



## A SUCCESSFUL EXPERIMENT ON PARTICIPATORY IRRIGATION MANAGEMENT IN IRAN

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### ABSTRACT

In southwest of Iran, in Khuzestan province there is an irrigation network with about 7600 hectares gross areas which is under private sector. This network that was constructed in 1950, supplies its water requirement from Ojiroob River with 14m<sup>3</sup>/s (maximum discharge); so it is known as Ojiroob Network. The network consists of a diversion dam with three gate and 3 m<sup>3</sup>/s discharge, 6/8 km. main canal (soil coverage) and 8 km secondary canal and main drain. All network's structures have been built and are operating by South Agricultural Corporation.

This network is managed fully privately by board of directors of South Agricultural corporation with no interference from any governmental organs. Corporation's shareholders and the board of directors are both owners and local farmers of the rural area. The corporation is in charge of all water supply, conveyance and distribution works, canal and dam protection and repairing, and farmers are as its customers who sell water in cheap rate and without any control.

The annually network's operation cost is at least about \$45000 which is met by shareholders and users' (water rate payment). But maintenance and operation costs of network are too expensive to be met only through these sources. The public sector has taken no efficient action in protection of network either in giving loan, or financial and technical aids to the corporation. Thus, in recent years this corporation has encountered financial crisis in the network maintenance.

Considering the network's conditions and functions, as a good pattern for encouraging the private sector and farmers' participation in irrigation management, it is essential to solve its problems and make efforts for its survival. Hence, in addition to receiving technical and financial support for the network optimization, it necessitates to construct water control structures and water usage according to volumetric units.

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## PREFACE

In recent years, by improving the process of designing and constructing irrigation networks, thousands of hectares of cultivable lands in Iran have gone under the irrigation networks coverage. Khuzestan province with more than 280,000 hectares of the network area has the maximum proportion. Besides the existing technical problems and limitations which have made operation associated with many problems, other obstacles such as policy making and legislations, current management structures, social and cultural conditions, also farmers knowledge and training level has eventually made irrigation network operation as a complicated and uneconomical activities so that government is imposed to pay huge costs for the networks operation and maintenance.

To escape from these growing problems, various strategies have been developed on basis of improving organizational structure and management of water sector, legal and legislative mechanisms, developing proper infrastructures and cultural context to attract water users, and private sector participation in constructing and operating irrigation networks. In Khuzestan, there is successful and worthy management experience in regard to private sector participation in irrigation.

South Agriculture corporation (S.A.co) was established in north of Khuzestan province by local farmers and land owners about 60 years ago. Due to constructing and managing Ojiroob irrigation network, this corporation, is considered the oldest Iranian private corporation which is active in modern irrigation network, perhaps it is a unique sample. S.A.co's structure and performance also its problems and accomplishments can be a paradigm criteria for assigning construction works and irrigation network management to private sector and for developing required programs and policy makings in this regards.

## HISTORICAL BACKGROUND AND SITUATION OF OJIROB IRRIGATION NETWORK CONSTRUCTION

In 1948, S.A.co was established by major land owners and local farmers. The corporation focuses on operation from water and soil resources and agricultural development by using the law of land farms assignment. In 1949

According to formal contracts between corporation's members and government, 7650 hectares of areas around Ojiroob River and its water right were assigned to this corporation for land reclamation and construction. S.A.co. according to item 1 of mentioned agreement called for constructing a diversion dam on Ojiroob River and a network of preliminary and secondary earth channels on its lands according to Mana consultant engineers' design as well as monitoring from Independent Irrigation Institute. Before that, these lands were cultivated in dry lands.

Ojiroob network is located of 25 km to south of Dezful city, also Ojiroob River and a part of Dez River are flowing at west of them.

In 1949 studies regarding Ojiroob irrigation network including diversion dam construction and network channels were accomplished by Mana consultant engineers. Furthermore the irrigation network and dam construction works were started in 1950. Independent Irrigation Institute undertook monitoring all of design and construction stages.



### TECHNICAL SPECIFICATION OF OJIROB IRRIGATION NETWORK

Gross area	7650 hectares
Net area	5500 hectares

Network components:

#### \*Diversion dam:

Type of dam	concrete – diversion
Dam height from the river bed	7/30 m
Constant water surface level	65/91 m asl
Crest length	20m
Number of spillway gates	3 gates with 3 cms capacity
Type of gates	metal – slide gate
Gate size	5*4/10m
Maximum discharge	20cms

#### \* Irrigation network

Conveyance (main) canal length	6/8 km
Length of the secondary canals	8 km
Number of inlets	2 sets
Input discharge average	10 cms
Maximum canal capacity	14 cms
Canal lining	earth canal



**Upstream of diversion dam  
and canal intakes**



**Downstream of diversion dam**

Although the network design consultant engineers have considered constructing a pumping station on 5 km of main canal inlet in order to water provision for the west areas of network. This design didn't implement in reality. Instead diversion weir was constructed at that location, hereto this action led to many problem regarding downstream water supply and canal maintenance for the farmers and the corporation.

### **IRRIGATION NETWORK MANAGEMENT AND OPERATION**

S. A. co. the owner of Ojiroob Irrigation Network, is in charge of management and operation of this network. Its major members are general meetings of shareholders and board directors who are elected by all the members for 2 years. The office of corporation is located in the largest village of the area. About 1500 hectares of network lands belong to the members and the rehabilitation and construction secondary, tertiary and quarter nary canals costs are paid by themselves. The remaining lands assigned gradually to the local farmers, are irrigated by traditional secondary canals. The operation and maintenance of the network are in the hands of corporation. Network water demands are supplied by diversion dam and conveyance canal. Water flows through the canals full time (24hours) and there is no control on users' water consumption

Besides the farmland requirements in this area, the corporation undertakes to supply required water for sugar cane farms of block E of Karun Plantation and Industry Company.

### **LAND USE PROCEDURES IN OJIROOB AREA**

Since Ojiroob network is adjacent to the largest Iranian irrigation network (Dez), local farmers follow current crop pattern in Dez network areas and land use procedures in the area is similar to this network. The existing farmlands at S. A co. is cultivated by following two season pattern crops:

**Winter-Spring crop:** wheat, under plastic crops, (eggplant, cucumber, and tomato), sugar beet, strawberry, lettuce, onion, snap bean, carrot, potato and autumnal watermelon.

**Summer crop:** milo, bean, tomato, rice.

Prevailing crops in this region are wheat in winter and milo in summer.

## **WATER SUPPLY AND DISTRIBUTION**

In the first decade of network's operation, the entire network and lands belonged to the corporation's shareholders, so water allocation was accomplished based on obtained agreement and land ownership ratio of each shareholder, and the members were fully responsible to pay their annual subscriptions. After Land Reclamation in 1963, the major part of those areas was assigned to farmers gradually. According to the permission from K.W.P.A. (Khuzestan Water and Power Authority) and Agriculture office, this corporation took water rates from farmers according to %25 of winter yields (wheat) and %15 of summer yields (rice).

After Iran Revolution (1980), because of the changes in social relations and condition, legislation, land ownerships and farmer's disputation it was difficult to determine water rate and farmers hardly paid it. Non-payment of water rate resulted increasing breakdown and corrosion of the network structures. With the corporation's members continuous follow-up and according to Dezful governor's recommendation, it was determined to pay water rate on the basis of cost of 125 kg wheat per hectare in each cultivable season.

However, despite very low water rate in the network, most of water users aren't willing to pay water rate except about %20 of them (mainly residents of local corporation village) because of non-transparent legislation for private irrigation network and lack of executive criteria. The corporation doesn't contract with farmers for water sale. Just receipt money and important information is recorded when farmers come to pay their debts.

There is not any control on water usage due to lack of measurement structures and control consumptions and 24 hours flowing water through the channels. Thus due to excessive waste water and low irrigation efficiency, irrigation canals and drainage system are deeply eroded.

## **CORPORATION'S PROBLEMS AND RESTRICTIONS**

The most important problems which this corporation is involved with are different problems based on their type and origins as follow:

### **1- TECHNICAL PROBLEMS**

- The lack of measurement structures and controls on farmers' water usage.

- Decline of conveyance canal's capacity, particularly at diversion weir (5km canal) because of intensive sedimentation, requiring continuous silt removal from the channels.
- Improper dimension of secondary channels, their soil lining and excessive growth of weeds on them,(in fact these channels are considered as traditional ditches)and too much water losses in these ditches.
- Negative effect of diversion weir on provision of required water for farmlands down-stream of conveyance channels
- Operation stage (incomplete construction of pumping station for conveyance channel, some of secondary channel's and service road)
- Intensive damage and erosion at diversion dam abutments and support walls due to river bank ruin through downstream.
- Stilling basin and tail water distraction due to percolation of river bottom springs
- Dam gate rustiness and corrosion and also gate lifting system

## **2-FINANCIAL PROBLEM:**

Financial issues regarding the network maintenance and essential repairing can be considered as the most important restrictions for the network operation. The corporation's financial budget is provided only by the member's subscription and farmer's water rate payment. Considering the network's oldness and corrosion, keeping it safe even at the current situation is beyond the company's financial strength.

An accomplished evaluation indicates that the amount of the required annual budget is about \$45000 only for keeping the network safe in its current situation and for its annual common maintenance (not essential).

Regarding the corporations limited financial resource, providing the budgets for the basic maintenance and rehabilitation of the network will be accomplished only via government and banks financial support although the corporation hasn't already managed to do it because of ambiguity in legislation and various interpretations of laws.

In the last years, board of directors and some of the shareholders have inevitably spent their own funds for the network maintenance and durability.

On the other hand, because of continuation of increasing prices and costs for repairing due to corrosion, it can't be expected that they can stand in this situation for a long time.

## **3-LEGAL PROBLEMS**

The most important legal and legislative obstacles which the corporation was involved with are as the following:

- The existing supervisory and supportive laws in regard to the irrigation network operation focus on governmental management.
- Legislatures and bylaws ambiguity and non-transparency regarding nongovernmental irrigation management cause contradictive interpretation of laws.

- Lack of legislative guarantees and executive terms within non-governmental management activities in order to follow-up their demands and cutoff water consumption for users who do not pay water rate.
- The existing ambiguous laws and lack of executive bylaws are hindrances of private irrigation management to take loans of banks and executive organs' supports.
- The lack of proper legislative mechanism in the corporation to make contracts with farmers and follow-up their debts.

#### **4- SOCIAL PROBLEMS:**

The shareholders and the boards of directors who are native, having a long term background in local activities and a stable social status, are trusted and admired by local residents and farmers. While there is disagreement between the farmers or even familiar and ethnic problems they act as a dean or conciliator to settle their problems. Nevertheless, the viewpoint and performance of most of the farmers toward water rate and the operation issues, are influenced by their tradition, beliefs and social relations. The most essential problems and challenges in this regard are summarized below:

- The farmers' deep-rooted religious beliefs regarding God ownership on gift of nature including water, cause farmer's non-payment for water rate.
- The existing beliefs expressive of necessity of exerting obligation and pressure on some users to pay water rate constrainedly.
- Low level of farmer's social awareness and their unwillingness to participate in operation and maintenance of the network.
- Farmer's low literacy and their misunderstanding of laws and private irrigation management position.
- Misunderstanding of the private sector's position by water consumers and not considering a legal aspect for this sector.
- Indifference, non-cooperation and lack of necessary supports from local governmental institutes toward S.A. corporation activities.
- Easy access to water by users due to steady streaming water in the network with no control thus neglect of real value of water.

#### **CONCLUSION AND SUGGESIONS**

Considering the government strategies in order to attract farmers' participation in construction and management of irrigation networks, S.A.co with more than 50 years successful experience, can be evaluated in different aspects and the obtained results can be utilized for planning and proper pattern representation in the other part of country.

As mentioned before, this corporation has encountered many problems and constrains during the past years which have involved it in various crises. In spite of all that it can stand on its own. Where-as government sector with all its available support and

possibilities, couldn't be successful in irrigation management so much. Perhaps we can summarize the secrets and reasons of its survival through the following cases:

- Necessity of network survival because it is the only resource to supply water to all region areas
- Formation of corporation's staff by local farmers and native land owners; thus their enthusiasm for agricultural activities.
- Corporation's members consider facilities and network structures as their own heritage and try to preserve them.
- Corporation's members are so rich and well-educated also familiar with agriculture scientific concepts and use new procedures and can have a large income.

It can't be denied that it is essential to maintain Ojiroob network for supplying water requirements in the region. However, the network survival involves offering financial and technical and, legal supports briefly as the following:

- Offering possibilities and bank loans for rehabilitation and basic maintenance of diversion dam and network structures.
- Making laws transparent and revision of the laws and bylaws to oblige relevant sectors responsible for incorporating with the corporation such as offering services and required supports.
- Construction of measurement and control structures and consultant and technical supports from scientific sectors and executive authorities in this regard.
- Developing a particular system and mechanism in the corporation in order to record water demands, computations, determining the water rate due to users' water right and following up delayed payments.
- Reviewing the determination of water rate, on the economic basis or at least on the basis of dominant relevant laws regarding governmental irrigation network (%3 yields per hectares), and providing a proper cultural context for farmers to agree with.

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