



THE NECESSITY OF FARMERS PARTICIPATION IN CONSTRUCTION OF PRESSURIZED IRRIGATION SYSTEMS FOR PIM SUSTAINABILITY IN IRAN

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ABSTRACT

As a developing country, Iran has several large-scale irrigation and drainage networks under study and operation. These networks are often constructed in small-scale farmlands, and because of water deficit, inappropriate topography and incentive policies, they are equipped with pressurized irrigation systems in which operation is more complicated, comparing with surface irrigation method. On the other hand, government policy is to develop private sector and therefore transferring operation of the networks to farmers organizations is highly considered. Regarding considerable costs of project execution which is provided by public credits also bank facilities by farmers commitment establishing a sustainable PIM is highly important.

Nowadays, national policy is often accelerating construction in large-scale pressurized irrigation projects, as a result all components of pressurized irrigation systems being performed by government, so farmers do not play such an important role in this process. This theorem would cause some problems in transferring the irrigation system management to farmers organization.

In the present paper, the results obtained from performing under pressurized irrigation systems by government is compared with the one constructed by farmers organization, also offers some suggestions with regard to changing the present procedures and participating farmers organizations in project execution.

1- INTRODUCTION

Iran as a developing country has 250 mm precipitation, often with arid and semi-arid climates. There are irrigation and drainage systems in areas about 2 million hectares under study, planning and construction. Because of water resources deficit and inappropriate topography, most of the projects are equipped with pressurized irrigation systems.

On the other hand, having small-scale farmlands and the necessity of constructing an independent pump station and pressurized irrigation systems at usual areas of 100-300

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hectares, will result in an independent irrigation unit which involves more than 100 farmers. With regard to government policy after project execution, operation and maintenance of pressurized irrigation systems must be done by farmers organizations.

Now, the costs of constructing pressurized irrigation systems are provided by public credits and bank credit, so that farmers don't need to cash investment but they only must undertake to pay their loans. Project construction will be done by contractors which are selected by government organizations of provinces like agriculture-jahad organizations. At the end execution, project will be transferred to farmers organizations. But some experiences show that if participation is consistently emphasized in all phases of the project, local people will increasingly become the owners of the changes they propose (Natasha van dijk1999) and farmers participation in construction can gain farmers a stronger basis for insisting that construction is done to good quality standards and using designs which better serve their needs(Bryan Bruns and Helmi 1996).

2- CONSTRUCTING PRESSURIZED IRRIGATION SYSTEMS IN AREAS WITH PERSONAL OWNERSHIP

Such a project in which farmlands belong to one farmer, if farmland owner tends to install a pressurized irrigation system, after a necessary examination and consulting with experienced experts he can choose an appropriate system, then after making a request to public organizations, they will start to design his farmland .According to costs of project, bank facilities with the progress of execution will be paid. Therefore, farmers will be involved in all phases from choosing irrigation system, designing, providing equipment until project execution.

At the end of project execution and obtaining O&M guideline, due to having enough information by farmers, he often can operate the system successfully.

3-CONSTRUCTING PRESSURIZED IRRIGATION SYSTEMS AT LARGE AREAS WITH SMALL SCALE FARMLANDS

In extended project with about a few thousands hectares areas and small-scale farmlands to constructing pressurized irrigation system, government organizations select consultant engineers to study and designing the project, so farmers will not be aware of the project details. Usually small-scale farmlands with areas about 1-5 ha, and the necessity of constructing an independent pump station in an area of 100-300 ha, will result in an independent irrigation unit which involves more than 100 farmers.

On the other hand, pressurized irrigation systems won't be operated until all canals, pump stations, main, sub-main and lateral pipelines are installed. Hence, for a prompt operation of soil and water resources, government undertakes constructing all parts of projects and farmers only will pay back the loan. In such conditions instead of small projects in which farmer is directly involved in choosing irrigation system, design, providing equipments and construction, in large scale projects which may include over 1000 farmers , these farmers wouldn't have deterrent role in project and usually these projects would be constructed uniformly for all of them.

In such projects, during execution, farmer organizations will be established by cooperation of government organization and consultant engineers. These farmers organizations, meanwhile settling down opponent farmers at construction phase and they will learn about irrigation system operation and maintenance, and after project

execution accomplishment, the project will be transferred to farmers organizations. Thus because of farmers are not involved in construction, the operation phase will face some problems and may not achieve success.

The advantages and disadvantages of construction without farmers' involvement are:

A- ADVANTAGES:

- 1- By an intensive management, project execution will be performed rapidly and all project components including: pump stations, main, sub-main and lateral pipelines will be installed simultaneously and operation of project after that will be conceivable.
- 2- Due to supervision by expert engineers, the quality of equipment and project execution will be suitable.
- 3- Project performance is uniform through the farms.
- 4- In the absence of farmers, decision-making in construction would be easier and faster.

B- DISADVANTAGES

- 1- If farmers do not participate in construction they will be disappointed and inattentive about the system and this, in turn, may lead to some damages to systems during cultivation.
- 2- Since farmers don't have enough knowledge about the irrigation system and are not involved in construction, in some of projects, they may not be interested in operation and project probably won't be operated completely.
- 3- Since the whole project is constructed in limited period, some problems and disadvantages of system regarding the region conditions and social affairs won't be identified.
- 4- Because farmer organizations don't participate in construction phase, system maintenance by them will be difficult.
- 5- Since construction depends on government organizations, it may continue the dependency during operation phase and as a result it may delay irrigation management transfer.

4- CONSTRUCTION OF TOBA PROJECT IN SMALL SCALE FARMLANDS BY FARMERS ORGANIZATION (CASE STUDY)

In recent years, some projects were executed on small scale farmlands by farmers organization in Iran that one of them is **Toba project in Ben town**, Chahar mahalo bakhtiari province, south west of country, and its general specifications are as follow:

Area: 470 hectares

Water resource: Zayandeh rood river

Pumping head: 385 meter with 2 pump stations

Discharge: 188 lit /sec

Conveyance pipeline: 4 km steel pipe with 500 mm diameter

Crops: Almond and Peach trees

Irrigation system: Drip Irrigation

Numbers of farmers: 670 persons

Farmlands area for each farmer: 0.5 to 0.8 hectares

4-1-PROJECT EXECUTION

The project area, before construction belonged to Natural Resources Organization, which is transferred to Ben town people for job and occupation purposes. The project execution initiated in 1999 and finished in 2004. Haj Ali Akbar Salimi was involved in some contractors companies so he has valuable experiences. Hence he undertook the project construction and irrigation management as managing director of farmers organization and project is constructed directly by farmers organization.

Agri-bank started to pay the loan to the farmers organization gradually from 1999. and after 5 years farmers started to refund the loan and this will last for the second 5 years. In order to get the loan from bank, farmers should first pay 1300 million rials to farmers organization but just 280 million rials was paid by farmers and the rest were provided by farmers working on construction activity. Following to receive loan from bank, farmers began to purchase equipment and project execution. With farmers activity and their participation in construction also decreasing the costs, parts of money was saved in bank, so that some of installments were paid by these savings. In addition, for the last 3 years, costs of irrigation system operation are provided by bank interests of that savings.

4-2- OPERATION & MAINTENANCE

The operation of project started from 2004 .Farmers organization is on the basis of 6 parts. Each part includes 2 groups and each group consists of 54 farmers (farmers organization chart is given in diagram (1)).

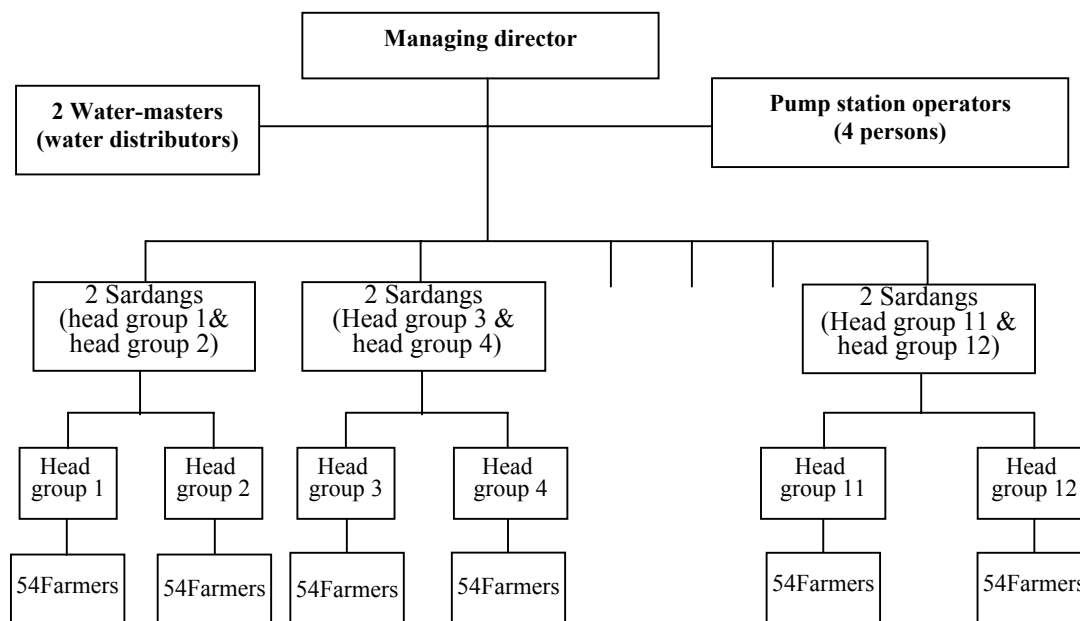


Diagram (1): operation chart of Toba

Irrigation is done by 2 water-masters (water distributors). Their job is controlling main and sub-main pipelines as well as opening and closing valves, but farmers are responsible for operation and maintenance of manifold and lateral pipes that are in their farmlands. Watermasters and pump stations operators are responsible for maintaining the main network, pump stations and filtration equipment. If some technical problems like electrical problems occur, they will call for active technicians in **Ben** town. Managing director and sardangs (the responsible person for each part of six parts is a sardang) will undertake accounting procedures.

The advantages and disadvantages of construction with participation of farmers organizations involvement are:

A-ADVANTAGES

- 1- Construction costs would be economical.
- 2- Economized construction costs will lead to saving money as farmers organization support.
- 3- Since government is not involved in project construction, the dependency of farmers organizations will decrease in operation phase.
- 4- If the project doesn't have a suitable prospect in farmers point of view, it won't be constructed. In other words, the presence of farmers in construction is a sign of PIM sustainability.
- 5- The presence of farmers at construction phase will increase their knowledge about operation and maintenance.
- 6- The cooperation of technicians with farmers organization during construction, will simplify solving technical problems which occur during operation and maintenance.
- 7- Farmers cooperation at project construction will reinforce the relationship between members and will inspire them to participate in collective activities.
- 8- The presence of farmers during construction leads to identifying active and committed people who can play effective roles in operation phase.
- 9- Farmers participation cause some changes in planning which, in turn, will result in the project be more adapted to farmers interests and desires.

B-DISADVANTAGES

- 1- The quality of equipment and construction will decrease because of not having a contractor and experienced supervisor.
- 2- The time of construction will be longer because of the necessity of farmers participation and their full acceptance.

5- CONCLUSION

As mentioned before, usually at pressurized irrigation projects in large areas which are constructed in small scale farmlands, all of the project execution are done by government and after accomplishment of project execution, will be transferred to farmers organizations. This issue will result in farmers irresponsibility, and it will, in turn cause their dissociation during project operation so that after transferring the system to farmers organizations, farmers will ascribe the organizations' managers to be responsible for all the system's problems.

5-1- THE PURPOSE OF CONSTRUCTING THE PRESSURIZED IRRIGATION SYSTEMS

It is presumed that final purpose is PIM sustainability of project. Whereas in large projects, often executing in short period of time is now the main goal and project operation is purpose defined in parallel with main goal also it will become more important when the project is approaching its final stages of execution. Therefore, these dilemmas will arise within the project:

- In order to achieve a time schedule and to accomplish the projects timely, there will be an attempt toward minimizing the need for arrangement with farmers.
- In order to accept project construction by farmers, it is necessary that a considerable part of construction costs be gratuitous. However in small projects in which people make the request for construction, financial support is less than the one in large projects

If farmers organizations are to be involved in executive procedures, some changes as the following will be necessary in order to achieve sustainable PIM:

- 1- 1-In order to encourage farmers to accept project construction, they should be well informed of irrigation system and operation procedures, for this purpose constructing pilots is inevitable and it is one of the priorities, also promoting activities as well as informing people will be done comprehensively.
- 2- 2-If the project be accepted by farmers organizations and if they must participate in project construction, the system should be accepted by the majority of farmers that will lead to changing the project layout according to farmers opinion and characteristics of farmers society.
- 3- Project execution by farmers organization will result in gradual on-farm system construction and the experiences achieved from last constructed areas, will improve the project execution in other areas.
- 4- 4-If farmers organization are constructing the on-farm irrigation system , it is necessary to use local contractors or train farmer organizations the necessary instructions that will lead to localizing the construction knowledge of pressurized irrigation systems.
- 5- In order to attract farmers interests and increase their motives to accept the project, economic sustainability will become more important, so that this will cause the companies, government organizations and research institutions give a special consideration to decrease the costs and increase farmers incomes which results in PIM sustainability.

Therefore farmers' participation will have positive effects in project construction and sustainability of PIM. There is no doubt that farmers participation should be precisely studied and the level of such cooperation should be on the basis of project's conditions and characteristics of farmers society.

5-2-DIFFERENT LEVELS OF OPERATION AND MAINTENANCE MANAGEMENT OF PRESSURIZED IRRIGATION SYSTEMS

Before changing the execution procedures of pressurized irrigation systems, it will be useful to identify different levels of operation and maintenance management. At present, usually a rural producers cooperative company is established in farmlands in area of 1000-3000 hectares and that company is responsible for the management of irrigation and cultivation of the farmlands. At higher levels, water users association (WUA) or government organizations are involved but they are not related to the present paper. The lower levels of operation and maintenance management of pressurized irrigation systems are shown in diagram (2). It shows the responsibility of operation and maintenance in different levels:

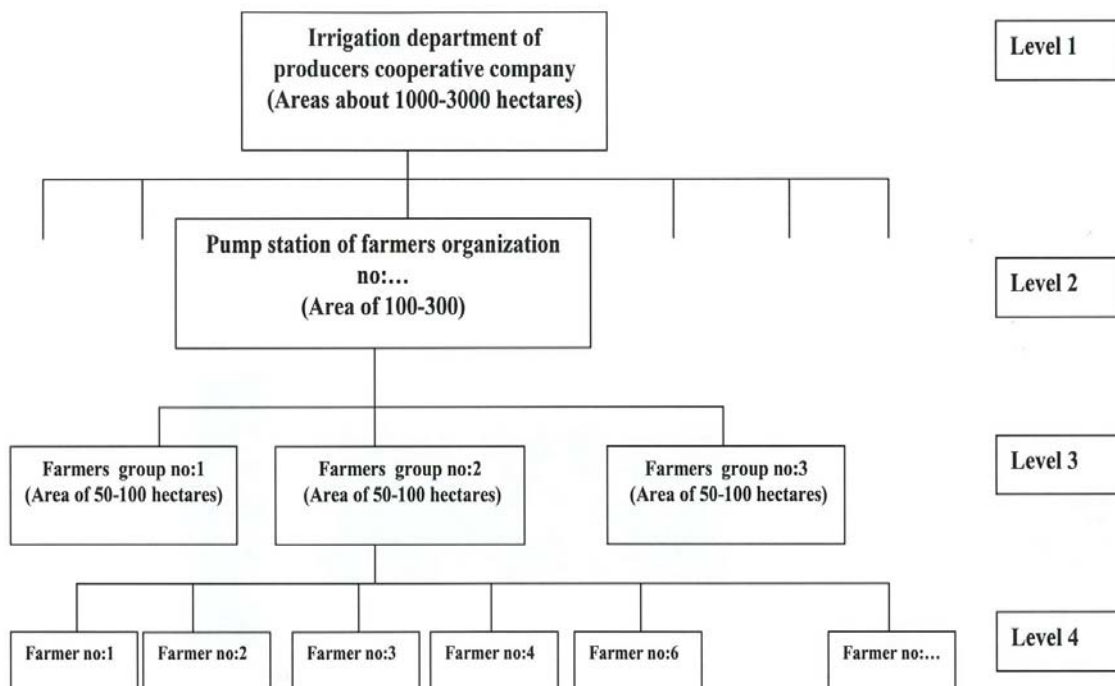


Diagram (2). A typical chart of operation organization for pressurized irrigation projects and different levels of operation and maintenance management

Level 1: irrigation department of the cooperative company is directly responsible for operation and maintenance of the main pump stations, reservoirs, canals usually in areas about 1000-3000 hectares.

Level 2: In farmlands areas covered by secondary pump station (usual areas of 150-300 hectares) a farmers organization will be established in which one person is responsible for this organization. This organization will be directly responsible for operation and maintenance of secondary pump station and main pipelines.

Level 3: It will be necessary to establish a group in covered farmlands with one or more sub-main pipelines in usual areas of 50-100 hectares. And in each group, one person will be chosen as the group representative. Hence, in every operation organization covered by an independent pump station, usually there are 3-5 representatives of a group so that one of them can be chosen as organization undertaker.

Level 4: farmers will be in the fourth level of operation and maintenance of pressurized irrigation systems and usually the farmland area for each of them is 1-5 hectares.

5-3- CONSTRUCTING IRRIGATION SYSTEM AT FIRST AND SECOND LEVELS

Irrigation network in first and second levels includes main pump stations, canals, reservoirs, secondary pump station and main pipe lines. At present, it is not possible for farmers organization to construct this part of system with proper quality, so it is better to continue the construction in these levels by experienced contractors and consulting engineers.

In this regard, the construction of main pump station, canals and reservoirs, should be arranged by producers cooperative company and farmers organization representatives, so they will be involved in project construction as much as possible. The employer should also inform them properly. Regarding the construction of secondary pump stations and main pipelines, in addition to producers cooperative company and the agents of farmers organization, the representatives of groups should be involved and contribute to the project as well.

5-4- CONSTRUCTING ON-FARM IRRIGATION SYSTEM IN THE THIRD AND THE FOURTH LEVEL

Irrigation system components at the third and the fourth levels include sub-main pipelines, manifold (in micro irrigation) and lateral pipes. In small-scale lands with very small areas, all of the pipelines even laterals will be constructed jointly and in a few farmlands, but in large-scale farmlands, only the sub-main pipe is jointly constructed.

Constructing this part of system have less complications, compared with the first and the second levels, and it will be possible to involve representative groups and farmers in planning. Diagram (3) offers a flowchart for on-farm pressurized irrigation system construction.

6- SUGGESTIONS

The participation of farmers in constructing the project may result in PIM sustainability, for this reason, the necessary laws should be approved, also the extent and method of participation of farmers organization should be studied in every project by consulting engineers.

Changing the construction procedures as well as farmers participation in constructing the pressurized irrigation projects in short term, will slow down the construction and defer initiating the project operation, however, farmers participation in long term leads the farmers creativity, attitudes, energy and their machines and equipment, into a suitable way and use them for developing the project purposes.

The important issue in constructing on-farm irrigation system by farmers organizations, is observing the standards and qualification measurements in providing the equipment as well as constructing the project, for this purpose, the necessary guidelines and supervisions should be available.

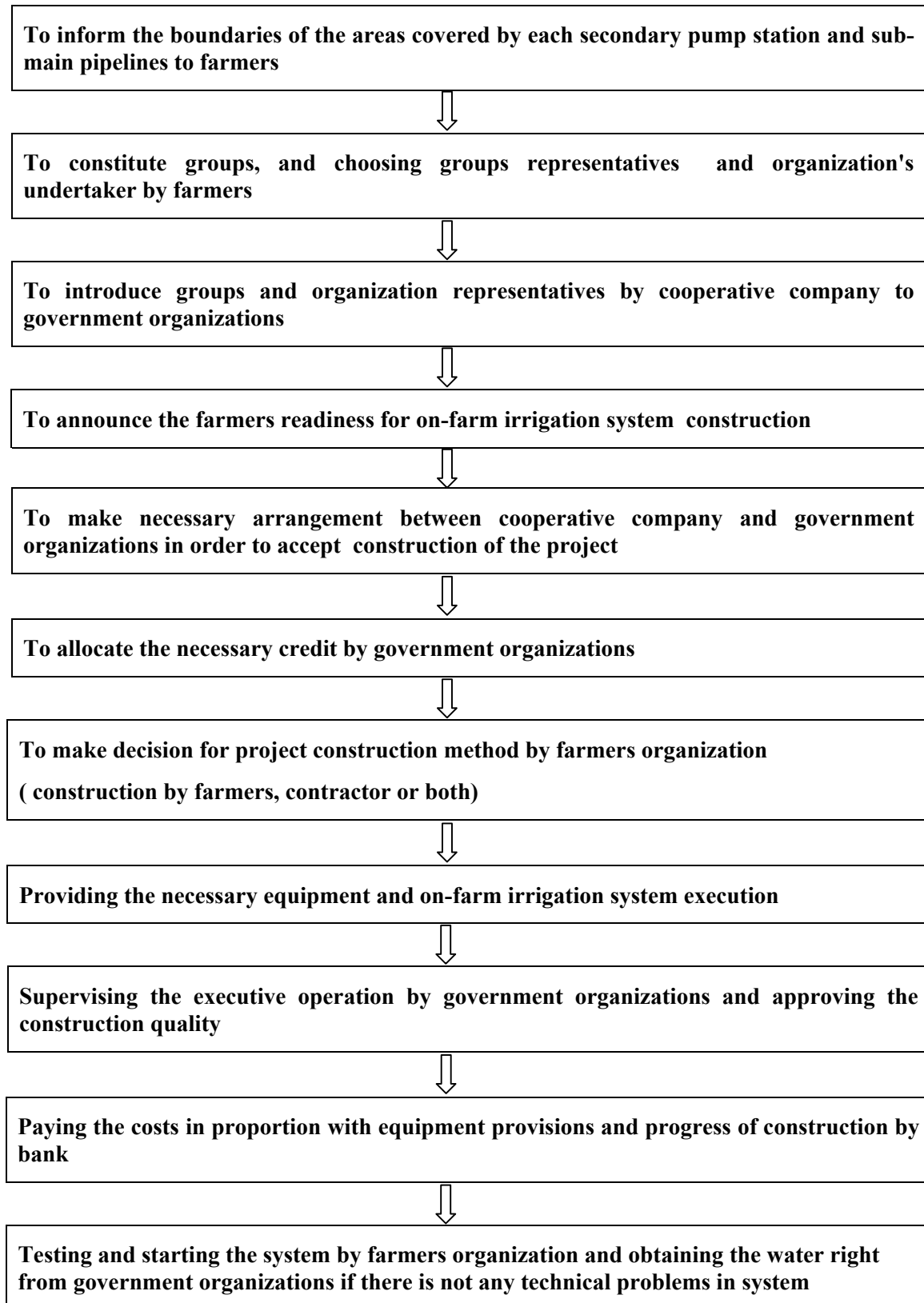


Diagram (3): Suggested flowchart of constructing phases for on-farm pressurized irrigation system by farmers organizations

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