all costs for the project without a financial deficit. Through field visits to water charitable projects show that implements some elements of IWRM. This has led to success, so Water value economic in Water community projects is efficient.
    - The economic value for water projects healthy is the best sectors to achieve a large profits, so these projects in a large spread.
    - Water value economic in agriculture is approaching to zero because of the large water attrition and the lack use efficiency, especially in large farms. But with the high cost of diesel in recent times to make the farmers to adopt new technologies in irrigation, such as the use of the pipe for carrying water to the fields. The use of modern irrigation techniques that led to reduce water losses and raise the efficiency of water use.

- Lack of water users associations has led to a lack of awareness among the farms in water conservation, and the weakness of the role of agricultural societies and government support has led to a deterioration of Agriculture.
- Drinking water quality has consistent with Yemeni and international standards.
- Most irrigation water qualities has consistent with FAO standards, but there some wells were polluted because they are near the holes of sewage or the farms used wastewater.
- A lot of agricultural land is used for the construction of housing units and this will threaten the disappearance of vegetation cover.

Recommendation

- More research is recommended in future for implementing integrated water resource management in water projects for more improvement in water management.
- We will move in our solutions via IWRM that are considered the main bases of the solutions which we set out to solve the problems such as the demand for water in Hadhramout in general and Triem in particular.
- should be enabled participatory work.
- Activating the awareness role to water conservation and raise water efficiency use, especially in the agricultural sector through field visits by agriculture and water associations, government offices, and activating the role of the media through radio , television ,and newspapers.
- Awareness sessions should carry out periodically to ensure effective water management.
- Re-consider the development of the water Law to suit the conditions and customs areas. Should impose sanctions and financial penalties on violators.
- should be flood control measures and take account of the importance of flood waters for groundwater recharge.
- Improvement of spate irrigation technical and increase the efficiency of agricultural water use , that can led to alleviation of poverty .
- The government ,international ,and local organizations have roles to improve and maintenance traditional structures for spate irrigation.
- A program of public education on saving water and demand management in school, university, and mosque.
- An integrated program of monitoring should be agreed between the various parties and overseen by NWRA.
- Should be establish sanitation projects in Hadarmout general and Tarim particular to prevent increase pollution.
- Controls on abstraction rates from existing boreholes should be considered, with priority on the areas of poorest quality water.