

THE ROLE OF DEVELOPMENT AND ENHANCEMENT OF HUMAN FORCES IN WATER RESOURCES MANAGEMENT

ROLE DU DEVELOPPEMENT ET DE L'AMELIORATION DES FORCES HUMAINES DANS LA GESTION DES RESSOURCES EN EAU

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ABSTRACT

Water is the most precious element for sustainable development. Various factors are responsible for ensuring sustainable development of water resources. Considering the objectives of water resources management, it is clear that voluntary human indulgence in the efforts towards economizing on water use and managing the demands based on the availability of water resources is essential. The following questions are set forth to assist with gaining a better understanding of the deficiencies and the gap between the present and the desired level of water management:

- *At what skill level are the farmers and operators? And what level are they supposed to attain to?*
- *What level of development are the local social and economic systems? And what is the best exploitation system to attain a sustainable development?*
- *Is there a proper economic system?*

To answer these questions, one must have a comprehensive knowledge of the present operators and a proper definition of present agricultural skill levels and the same items under the desirable conditions. To clarify the subject, a sample plan aiming to empower the operators in the irrigation and drainage network is discussed in this paper for the East Azerbaijan Province, Iran.

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Key words: *Human Force Development, Water management, Irrigation and drainage network, Water consumption pattern, water resources management, Azerbaijan Province.*

RESUME

L'eau est un élément le plus précieux du développement durable. Différents facteurs sont responsables pour assurer le développement durable des ressources en eau. Compte tenu des objectifs de la gestion des ressources en eau, il est clair que l'indulgence volontaire humaine est essentielle dans les efforts pour économiser l'utilisation de l'eau et la gestion des demandes sur la base de la disponibilité des ressources en eau. Les questions suivantes sont prévues pour une meilleure compréhension des déficiences et de l'écart entre l'état actuel et le niveau désiré de la gestion d'eau:

- *Quel est le niveau de compétence des agriculteurs et des exploitants? Quel niveau nécessitent-ils atteindre?*
- *Quel est le niveau de développement des systèmes social économique local? Et quel est le meilleur système d'exploitation pour atteindre le développement durable?*
- *Est-ce qu'il existe un bon système économique?*

Pour répondre à ces questions, il faut avoir une connaissance approfondie des opérateurs actuels et une définition appropriée des niveaux de compétences agricoles actuelles et les mêmes éléments dans les conditions souhaitables. Dans cet article est discuté un plan d'échantillonnage visant à donner la charge aux opérateurs du réseau d'irrigation et de drainage de la province de l'Azerbaïdjan oriental en Iran, pour donner des éclaircissements à ce sujet.

Mots clés: *Développement de la force humaine, gestion d'eau, réseau d'irrigation et de drainage, modèle de consommation d'eau, gestion des ressources en eau, province d'Azerbaïdjan.*

1. INTRODUCTION

Development is gradual growth towards improvement in all spheres of human activities, that are sustainable. Thus, reduction of poverty, unemployment and inequality are the yardsticks of development in many countries of the world. Due to various and different critiques made on development issue in 1970s and especially in 1980s, it was discerned that through the process of development, different societies, now in the conditions of underdevelopment and lagging behind, will turn into developed societies with undergoing some qualitative and quantitative changes and passing through more or less similar evolutionary process. In the recent years, development is defined with a look into the future and expanding life facilities which contains the basics and fundamental concepts of stable development. In World Commission on Environment and Development, the stable development is defined as a development in which contemporary needs of world are met without endangering the faculties of future generations in meeting their needs.

The components of stable development

Stable development is human based and regarding his vastness of life and many capabilities, human is considered as the constructor and influential factor for changes in stable development. In stable development, human is introduced as the axis of development, deserving healthcare and enhanced life in accordance with nature.

Aspects of stable development

Maintenance, replacement and growth of physical resources.

Development of human resources.

Protection of environment.

Adaptability to changing scenarios.

Protecting future generations from debt trap.

Financial, administrative and political sustainability.

Self sufficiency.

2. THE IMPORTANCE OF WATER IN DEVELOPING HUMAN'S LIFE

Water is the most precious essence of creation which is bestowed upon humans by God to support life on the earth. Water is regarded as the pivot around which every activity runs. During recent years, the importance of water due to increasing needs, misuse, various contaminations, and pollution, and lately due to global warming, is more under attention and focus than ever before. Water has become a national priority all over the world.

Iran's water resources situation

The amount of water exploited from renewable water resources to meet various needs and demands exceeds 92 billion cubic meters (bcm) per year. Considering that Iran's annual renewable water resource is 130 bcm, the present annual exploitation is 70.8% of the average annual replenishment.

For the current population of 70 million, the per capita water need is 1300 m³ annually. If we are able to harness, control, adjust and exploit the country's surface water resources, and assume that 1300 m³ of water is per capita water use, the remaining exploitable water resources will be able to meet the needs of only other 25 million people with the current exploitation pattern.

Even with the most optimistic predictions about the decrease in population growth rate, during next two or three decades, Iran will have a population of 100 million. In such a case, the whole renewable and exploitable resources of the country will be in balance with consumptions. This can be realized only if we are able to manage the consumption trend, exploit 30 bcm water further and the consumption pattern does not increase. With these assumptions, the pressure of water shortage will begin gradually and in various aspects, which is already felt in certain parts of the country since some years in the past. So, the improvement of water

consumption patterns especially in agriculture which is the most important water consuming sector should be considered as the most primary component in any strategic planning.

The influential factors of stable development in water resources

Four relevant dimensions in stable development are as follows:

Economic dimension: Equitable distribution of wealth.

Human dimension: Improvement in the quality of life.

Environment dimension: Maintaining ecological integrity that nature had provided.

Technology dimension: Cleaner and more efficient technologies.

It is noteworthy that all of the above are intimately related with water.

3. THE GOAL OF WATER RESOURCES MANAGEMENT

The goal of water resources management is simply the optimum use of water. The concept of 'optimum', however varies with reference to the context. Whatever may the context, the basic tenet of development: "Meeting the present need, without endangering the faculties of future generations in meeting their needs" holds. Its two components are goals with direct economical output and indirect economic output. The goals with direct economic output include water supplying for urban uses, rural uses, drinking and industry, irrigation and drainage, flood control, electricity generation, quality management, harnessing sediment and erosion. The goals with indirect economic output include:

- Protection and betterment of water and soil resources and ecological supervision
- Economical development of region
- Enhancement and distribution of incomes and improving life index
- Healthcare and well-being
- Preparation to encounter emergencies.

The tendency in development in the past has been to focus more on the direct economical output. The sustainability aspect of development, by considering only the direct economic output, particularly with respect to the water resources, has been neglected due to organizational structures and this has resulted in minimum efficiency of irrigation, the largest water consuming section everywhere, including Iran.

4. SOLUTIONS FOR REALIZATION OF STABLE DEVELOPMENT IN WATER RESOURCES

So far as the water resources management concerns with humans, certainly the final goal of development too is human being. So water resource development needs developed humans.

Statistics show that developing countries which face poverty have various problems in developing human resources and this has resulted in intense emigration from these societies to developed ones. In Iran too, emigration has continued especially among young experts and researchers.

To understand the impact better, the following questions should be addressed:

- What is the status of farmers and exploiters from agricultural skills point of view?
- What are development levels of social and economic systems in the region? Is there any proper economic exploiting system?
- In which situation should farmers and exploiters stand from agricultural skills point of view?
- What are the most suitable water resources exploitation systems for realization of stable development?
- What is the most suitable economic system for realization of stable development?

In order to answer abovementioned questions, the following items should be taken into consideration:

- 1- There should be a comprehensive and complete knowledge about exploiters at the present situation.
- 2- Precise definition of skills from the stable agriculture point of view.
- 3- Lack of skills among the water users.
- 4- Definition of expectations from exploiters and beneficiaries.
- 5- Understanding the society and its needs.

Today, the study of social and economic issues and exploitation systems is considered essential requirements to embark upon any development endeavour, more so in water resources, as it is an integral component of any society. Researches show that our agriculture doesn't have a proper exploitation system and there hasn't been a successful and stabilized system so far. We haven't had a powerful, comprehensive and dynamic exploitation system exploiters of which can have the chance of being active. Undoubtedly, the powerful exploitation systems will have an important role in developing individual skills of exploiters. We can obtain synergy by solidifying the activities of exploiters in a proper exploitation system. What is obvious is that the absence of proper exploitation systems is an important loss in agriculture sector. On the other hand, a dynamic and consistent economy will have an important role in raising water management efficiency along with developing agriculture sector. If we can have industrial agriculture or if the agriculture sector has sufficient profitability, the exploiters will surely have enough assiduity towards the most important agricultural component i.e. water. Having an ill agricultural economy, loss of a clear economic approach in agriculture sector and fluctuation of prices are among factors which cause water resources management to encounter problems.

5. EMPOWERMENT OF SAHAND IRRIGATION AND DRAINAGE NETWORK EXPLOITATION IN WATER AND SOIL RESOURCES MANAGEMENT

The East Azerbaijan regional water company had attempted to address many of the issues discussed earlier in a small part of Shanad irrigation and drainage network as a pilot project. In this article regional water approach as an empowering factor for human forces in all fields is addressed.

Summary of project's features: Sahand irrigation and drainage network project has considered to transfer water from Sahand reservoir dam and its distribution to the lands inside project border which include those in both banks of Qarranqu River. With respect to this fact that most of the 10300 ha area under the development project are at a higher altitude than water level in reservoir dam, water transfer to lands is done through major and minor pumping stations with pressure pipes network.

Geographical location of project: Sahand irrigation and drainage network project is located in Northwest of Iran in East Azerbaijan province, 25 kilometers from Hashtrood city. The lands of the project are located at two sides of Hashtrood-Maragheh road. Borders of project are between 37.19 and 37.24 degrees N latitude and between 46.49 and 46.58 degrees E longitude. The road distance from Tabriz to the project location is 130 kilometers and Tabriz-Zanjan freeway lies to the east of project passing from QoyunQishlaq village.

The goal of operational program: the goals include: administrative programming and planning of exploitation system to facilitate executive actions of network foundation, preparation of exploiters for managing the exploitation and maintenance of network via: public organizations (promotion of local abilities and capabilities), private exploitation companies, creation of new local capabilities (building capacities in private sector), local governmental offices like Hashtrood's Agricultural Jihad management (expanding cooperation and participation of governmental sector), training social and exploitation experts for future management of network, performing and studies and removing existing research deficiencies by consultants.

Approach and policy: The planning of exploitation system will include: determining subsystems and systems, tasks and relations of subsystems with each other and governmental elements and the quality of its realization. This program consists of five main components as follows: registering cooperatives and bank contracts with owners to provide some costs of making the network; recognition of owners and exploiters; the status quo of founded organizations and their problems and obstacles; determining the irrigation management transfer landscape including the level of responsibilities and tasks transfer and the amount of abilities promotion and developing local capacities, presenting operational programs to empower organizations including educational and promotional programs, executing operational programs for local empowerment and capacity building.

Educational needs of exploiters: Educational needs of exploiters and arranging educational programs in 3 categories: educating exploitation and maintenance of pressure irrigation equipment pumping and water transfer systems, educating management and programming, educating irrigation management and new pattern of cultivation.

Educational programs: According to the projections made, the 3 abovementioned categories of needs will be noticed as follows:

- Educating the exploitation and maintenance of pressure irrigation equipment, pumping and water transfer systems

Management and programming education: In this respect, some capabilities of exploiter community are considered such as: separation of duties among parts of active public groups, the relations between minor organizations of small farms with water exploiters cooperatives and the methods of optimum use of exploiter community in irrigation management, the ways of supplying needs and etc. this education is fulfilled directly by consultant and with contractor's accompaniment.

The education for farm irrigation management and new cultivation patterns: In this part of education, the techniques of planting, maintenance and harvest of new species imported to local cultivation pattern are considered. In this regard, the relevant education is provided using cooperation of Agriculture Jihad's experts and other local forces at pilot level.

Activities details: Activities are: contributive and participation-based identification and preparation of local practitioners, executive planning, foundation of exploitation system and fortifying backgrounds aiming at efficient functional continuity of exploitation system.

Participation based identification: Identifying exploiters and owners, study and analysis of relevant parts of irrigation development project and the role of each, study of social map with irrigation plan and having necessary interactions with relevant governmental sectors, identification and evaluation of relevant local private organizations' status.

Executive planning: Field survey, final adaptation of social roles with irrigation development map, arranging meeting sessions with exploiters community and government's decision makers, preparation of list of duties, responsibilities and requirements, determining authority and responsibility of each of local practitioners for irrigation system management, preparing agreement contract between governmental and exploiters community, determining suitable structure for irrigation system management, determining managerial structure in exploiters community, preparing the list of educational and promotional programs and the list of execution, exploitation and maintenance processes, presenting details of operation plan based on contracts, water right and the method of collecting water fees, water distribution and delivery methods, financing the foundation, exploitation and maintenance of irrigation system, bank credits repay time table, executing pilot project along with promotion program for local capabilities, etc.

Exploitation system settlement: Formation of active public groups, removing deficiencies and decreasing conflicts, following the issues related to transfer of responsibilities, arranging financial and judiciary conditions and removing obstacles, facilitating conditions for local capabilities, facilitating the activation of private sector in supplying executive requirements of project, taking action to facilitate altering the structure of local sections for new managerial errands, planning and executing the survey and evaluation of operation plan.

Performing pilot project and educational programs: To perform the project experimentally, a farm with 160 hectares area has been chosen. In addition to technical scrutiny of system

function, educational and promotional goals are considered as well. Executing pilot project started from the beginning of 2009 and along with foundation activities, related education was considered. Part of this education is the contractor's responsibility and another part is done by the consultant. This is explained in the following:

Capacity building: This education is performed in accordance with the consultant's program and is aimed towards preparation of active public groups by the contractor and sellers of pressure irrigation equipment. The education consists of applying, exploiting and fixing technical equipment. These educational activities will be realized under consultant's supervision.

System management: In this respect, part of exploiter community capabilities such as separation of public active groups' duties, the relations between small organizations with water consuming cooperatives, the efficient use of exploiter community in management of irrigation and how to supply the needs are considered. This education is fulfilled directly by the consultant and with accompaniment of the contractor.

Irrigation management and new cultivation patterns education: In this regard, the consultant performs relevant education in pilot project using its own experts and with the aid of Agriculture Jihad's experts and other local forces.

6. CONCLUSIONS

The study and true recognition of existing circumstances and exploiters skills is an urgent necessity. Public education is to be strengthened to realize the national perspective and goal of water resources management. The optimum use of water resources has a vital role in success of development plans for society and improving the function and efficiency of water management requires improvements in planning, execution and policy making system. On the other hand, the coordination between different social institutions and their participation in decision making process has a remarkable influence over successful performance of projects. Position of project and different networks should be considered in realization of projects' accomplishment and regarding variety and difference in each region, a series of suitable implements should be applied and special economic, social and cultural traits should be taken into consideration. Regarding project's goal which is emerged from exploiters opinions, necessary education to acquire needed skills should be performed. It should be noticed that water resources management and optimum use of it is to be fulfilled by exploiters who will be able to perform their role only after gaining required education and skills in a dynamic economic-social system. Favorable water resources management may not be reached without noticing the development of human forces and economic-social structures.

What was propounded in the real example, is only about executive planning of exploitation system settlement to facilitate foundation of network and preparation of exploiters to manage the irrigation system which refers to only some among many activities in stable management of water resources. It's evident that the realization of stable management of water resources is a national and public duty. Leaving it to a select group will over burden them and task will not be completed satisfactorily.

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