THE IMPACT OF TRAINING AND COORDINATION IN EXECUTING MODERN IRRIGATION AND DRAINAGE SYSTEM (DASHT E ABAS-IRAN)

IMPACT DE LA FORMATION ET DE LA COORDINATION POUR EXECUTER LES SYSTEMES MODERNES D'IRRIGATION ET DE DRAINAGE (DASHT E ABAS-IRAN)

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ABSTRACT

The construction of on-farm irrigation and drainage system over the farmlands generally faces some social problems in Iran. While studying and designing such systems, comprehensive study on the existing condition of agriculture and irrigation, identifying farmers' concerns and problems and paying attention to them may alleviate the problems during execution.

The approximately 19,000 hectares of Dasht-E-Abbas Lands are situated at the southwestern part of Iran.

After part construction of the main irrigation and drainage system, the operation of water transfer was started from Karkheh Dam to some areas of this plane. Due to lack of on-farm irrigation and drainage system on these farmlands, the farmers were using water in the traditional way. Two years later, the construction of modern on-farm irrigation and drainage system was started over 780 ha of the plane. Predictably, several social problems were encountered mainly because the modern system. To solve this problem, it was considered if the social barriers might be removed by changing routes of the modern system in conformity with the traditional system.

To clarify this point, the problems of farmers and their viewpoints about traditional system as well as on the modern on-farm system were collected through holding several meetings with them. Then, these points were studied, reviewed and assessed in terms of technical, social and economic aspects. The derived results from these evaluations indicated that there were a lot of issues and problems concerning to the existing traditional system so it

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was impossible to solve them easily. In order to inform farmers about problems and defects of the traditional system, several training meetings were held and the necessary information was given to the farmers about advantages of implementation of modern on-farm system and the corresponding economic benefits.

Through proper study and identification on farmers' issues and problems, appropriate solutions were identified and by agreement of the concerned organizational and departmental authorities, these solutions were adopted. Result of the above activities was conveyed to farmers and this led to their agreement to execute modern on-farm irrigation and drainage system. Afterward, execution trend progressed with suitable speed.

Key words: *Modern irrigation system, Farmers' issues and problems, training and coordination, Dasht-E-Abbas (Iran).*

RESUME

La construction du système d'irrigation et de drainage sur place sur les terres agricoles est face à certains problèmes sociaux en Iran. Pendant l'étude et la conception de tels systèmes, une étude détaillée sur l'état actuel de l'agriculture et l'irrigation, l'identification des préoccupations et des problèmes des agriculteurs, et leur accorder l'attention peuvent atténuer les problèmes en cours d'exécution.

Environ 19 000 hectares de terres de Dasht-e-Abbas sont situés au sud-ouest de l'Iran.

Après la construction de principal système de l'irrigation et de drainage, l'opération de transfert d'eau a été commencée du barrage Karkheh à certaines zones de cette plaine. En raison de l'absence de système d'irrigation et de drainage sur place sur ces terres agricoles, les agriculteurs utilisaient l'eau à la manière traditionnelle. Deux ans plus tard, la construction du système d'irrigation et de drainage sur place a été lancée sur 780 ha de la plaine. Comme prévu, il y a eu plusieurs problèmes sociaux principalement parce que le système était moderne. Pour résoudre ce problème, les autorités ont décidé de modifier le système moderne en conformité avec le système traditionnel afin de réduire ces conflits sociaux.

Pour clarifier ce point, les problèmes des agriculteurs et leurs points de vue sur le système traditionnel ainsi que les systèmes modernes sur place ont été recueillies au cours de plusieurs réunions avec eux. Ensuite, ces points ont été étudiés, examinés et évalués en termes techniques, selon les aspects sociaux et économiques. Les résultats issus de ces évaluations ont indiqué la présence de beaucoup de questions et problèmes concernant le système traditionnel, impossibles à résoudre facilement. Afin d'instruire les agriculteurs sur les problèmes et les défauts du système traditionnel, plusieurs réunions de formation ont eu lieu. Les agriculteurs ont été renseignés sur les informations nécessaires concernant les avantages de la mise en œuvre du système moderne d'irrigation et de drainage sur place et ces avantages économiques.

Grâce à une étude approfondie et l'identification des problèmes des agriculteurs, des solutions adéquates ont été identifiées. Par l'accord des autorités organisationnelles et ministérielles

concernées, ces solutions ont été adoptées.

Les résultats des activités ci-dessus ont été transmis aux agriculteurs et cela a aidé à obtenir leur accord pour exécuter le système moderne d'irrigation et de drainage sur place. Ensuite, l'exécution a progressé à une vitesse convenable.

Mots clés : *Système d'irrigation moderne, problèmes des agriculteurs, formation et coordination, Dasht-e-Abbas (Iran).*

1. INTRODUCTION

The 19,000 hectares Dasht-E-Abbas lands are located at the southwest of Iran close to Iran- Iraq border and within the earlier 8-year long Iran-Iraq war zone. The 1st phase studies on irrigation and drainage system development plan were immediately carried out after the war during years 1989-1992 for agriculture development. The 2nd phase studies on main irrigation and drainage system were done during 1996-2002 and on on-farm irrigation and drainage system during 2002- 2005.

Construction of main system was started in 2002 and ended in 2010. In late 2008, construction of on-farm system was started as a sample unit over 780 ha in the southern region; however, mainly due to social problems, construction activities progressed slowly for one year. The goal of this paper is to explain the processes of identifying social issues and problems, which hindered construction of modern on-farm irrigation and drainage system, and also to identify and adopt appropriate solution that solved farmers' concerns and problems.

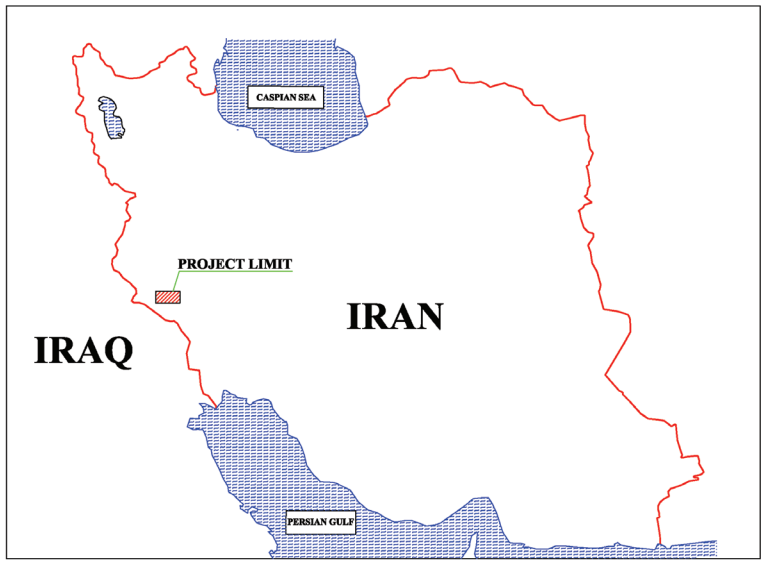

Fig. 1. The project limit in Iran plan

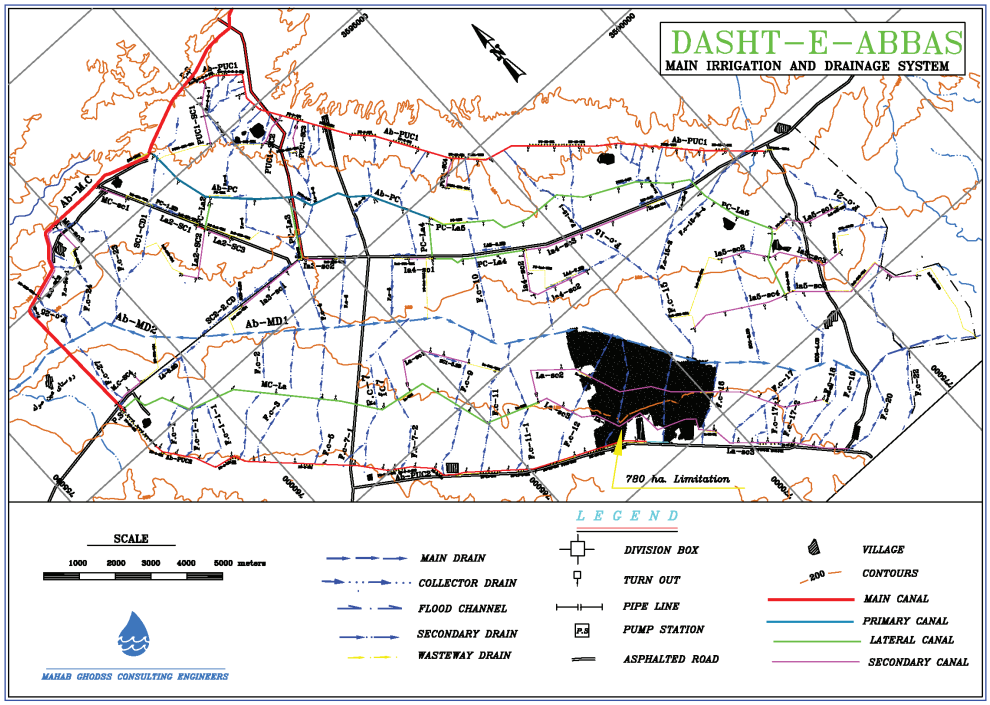

Fig. 2. The layout of main irrigation and drainage system

2. CLIMATE CHARACTERISTIC

Dasht-E-Abbas is located in dry and hot region. General characteristics of some climatic parameters within study area are as follows:

- Mean annual precipitations 252mm
- Annual average temperature 24.4°C
- Average annual wind speed at 2m height 1.64m/s
- Annual Mean evaporation from pot 3768mm
- Annual Mean evaporation at open sea level 2132mm

3. WATER SOURCES

Before implementation of main irrigation system development plan on Dasht-E- Abbas, the water for agriculture was obtained mainly from the existing 85 wells. The volume of water derived from these wells had been estimated as 18.5 Mm^3 during one farming year, irrigating 2650 ha. Grain crops were also cultivated by dry- farming technique over 10200 ha. Well water quality varied among different areas and according to Wilcox Diagram they could be classified as follows:

- At northern side of the plane in classes of C3-S1 and C2-S1

- At central part of the plane in classes of C4-S1 and C3-S1
- At southern side of the plane in classes of C4-S2 and C4-S1

Mainly due to poor quality of ground waters, no well has been drilled in the 780 ha unit of these lands, located on the southern side of the plane.

In the farming development plan on Dasht-E-Abbas, it is stipulated that about 180 Mm^3 water would be drawn from Karkheh Dam's reservoir during one farming year.

4. GENERAL CHARACTERISTICS OF 780 HA (SAMPLE UNIT)

- Before development of main irrigation system, and due to poor quality groundwater, most of the farmers had no experience of irrigation and the crops were cultivated based on dry- farming technique. As a result, the crop yields were low. A few accessory roads to facilitate mechanized farming were, however, built.
- Lands belonging to each of farmers were generally distributed and each farmer has approximately 10 ha of total farming land on an average.
- The farm boundaries were irregular and so was the cultivation pattern.
- According to results of pedology studies, the 780 ha land lot is situated in classes I to III in terms of soil classification, and it mainly varies due to topography.
- Water transfer to the 780 ha area started through the main system in 1997. Due to lack of on-farm irrigation system on the farmlands, delivered water was distributed unscientifically to the cropped area, which caused non-uniform crop yield within the irrigated area.

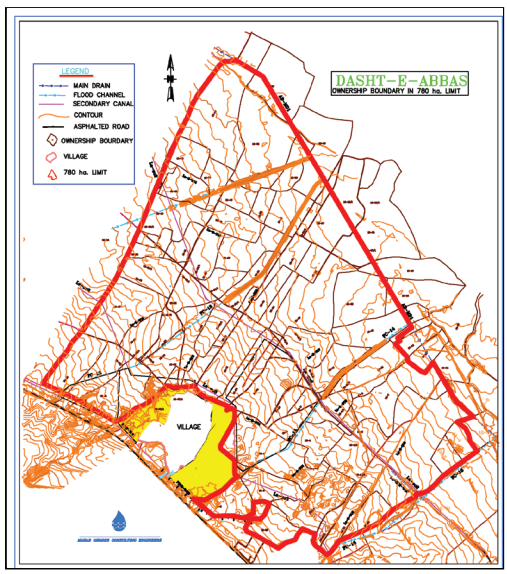

Fig. 3. Ownership border in 780 ha (sample unit)

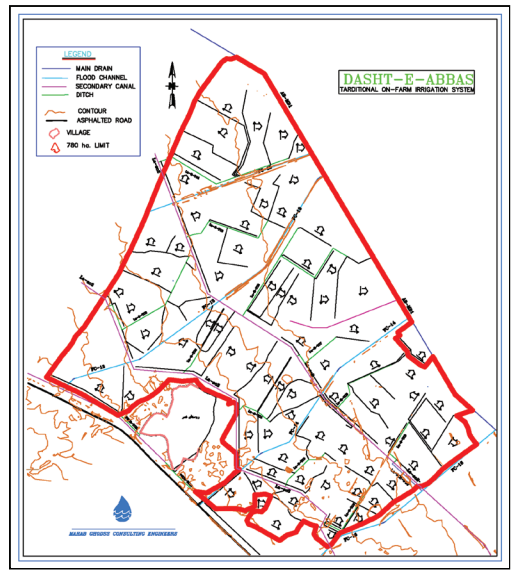

Fig. 4. Layout of traditional irrigation system in 780 ha (sample unit)

5. CONSTRUCTION OF MODERN ON-FARM IRRIGATION AND DRAINAGE SYSTEM IN 780 HECTARE AND SOCIAL ISSUES

Design of modern on-farm irrigation and drainage system for lands in Dasht-E-Abbas plane was carried out by observance of technical and economic principles vis-à-vis the climatic, soil and topography and operation and maintenance of the systems in order to fulfill goals of agriculture development plan. Implementation of the plan started in the late 2008 after settling certain disputes on the routes of irrigation and drainage channels. Initially, the progress of work was slow due to such disputes. In order to remove these barriers, several sessions were held with the presence of farmers and their concerns, problems and viewpoints were gathered and classified separately about the existing traditional irrigation system and the modern on-farm irrigation and drainage system.

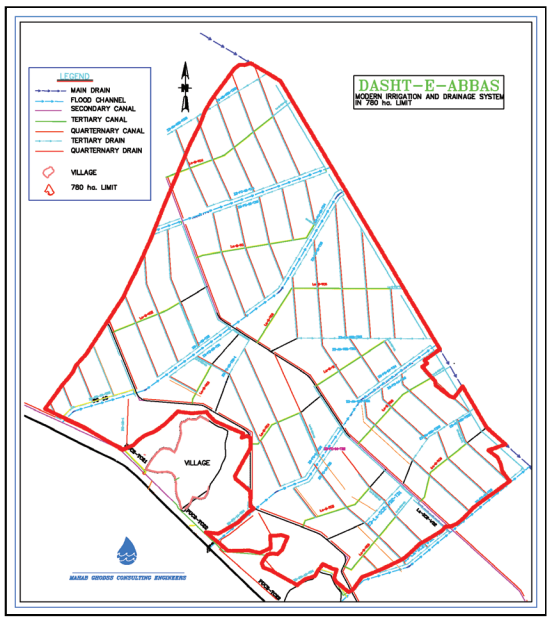

Fig. 5. Layout of modern on-farm irrigation and drainage system in 780 ha (sample unit)

Farmers' issues and problems concerning to the traditional irrigation system

By means of water transfer to the given lands and development of irrigated agriculture, necessity of using agricultural machineries, tools and mechanization had become stronger, while the accessory roads had not been developed over the farming lands so the farmers were faced with some problem in application of those machineries during farming period.

In some farmlands, affected by ownerships borderline, routes of traditional irrigation system have not passed through ridge; thus, it was not impossible to transfer water by gravity for the lands locating on ridge.

Because of some social conflicts between farmers in some farmlands, no one allowed to excavate ditch within their lands in order to transfer water to the downstream farmlands.

Farming lots for some of farmers were not consolidated at one place and this created problems for them in farm management.

Due to lack of drainage system inside farmlands, the accumulated water due to irrigation and rainfall caused some losses and damages to crops in some farmlands.

Owing to the exiting conflicts and problems among some farmers as well as lack a reliable reference to identify their problems and evaluate them and hold sessions for negotiations over such matters among farmers complex, these problems had generally remained unsolved.

Farmers' issues and problems about execution of modern on-farm irrigation and drainage system

With respect to the fact that the land required for implementation of on-farm irrigation and drainage system (according to law) should be surrendered by farmers without receiving any compensation, those farmers whose lands were acquired for laying irrigation and drainage channels considered themselves losers, as compared to those whose land need not be acquired for this purpose. Many farmers asked for changing routes of modern on-farm irrigation and drainage system to save their land.

6. THE SUGGESTED SOLUTIONS

After gathering and classification of farmers' comments about the existing traditional system and modern on-farm irrigation and drainage system and study on them, 2 options were introduced to solve this problem as follows:

- *Option 1*: Adapting the routes of modern on-farm irrigation and drainage system to ownership borders by review those plans.
- *Option 2*: Identifying executive and appropriate solutions for the problems perceived by the farmers and modifying of ownership borders and adapting the borders to canals and drainage routes of modern on-farm system.

7. ASSESSMENT OF SOLUTIONS

To select the optimal choice, advantages and disadvantages of both options were evaluated as follows:

Option 1

- Despite of selection of canals route inside the farmlands in accordance with ownership borders, farmers' issues and problems will still exist about traditional system.
- The situation of farmers' agricultural lots is not adapted to topographic characteristics of blocks for land leveling, so cut depth and excavation value may remove the good quality top soil.

- Due to inappropriate dimensions of some of farmers' agricultural lots, it will not be possible to achieve the desirable efficiency of irrigation.
- Accordingly, in the case of adaptation of on-farm irrigation and drainage system to ownership borders, plan goals was not fulfilled about sustainable agriculture development in these lands so this option was not recommendable.

Option 2

By study and taking due note of the farmers' issues and problems concerning to modern on-farm irrigation and drainage system, some appropriate solutions were identified and through agreement between the concerned authorities of organizations, those solutions were evaluated.

- Due to the fact that the soil quality throughout the farmlands is the same, land leveling was a suitable way to solve the farmers' problems for shifting land lots, but there was problem due to differing topography. The Provincial Organization of Agricultural Jihad possessed facilities and budget for land leveling. Thus, it asked for cooperation in land leveling from the authorities in this organization, as land leveling was necessary to properly distribute irrigation water. The organizations agreed to cooperate.
- The needed area was estimated for implementation of canals, drainages and access roads over farming lands and it was suggested to all farmers to share in land delivery for execution of modern on-farm irrigation system based on their ownership rate.
- To shift ownership borders in accordance with routes in modern on-farm irrigation and drainage system (after subtracting the occupied area by the on-farm system), it necessitated to adjust ownership documents; therefore, in addition to explanation of plan issues, the Department of Lands Affairs was asked for cooperation. Due to this adjustment, the farmer's distributed holdings got consolidated.

Due to cooperation from all concerned, execution of the above solutions became feasible. By execution of modern on-farm system, it became possible to irrigate all farming lots and build their access roads. With respect to the appropriate dimensions of their blocks and leveling them, achieving efficiency, application of irrigation became possible proportional to goals of development plan and to facilitate management and operation of the system, the appropriate equipments and organizations were formed.

8. THE RESULTS OF SOLUTIONS ASSESSMENT AND SELECTION OF THE OPTIMAL OPTION

During meetings held with the farmers; defects, issues and reasons for rejection of Option 1 were explained to them. Similarly, Farmers' perceived problems and concerns about Option 2 and the suggested solutions and way of their implementation were described by introducing modern on-farm system accurately and perfectly, its facilities and advantages were clarified for the farmers. The result of holding these sessions led to farmers' agreement to implementation of modern on-farm irrigation and drainage system, and by resolving social problems the construction was accelerated and terminated by late 2010.

9. RESULTS

1. Accurate and perfect study on social parameters of the plans at the existing conditions and considering them along with technical principles and disciplines may prevent from incidence of social barriers upon construction in order to use their potentiality to solve the problems.
2. Distinguishing farmers' issues, problems and concerns and evaluation of factor which may cause their dissatisfaction will be greatly effective in identifying the appropriate solutions.
3. Giving information to farmers about plan goals, introducing the system perfectly and describing facilities and benefits of plan implementation for them may draw their trust and further cooperation.
4. Describing plan issues and goals properly for authorities of the influential organizations and departments and using them to solve the problems.

REFERENCES

Reports of DASHT E ABAS Project, Studied in MAHAB GHODSS CONSULTING ENGINERS.