A STUDY OF ADAPTIVE IRRIGATION MANAGEMENT PLANNING –A FARMER'S PERSPECTIVE

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Abstract- Irrigation sector has been fundamental to India's economic development and poverty alleviation, since 25% of India's Gross Domestic Product (GDP) and 65% of employment are based on agriculture (MOWR GOI 2006).In india different types of irrigation methods are used by farmer according to water availability and nature of soil. This study was carried out to assess the present irrigation system of command area and to perform diagnostic study for the possible improvement in command area of Ghatera Babaji tank canal situated in Betwa River basin. The study area has a gross command area of 147 ha out of which cultivable area are 127 ha. Irrigation is supplied during Rabi season in about 121 ha. The soils in the command area have the texture from clay loam to sandy clay loam with clay varying from 43.25 to 39.52 percent.
Keywords: irrigation, clay, loam, sand.

1 INTRODUCTION

Water is a vital component of nature, which brings life in land; therefore the judicious utilization of water is needed for all types of human advancement. India is a monsoon dependent country for its water resources. The average annual water availability of the country is assessed as 1869 billion cubic meter (BCM). Of this total utilized water resource is assessed as 1123 (BCM) comprising of surface water 690 BCM and ground water as 433 BCM (MOWR, GOI). India has 17 percent of global population and only 4 percent of global fresh water supply. Irrigated agriculture has a predominant role in India's food production. The ultimate irrigation potentiality of the country has been assessed as 139.9 M ha. At the beginning of plan era, the total irrigation potential created was of the order of 22.6 M ha. Irrigated agricultural land reportedly increased yield of most of the crops by 100 to 400% (FAO). A large number of irrigation projects were therefore taken up with the objective to further increase agricultural production in the country. To achieve food security for the growing population the country's focus is on to bring more and more area under irrigation, reducing gap between potential created and utilized as well as efficient water management. Most of the major irrigation command areas in India suffer from problems of inadequate and unreliable water supply. This leads to temporal imbalance of water demand and supplies, excessive seepage losses and rise of ground water table, resulting in problems of water logging & salinity. The problem of water loss and insufficient water use in irrigation schemes cannot be attributed to canal control and operation only. Institutional and socio-economic factors also contribute to the problem. An integrated approach should be adopted to improve water use efficiency. The main areas for improvement are management of water course, feeling of ownership among water users, appropriate methods for conveyance through canal and its application on field. Institutional and socio-economic factors also contribute to the problem. An integrated approach should be adopted to improve water use efficiency. The main areas for improvement are management of water course, feeling of ownership among water users, appropriate methods for conveyance through canal and its application on field. Command area development program (CADP) was launched exclusively to reduce the physical and time gap between irrigation potential created and its actual utilization through systematic land development, scientific water management and appropriate extension methods (Shah, 2011).

In spite of sincere efforts, the water use efficiency in most irrigation system is low especially in surface irrigation system ranges from 35 to 40 per cent. The main causes of low efficiency as observed by Indian institute of management (IIMs) are: deficiencies' in water delivery system, inequitable delivery of water to the field and inefficient

management. The reasons of present low efficiencies also include delay in construction large projects resulting in shift towards high water consuming crops, wasteful use of water by head reach farmers, excessive seepage and evaporation as well as percolation below the root zone. Efforts made so for are from institutional side and farmers were not given due consideration in improving situation. Therefore a need was felt to include farmers view to finalise the water anagement plan in an adaptive mode. Adaptive management is defined as a framework and flexible decision making process for ongoing knowledge acquisition, monitoring, and evaluation leading to continuous improvements in management, planning and implementation of a project to achieve specified objectives. An adaptive management approach provides a structured process that allows for taking action under uncertain conditions based on the best available science; close monitoring, evaluating outcomes, re-evaluating and adjusting decisions.

Due to inadequate availability of irrigation water in the reservoir, most of the flow based minor irrigation projects suffer from poorirrigation intensity and cropping intensity. There is a need of proper crop planning especially during dry season taking into account the availability of irrigation water in the reservoir. Higher crop coverage sometimes leads to severe scarcity of irrigation water in the advanced crop growth stages thereby restricting the productivity of the crop significantly lower than the potential. The Water Users Association formed to look after the operation and maintenance of the system and collect water tax from the farmers still have several problems.

Therefore, the challenges of water resource management in minor irrigation sector calls for immediate assessment of their performance to identify the gaps and development of suitable ways and means to bring improvement. Involvement of farmers was initiated by participatory management programs which should be extended to all projects and to all activities. It is the need of time to plan improvement in consultation of farmers or water users in the command area. Looking to the fact that in irrigation management planning farmer or water user is the most important component for improving irrigation scenario present study was undertaken with the following specific objectives-

1. To assess the present irrigation system of a minor command.
2. Diagnostic study of the system for possible improvement.
3. To study the farmers response for suggested technical intervention.
   To prepare mutually agreeable

adaptive irrigation plan for the study area.

2 STUDY AREA

The study has been undertaken in the command area of Ghatera Babaji tank canal, a tank irrigation project located at Ganjbasoda, Vidisha district, Madhya Pradesh. Ghatera Babaji tank irrigation project is a minor irrigation project in Madhya Pradesh; the dam is situated on local nalla, a tributary to Betwa River. The Ghatera Babaji dam can be approached from Basoda city, a tehsil head quarter and is located about 22 km of Basoda town. The site is approachable from Basoda-Sagar road. The approach to dam site is a tar road. It is motarable during monsoon. Command area of Ghatera Babaji Tank canal lies between 23°48‟00”N and 78°07‟00”E respectively. (Fig.3.1) Canal system of the Ghatera Babaji scheme consists of main canal 1360 m long. This project was constructed in year 1970 to irrigate 65 hectares of Rabi crop through unlined canal structure but it is providing irrigation to 110 ha of land with 100 ha during Rabi and 10 ha during kharif season. Table 3.1 presents the general features of the project.

Salient features of Ghatera Babaji minor tank project :

S. N o.	Features	
	Locationofdam site	
1	Longitude	78°07"00"
2	Latitude	23°48"00"
	Reservoirdata	
1	Catchmentarea	165sq. km.
2	Grossstorage capacity	0.650Mcum
3	Livestorage capacity	0.605Mcum
4	Deadstorage capacity	0.043Mcum
5	Fulltanklevel	30.175m
	Damdata	
1	Length	1380m
2	Height	4.22m
3	Topwidth	3.0m
4	Length of waste- weir	74.5m
5	Design discharge of waste-weir	21.7cumec
	Canaldata	
1	Lengthof main canal	1360m
2	Highest elevation	440m
3	Lowest elevation	431m
4	Sluice gate type	welltypesluice
	Area commanded	

1	Grosscommandarea	147ha
2	Culturablecommand area	120ha
3	Forestarea	7 ha

3 SUGGESTIONS FOR FUTURE WORK

From the present study conducted in the Command area of Ghatera Babaji Tank canal under minor irrigation project for survey of farmers for response on interventions suggested for improvement and to analyze the information collected and planning a system of irrigation, the following research work could be suggested for future. The study may be done considering more farmers in the command area. As per the present scenario, there are no measuring devices at the outlets to check the discharge and there are no means to account for the seepage losses. Therefore measuring devices should be installed in order to calculate the discharge and water use efficiency so that farmer's may plan crop accordingly. A computer based model should be developed for computing the time for water distribution to different beneficiaries. This type of study needs to be conducted on more canal command area to arrive at more realistic estimates of the operational losses and know about farmers view about our recommended technologies.

4 CONCLUSIONS

Based on the diagnostic analysis of GBT irrigation project, possibility of improvements and adoptability of farmers following conclusions may be drawn for the study.

1. The overall irrigation efficiency of 35 per cent needs to be improved to enhance water productivity of Wheat from 0.89 to 1.16 and for Gram from 1.18 to 3.43.
2. Improved irrigation method namely border and sprinkler are to be adopted to improve application efficiency from 66% to 80%.
3. Canal lining must be undertaken to reduce seepage from 29.0 m3/ M m2 to an acceptable range of 6 - 8 m3/ M m2.
4. Farmers need capacity building program to educate them for adopting complete package of practice of crop including variety, seed, seed treatment, fertilizer, weeding, irrigation scheduling and proper water management to enhance level of average yields from 22.6 to 40 q/ha for wheat and 10 to 20 q/ha for soybean crop.
5. Head reach should be paid more attention for crop water management, canal operation and maintenance to avoid excess losses.

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