



ESTABLISHING WATER USER ASSOCIATIONS FOR O&M IN BILEHSAVAR-MOGHAN IRRIGATION SYSTEM

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ABSTRACT

Bilehsavar-Moghan sprinkler irrigation system is located in Bileh-Savar and its villages' proximity with a net area of 3100 hectares. The main irrigation system contains one 3 m³/s central pump station and 3 convenience concrete canals 21km length and minor irrigation system has 21 secondary pump stations along open channels to supply water for 21 irrigation units with an average area of 150 hectares. Field irrigation system is solid set sprinkler irrigation system.

The whole area is divided into 1394 fields and 713 owners with the average of each field 2.2 hectares. Most of small fields do not have regular shape e.g. some of them are very long with 50m width and 1.5km length. Accordingly, operating a modern irrigation system is very complicated. Therefore, 21 water user associations (WUAs) and 2 rural co-operative companies established by incorporation of water users.

The main purpose of co-operatives and W.U.A. is to teach farmers and group them for O&M modern sprinkler irrigation system and its accessories. In this article, 4-year experiences and conclusions will be covered.

INTRODUCTION

Non-governmental organizations (NGOs) play an important role in realizing public desires and goals; and reflect the society's concealed requirements to the government. Generally they are the link between the body politic and government. Efficient and democratic governments pay much attention to people's expectations and ideas so they respect non-governmental organizations and associations. They also make great effort to improve quality and quantity of these associations.

Some of participatory user association researchers believe that the aim of users participatory is to associate them in different project stages such as programming, constructions prioritizing, and scheduled O&M of constructed accessories by using all financial, mental and physical facilities. Bilehsavar sprinkler irrigation system is the applied and objective example of this theory.

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1. HISTORY OF BILEHSAVAR PROJECT

Moghan irrigation system main canal with the length of 113 km, supplies water for approximately 90000 hectares of the field. Most of the lands are supplied by gravitational surface irrigation system, but some of them use inline pump stations to be supplied. The last pump station is the 8th pump station with a discharge of 3m³/s which is located 12 kilo meters far away from Bilehsavar and the foresaid pump station is established by financial participation of water users and Water Organization of Ardebil province. Figure 1 shows Bilehsavar project location in Ardebil province.

Lands in project boundary are dry farming and have very low yield because gravitational supply from the main canal is not possible and sprinkler irrigation system will cover these lands in the future. After construction of the main pump station, Jihad Keshavarzi organization of Ardebil province commenced the study of irrigation system project and after preliminary study, assigned the final design of irrigation system and establishment of W.U.A. to Saman-Abrah consulting Eng.

While constructing project components, the consultant stated the cultural, social and training of water users permanently and has established 21 WUAs for 21 irrigation units in 2 rural co-operative companies.



Figure 1. Project location in Bilehsavar (Ardebil province)

2. METHODOLOGY OF ASSOCIATIONS ESTABLISHMENT

To achieve the expected goals, the following topics were evaluated by consultant studying workgroups:

- Present condition study of agriculture and animal husbandry;
- Environmental investigations;
- Land ownership studies;
- Basic studies for associations establishment;
- Collecting users' information and ideas (general and especial questionnaires);

- Social and cultural issues investigations;
- Water using system study; because of its importance, experts and specialists founded a programming committee in the consultant central office and all social issues decisions have been firstly approved by this committee, then operated by resident experts in the field.

General investigated topics to establish associations for O&M are as follows:

- Water using systems analysis in Iran
- Results analysis of some other countries experiences in O&M associations of irrigation systems
- Holding personal interviews with farmers, paying attention to farmers' viewpoints and anxieties.
- Consulting with clients and certain experts.

3. OPERATING SYSTEM PLAN AND ESTABLISHMENT OF 21 ASSOCIATIONS

About establishing W.U.A., at first, land usage systems before reforming land rules in Iran and after the Islamic revolution, were analyzed. Then, land usage system background in Bilehsavar was studied.

Participation concepts and viewpoints in agriculture development in Iran and effective positive/negative elements in water users' participation were analyzed. Also the past condition of W.U.A. in Iran and applied experiences of establishing associations in irrigation systems were discussed.

Other countries experiences in user participation were studied to achieve wider range of information. Therefore, several reports from Turkey, India, Mexico, Spain and Colombia were studied. Also personal explores in irrigation associations in Nile delta in Egypt, pressure irrigation systems operation methods in Italy, and water distributing method in borders of Ghareghoom canal in Turkmenistan were useful to find the solutions.

Using above experiences, the consultant could attain worthwhile results by cultural, social and economical studies and providing 4990 general and family questionnaires for all water users. Therefore, the consultant could obtain a comprehensive knowledge about human resources, population and available potentials of land use management in different decades and prevalent cultivations in the area. Also cooperation level of water users with active agriculture organizations and W.U.A. was determined. Fig. 2 and 3 show questionnaires answering by water users.



Figure 2, 3: Bilehsavar water users answering questionnaires in the consultant office (right) and at home (left).

Analysis's results show that 713 water users own 1394 field lots with the average area of 2.2 hectares. Field lots and water users are increasing because of dividing due to inheritance and land sales rule. Available statistics confirm that 24% of fields have less than 1 hectare area, and 90% of them are smaller than 5 hectares. Water user family members are 4159 persons which are 74% literate and 36% of them have academic and high school studies. Figure 4 illustrates field blocks before the project implementation.

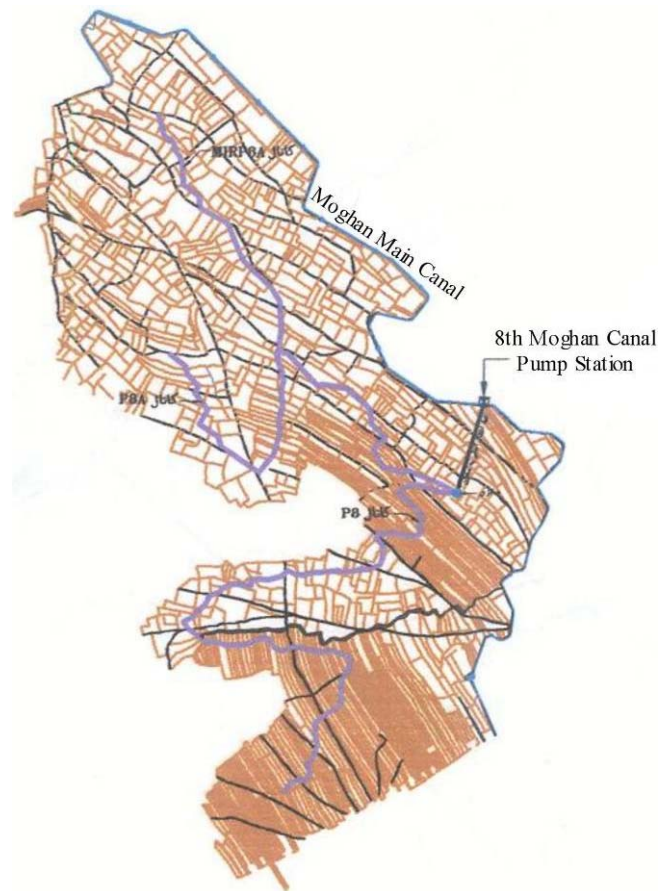


Figure 4. Field blocks before the project implementation

3.1. IRRIGATION UNIT ADMINISTRATOR ELECTION

After basic analysis and social-cultural studies, because the project area was divided into 21 separate 26-260 hectares irrigation units, one separate pump station was determined for each irrigation unit to supply enough head pressure of irrigation system. In order to assign O&M responsibility to water users, a W.U.A. was established for each irrigation unit. Candidates' introduction sessions were held and water users voted and elected 3 reliable persons as O&M administrators for 2 years. Therefore, there were 63 persons elected as O&M administrators for irrigation system and its accessories, after establishment of 21 associations. Figure 5 shows 21 irrigation units mapped by the 8th pump station Central Committee, and Figure 6 illustrates O&M associations' organization chart in each irrigation unit, and figures 7 to 10 show O&M administrator election sessions for different pump stations.

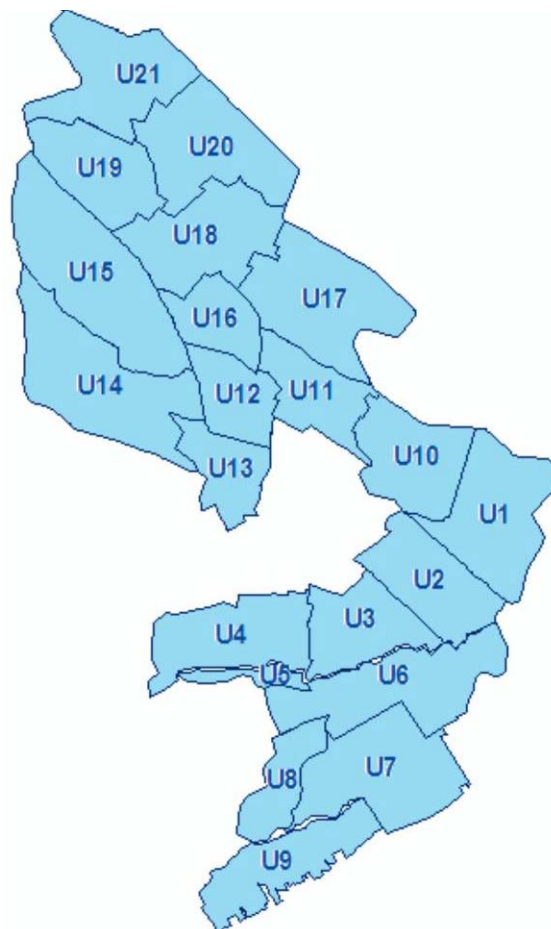


Figure 5. 21 irrigation units after Bilehsavar project designing

3.2. ELECTED ADMINISTRATORS (3 PERSONS) RESPONSIBILITIES IN ASSOCIATIONS

The responsibilities are as follows:

The first person: as the main representative and pump station administrator

The second person: as the deputy and responsible for solving discords (judgment)

The third person: irrigation officer

The above persons attended applied training courses and received introduction to systems and operating methods user manuals due to their responsibilities in 2 years.

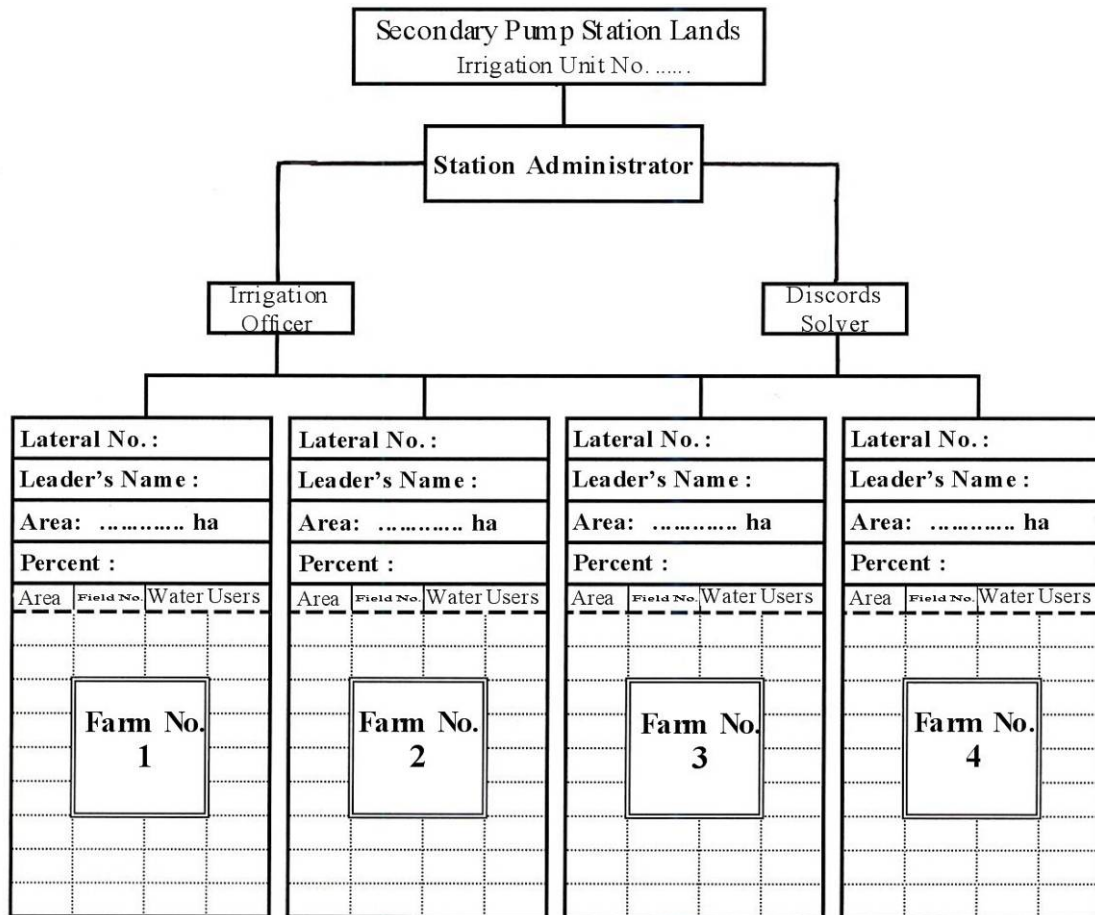


Figure 6. W.U.A organization chart in each irrigation unit-Bilehsavar-Moghan project



Figures 7, 8. Water users remarkable attendance, in the 7th pump station coordinating session.



Figures 9, 10. 11th pump station O&M administrators' election and coordinating session.

People elected totally 63 administrators (3 for each irrigation unit) and their responsibility interpretation is as the following:

1. Attending training sessions and courses which are held by the consultant or client (task master).
2. Being fully coordinated by director manager and board of directors of co-operative companies and system operation administrators.
3. Pursuing water users' commitments and payments for water and confirmed annual O&M costs.
4. Continual and periodic supervision of irrigation systems and secondary pump station to pursue the problems to be solved by technical system administrators.
5. Supervising on water users' irrigation.
6. Observing irrigation schedule based on cultivation pattern, and in time water distribution among users.
7. Solving water users' discords which are related to water distribution and irrigation.
8. Supervising on pump station and the accessories protection and security in O&M periods.
9. Co-operation with consultant experts to advance project goals.
10. Conducting water users to farm accretion.

4. RURAL CO-OPERATIVE COMPANIES FOUNDATION IN PROJECT AREA

The importance of establishing operation associations to use loans and legal subsidies (related to fundamental activities), were explained in workshops and training sessions for water users. In these workshops, different methods of using available potentials in the project area were described. Water users preferred the co-operative operating system in comparison to other methods, due to the following specifications:

Preserving each user's land ownership, conceivable overall cultivation, possible common water use, conceivable programming for mechanization and decision making based on co-operative company's rules. Bilehsavar Jahad Keshavrzi organization and Ardebil province Jahad Keshavarzi organization attempted to establish the general assembly and selected board of directors among irrigation units no.1 to 9 (with the area of 1200 hectares) water users and finally, Sagheh-Talaa rural co-operative company founded and started since 2003, managed by one of local agriculture experts. Figure 11 illustrates main pump station, secondary pump stations, and 1 to 9 irrigation units organization chart in Sagheh-Talaa rural co-operative company.

Also Ghatreh-Baran rural co-operative established in irrigation units no.10 to 21 (1900 hectares approximately) in 2004. Figure 5 shows the irrigation units in each rural co-operative.

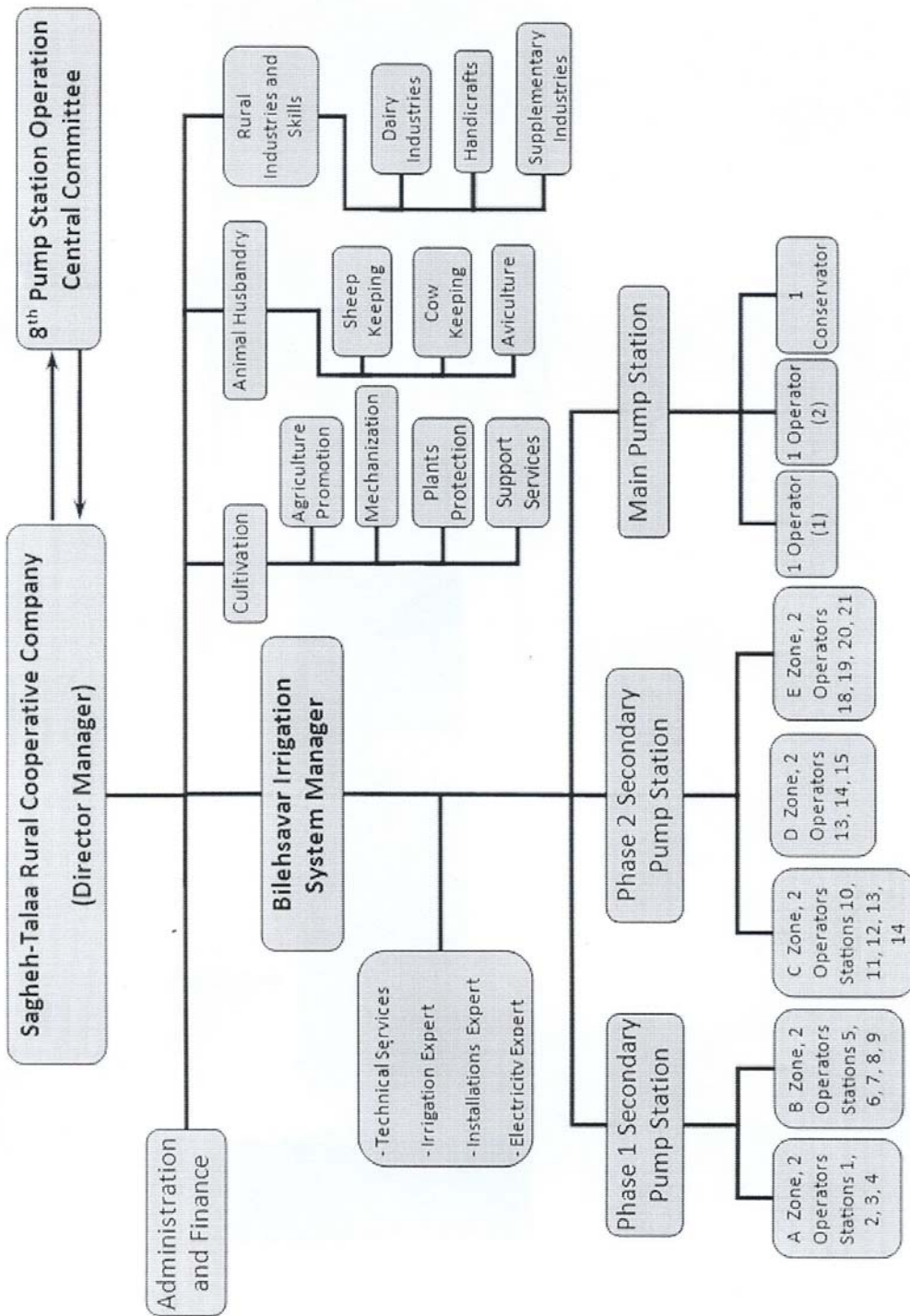
5. CULTURAL AND DIDACTIC ACTIVITIES

Since establishing O&M water user associations, performing training programs and providing and delivery of simple instruction manuals for operators, irrigators, administrators and all project beneficiaries, were the most important job that the consultant have done in corporation with local administrators.

which the bigger part of it is accomplished and will be in progress simultaneous with project operation. The following instruction manuals and training catalogues are mostly provided and/or are being provided:

- Introduction to solid set sprinkle irrigation system in Bilehsavar
- Solid set sprinkle irrigation system O&M instruction manual
- Secondary pump stations instruction manual for operators
- Electrical installations instruction manual in secondary pump stations
- Irrigated farming in operating period instruction manual
- Main pump station (8th Bilehsavar pump station) instruction manual
- Providing irrigation system O&M methods and Bilehsavar project movies and delivering the video CDs and video tapes among water users.

Figure 11. Main pump station, secondary pump stations and 1 to 9 irrigation units operating management organization chart.



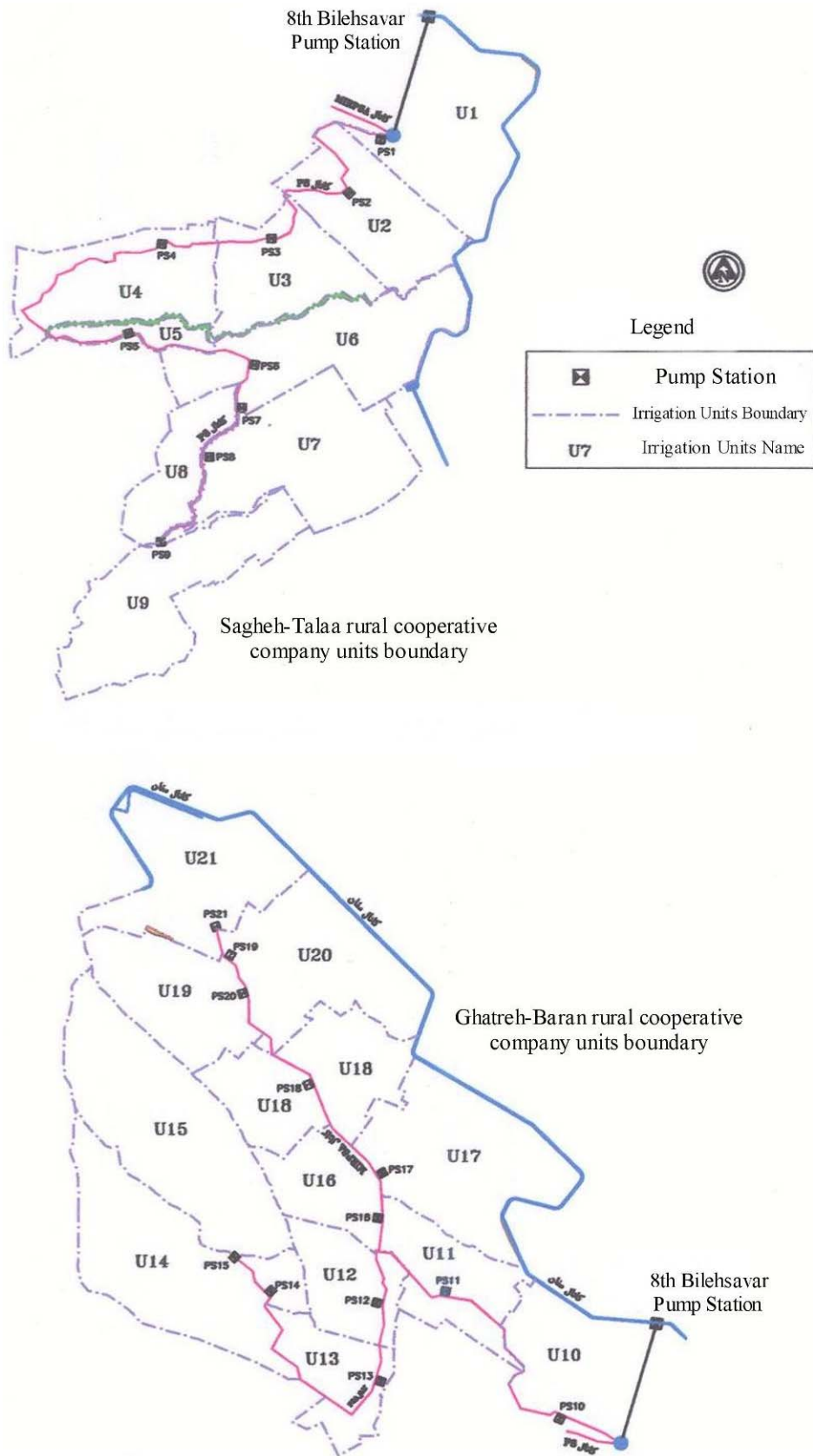


Figure 11. (1 to 9) and (10 to 21) irrigation units in Bilehsavar-Moghan

5.1. TRAININGS

Training water users is one of the headmost activities of consultant in this project which is to be continued till the end. Social, agricultural, and technical experts are used to teach sprinkler irrigation system to water users, administrators and water users' representatives so they can protect valves, pipes and other accessories while using them. Figures 13, 14 show Bilehsavar water users training sessions in Jihad Keshavarzi management amphitheater in the town.



Figures 13, 14. Bilehsavar water users training sessions.

5.2. ESTABLISHING PROGRAMMING AND OPERATING COMMITTEES

The consultant established the following programming committees in order to assimilate ideas and cultural/social activities, and getting better results from local operators and administrators' ideas:

- Consultant central office programming committee; consist of social science professors and irrigation systems operating experts.
- Ardebil province programming committee; consist of provincial experts and consultant representatives.
- Bilehsavar operation committee; consist of all project administrators in the town, water users representatives, and consultant representatives.
- Project opponents' resolver committee; consist of co-operative companies, executor, and consultant representatives.

It is important to mention that W.U.A. representatives, cooperate well to resolve opponents problems and ownership boundary mistakes during the construction duration. They have cultivated soybean and cereals in constructed parts of the project, using their trainings, skills and experiences.

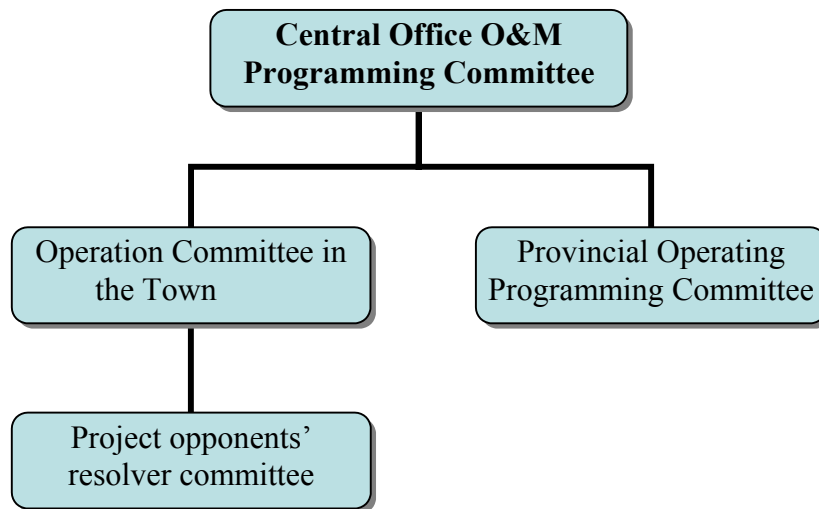


Figure 15. Programming and operating committees organization chart

6. INCORPORATING FARMS IN 21 IRRIGATION UNITS

Existing numerous small field blocks number in each irrigation unit, is one of Bilehsavar project problems which has overshadowed operation system compilation due to sprinkler irrigation system implements in the project area and the consultant has schematized to solve this problem.

As it is shown in Table 1, each irrigation unit (21 units), has the minimum area of 26 hectares to 260 hectares maximum. This kind of classification is based on topography, distance, sprinkler irrigation system head pressure requirements and head losses calculations. Each irrigation unit consists of 24 to 126 small irregular shape fields and 21 to 87 water users.

Each irrigation unit has secondary pump station in order to supply the necessary head pressure for sprinklers, based on designing. Main pipelines, sub main lines and laterals, supply water in irrigation wings. There are minimum 2 and 19 maximum laterals in each irrigation unit, depending on coverage area. Laterals' coverage area is the basis of incorporated farms in irrigation units and every farm which consists of several fields with different owner is an incorporated unit.

Each lateral's lairds are the components of an incorporated farm. Water users of each farm elect a leader in every tillage period and all O&M problems are supposed to be solved through the leader.

Table 1. Bilehsavar 8th pump station irrigation units' specifications.

Net Area (ha)	Supply Canal	Irrigation Unit Name	
174.6	P8	U1	
149.2	P8	U2	
119.9	P8	U3	
149.0	P8	U4	
26.1	P8	U5	
164.3	P8	U6-1	U6
30.1	P8	U6-2	
179.1	P8	U7	
95.9	P8	U8	
183.7	P8	U9	
137.1	P8A	U10	
97.7	P8A	U11	
84.9	P8A	U12	
83.6	P8A	U13	
24.4	P8A	U14-1	U14
214.5	P8A	U14-2	
260.0	P8A	U15	
77.1	MIRP8A	U16	
195.9	MIRP8A	U17	
171.1	MIRP8A	U18	
128.2	MIRP8A	U19	
185.1	MIRP8A	U20	
169.5	MIRP8A	U21	
3100.9	Total		

The number of laterals in each irrigation unit is shown in Table 2 which are incorporated farms in that irrigation unit. As it is shown in this table, all project laterals (or incorporated farms) are totally 178 farms with average area of 17.5 hectares.

Table 2. Number of laterals in each irrigation unit

No. of laterals (incorporated fields)	Irrigation Unit Name	No. of laterals (incorporated fields)	Irrigation Unit Name
6	12	14	1
4	13	12	2
11	14	7	3
19	15	10	4
2	16	2	5
11	17	16	6
6	18	11	7
6	19	4	8
6	20	11	9
5	21	11	10
178	Total	4	11

Figure 16 shows field blocks before (a) and after (b) project implementation.

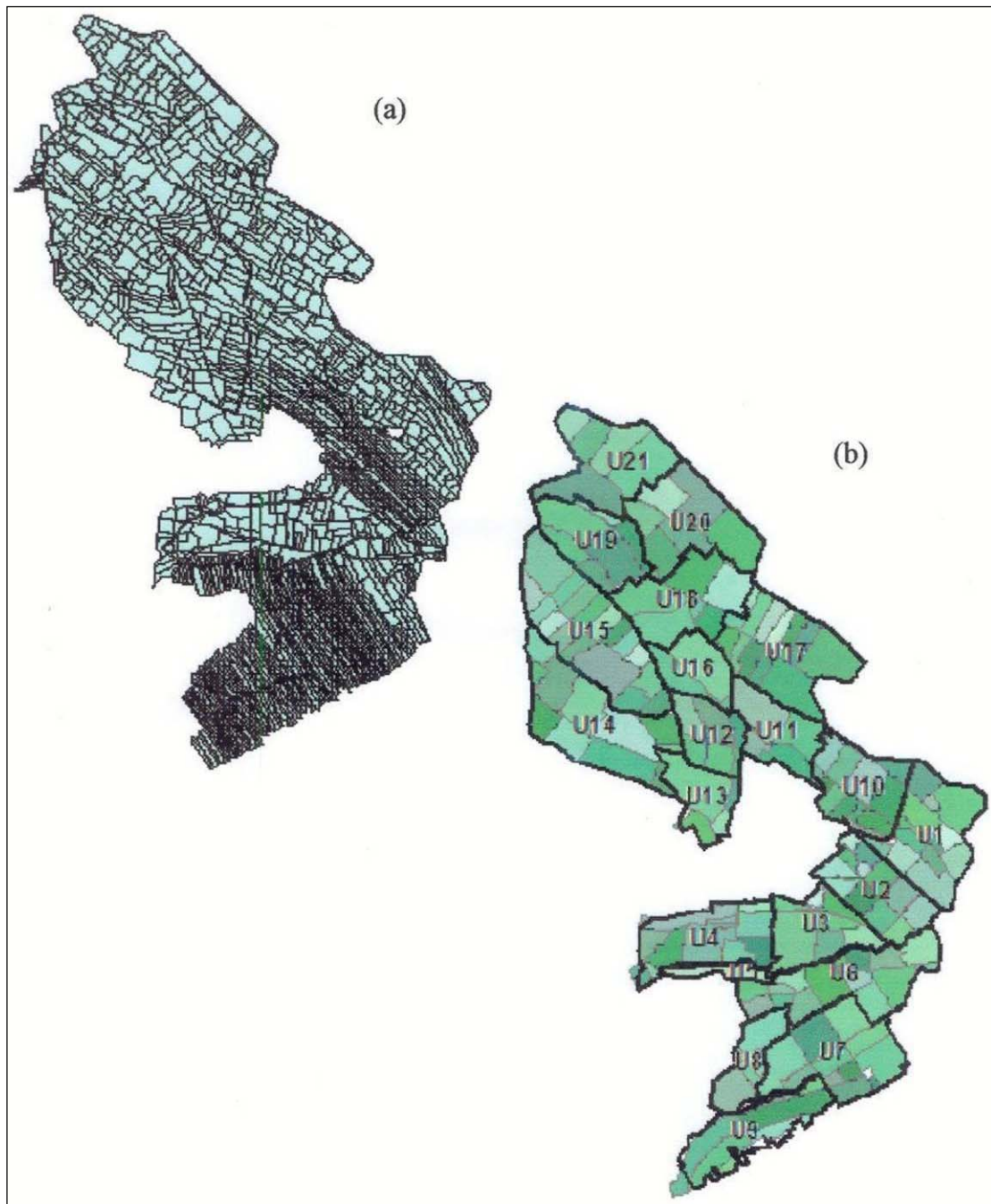


Figure 16. Field blocks before (a) and after (b) project implementation.

7. ASSOCIATION ESTABLISHING THEIR RESOLVING UNITS

Tribal oppositions were of most important problems through water users associating in addition to the following difficulties, which the consultant challenged to establish W.U.A. and cooperative companies. Most of the problems solved by consultant's experts' continual attendance in social activities, frequent personal negotiations with farmers, holding coordination sessions with local trust worthies, holding workshops

with local administrators and water users' participation, and technical and economical project justification. The most important knots in irrigation associations are as below:

- Farmers' high resistance against any kind of association and cooperatives during the first days.
- Bad memories of agricultural-joint stock companies in farmers' minds due to some managers malfunction in Babak and Bilehsavar area, before Islamic revolution.
- Farmers' financial participation before social studies without awareness of project's operation system.
- Farmers' owing to Agriculture Bank, not knowing about irrigation system and that independent use of water in each irrigation unit with the average area of 2.2 hectares with pressure irrigation system is impossible; and it should be designed for corporation water usage.
- Land owners have often several jobs and are not totally dependent to theirs land's income.

8. SOLUTIONS TO IMPROVE AND STABILIZE ESTABLISHED ASSOCIATIONS

Water users would be indifferent and associations would easily disintegrate, if there is not public trainings and taskmasters' financial supports; and their problem should be solved by administrators. Therefore, after any association establishment or cooperative company foundation, they must be supported normative, financially and spiritually by respective administrators and managers in order to become fully stable.

Here are the most important advices to improve and stabilize associations in irrigation systems fundamental projects:

- Projects financial support codification, to solve the technical problems and possible errors quickly, at least 2 years after handing over the project to farmers.
- Taskmaster and consultant's representatives' attendance in project, at least 2 years after handing over the project to user association.
- Holding extra training sessions and field workshops, associations technical, financial and administration guidance.
- Holding weekly/monthly coordination sessions with associations' administrators and local trustees and evaluating farmers' performance in operation periods.
- Providing financial workbook of water users financial participations and clarifying charges in order to present the report to users and administrators.
- Making legal discounts of water price for farmers who have financially participated in the main pump station, convenience networks and laterals construction; and who established W.U.A. to participate in irrigation management.

- Codification and performing users' capability improvement to promote their payment ability in O&M periods of projects.
- Codifying and approving operation management organization chart with the participation of local experts.

9. CONCLUSION

Establishing O&M associations has the following most important results:

- Water users' taking part in project programming and politicizing, because of their investment participatory on Bilehsavar 8th pump station, convenience canals and irrigation system construction.
- All Bilehsavar farmers' utilization from water supplies and dry lands promotion to irrigated fields.
- Strategic crops (wheat, cotton, soybean, alfalfa) cultivation development in project area.
- Agriculture occupation opportunity development and productive job increment.
- Social and technical promotions among people in project area.
- Providing cumulative cultivation in solid set sprinkler irrigation system and improving 1394 irregular scattered fields to 178 incorporated regular farms.
- Social problems (due to 713 water users in 1394 units) reduction.
- Mechanization standards promotion utilizing existing facilities.

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