



PARTICIPATORY MEASURES IN IRRIGATION- A CASE STUDY OF INDORE MINOR IRRIGATION TANK

Er.Pradeep S. Bhalge¹, Mrs.Charu Bhavsar²

ABSTRACT

The India was ruled by various dynasties and all of them were very much particular in promoting the Rain water harvesting and irrigation development. They were providing financial aids for construction of water harvesting devices. But they never interfere in the water management. Repairs and water management were totally in the hands of the community. But in the present days the water resources are the properties of the Government. Potential to the tune of 3.812 million hectares are created in Maharashtra. But there is wide gap between the creation and utilization of irrigation potential. The government is responsible for repairs, maintenance and water distribution. Due to which the peoples lost their affection to the water resources. Their participation in water management goes on reducing. The efficient and traditional community managed systems were being pushed in the verge of extinction. Peoples are again reviewing participatory irrigation management approach and implemented very successfully. Indore Minor irrigation tank (India) is one of them. This paper gives the details of their fantastic ideas about Participatory irrigation approach, rain water harvesting, and equitability in distribution, adoption of the advance irrigation method, and efficient use of harvested water.

INTRODUCTION

Maharashtra is situated in the southwest of India. The total geographical area is 30.8 million hectare, out of which 22.50 million hectares are cultivable. At the end of year 2004, 3.812 million hectares irrigation potential is created by harvesting the rain water. The harvested water are stored in various reservoirs. But the state lags in utilization of potential created. The gap between the potential created and utilization is increasing day by day. There is urgent need to adopt improved water policy and advance irrigation techniques to bridge the gap between the potential created and utilized. Agriculture has been the prominent occupation to provide foods and fibers to the growing population of the state. The state economy is dependent upon the agriculture production. Irrigation

1- Irrigation Engineer and Executive Council member of Indian Council For Water and Culture, Aurangabad, Maharashtra, India. pradeepbhalage@yahoo.co.in

2- Indian Council For Water and Culture, Aurangabad, Maharashtra, India. charubhavsar@yahoo.co.in,

facility is regarded as the key element of irrigated agriculture, the modern agriculture and irrigation practices play a key role in alleviating rural poverty.

The water resources, reservoirs, distribution systems etc. are the property of the Government. They are wholly governed by the Government. The rain water harvested in the reservoir is released as per the availability and demand of the beneficiaries and water tax is collected from the users. Maintenance and repairs of the head work, distribution net work up to the outlets is the responsibility of the governments and maintenance of the net work below the outlets i.e. field channels, water courses are the responsibility of the farmers. The farmers do not take part in maintenance work of the distribution system. They fills that it is the responsibility of the government only. The water taxes are so meager that, it can not be sufficient to maintain the schemes. Due to low maintenance the conveyance losses goes on increasing, this result in to the lower down the utilization.

PURPOSE

The government comes to the conclusion that without farmer's participation efficient water utilization is not possible. To improve the performance of irrigation sector, Government has promoting the users participation, water awareness and capacity building. Under this program, Number of water users associations is being formed under the command of irrigation projects. In many cases the water management is handed over to them. A case study of Jai Malhar water users Association, Indore village, Nasik district of Maharashtra State [India], is taken to review of the success of the implementation of the reformed policy and the efficient use of the harvested water.

PRESENT WATER ALLOCATION

In Maharashtra state, water is allocated on the basis of the designed crop pattern, the demand of the farmers, and availability of the water in the reservoir. The water is released on the basis of the sanctioned crop area in a given season. The quantity is to be releases at fixed interval to satisfy the crop water demand, but in actual practice the quantities and rotation period is fluctuates, since water is charged on area basis, farmers do not irrigate in night time. There is uncertainty in water supply. Water charges are levied according to the area irrigated and not on the volume of water supplied to the field. due to which tendency to use excess water is developed among the farmers. These results in deep percolation losses, leaching of fertilizers below root zone, run off at the end of borders and furrows, water logging and salinity. The present water application methods are not efficient, though they are adopted over large area in command of irrigation projects thus reduces the efficient use of harvested water. The reasons for this type of irrigation practices are,

1. There are no incentives to the farmers for efficient water use.
2. The farmers do not worry about the wastage of water, as they are not to pay on volumetric basis.

3. The rotation of water supply schedule is not implemented as it is planned on paper.

Therefore the beneficiaries will try to tap as much water as possible, when their turn is on. The head reach farmers apply excess water, while the tail reach farmers do not get water at all. In the night time some of the farmers diverts the irrigation water in to the drain, they are not penalized. The field channels are not well maintained as the farmers are not organized to share the water as their responsibility. The flow rate in each chak (Piece of land under command of one out let) is standardized as 30 Liter per second. But in most of the cases the out lets do not have discharge more than 10 liter per second. The present water policy does not permit farmer to let water in to the well. All above features drives the farmers mind to apply maximum irrigation water.

The present water distribution practices do not allow a farmer to irrigate more area in the same quantum of water. On the other hand he will be penalized for irrigating more area than the sanctioned area for growing the crops. The water demand is vary from out let to out let. The flow time vary from one day to seven days. It is very difficult to regulate the flow rate in the main irrigation canal. Thus the operational schedule gets disturbed. The end result of this type of operation practice is heavy water losses.

REFORMED WATER POLICY

As the area under the command of an irrigation managerial staff is large, it is difficult for them to maintain and keep watch on each and every field. Thus Maharashtra Government has decided to hand over the command area to the beneficiaries. The water users associations (WUA) of the beneficiaries are now formed. The command area is being handed over to the WUA. In some cases the formalities are completed. Water will be released to them on volumetric basis. Overall distribution, controlling and management of irrigation, maintenance is done by water user association.

BENEFITS OF WUA

1. Freedom of crop planning
2. Conjunctive use of water is allowed
3. Flexibility in water scheduling
4. Freedom of water distribution
5. Saved water can be use in the next season
6. Efficient water use
7. Equitability in water distribution
8. Quickly setting of the conflicts.

A CASE STUDY

The Indore village is situated 25 Kilometers away from the district head quarter Nasik, Maharashtra (India). The monsoon rain fall occurs in month of June to mid of October. After the monsoon rains are over, it was nor possible to raise the crops without supplementary irrigation. In the summer days the peoples were neither getting water for irrigation nor for drinking. To overcome the water crises problems, in the year 1972, Government has constructed one Percolation tank of 0.45 Mm³ capacities. In the period 1989-1992, the government has taken a decision and converted this percolation tank in to a Minor Irrigation tank. For that purpose the height of the dam is raised. Thereby the storage capacity of the tank is increased up to 0.89 Mm³. Two irrigation sluices one at the left flank and one at the right were installed. Thus 100 hectare irrigation potential is declared to be achieved. Villages under the command are Indore and Madakejamb.

The tank never get fill with water since its construction. It was governed by the irrigation Department, Government of Maharashtra. The maintenance, repairs and operation was done by the Irrigation staff working under the government. The irrigation was done in the Rabi seasons only i.e. October to February. The tanks could not have water to irrigate in the hot weather. The tank gets empty in two or three irrigation rotation. More than 15 Acres of land can not be irrigated by letting the water in to the canal since its renovation. The tail enders never gets water. As there was acute shortage of water, the farmers were raising crops like Millet, Green gram, Black Gram etc in the rainy season. And crops like Wheat and Gram in the Rabi season. Due insufficient and uncertain water supply from the reservoir, the yields of the crops were not enough. As agriculture was the only source of income, the farmers were getting more and more poor day by day.

To over come the problems the beneficiaries united to gather. After lot of discussions and brainstorming following decisions are taken by them.

1. Decided to form water users association to take over the management of the irrigation in to their hands.
2. To reduce the conveyance losses, decided to adopt pipe distribution net work only. For that they have taken the decision to close the irrigation sluices.
3. Group of 3 to 7 farmers having fields side by side or at convenient are to be formed. Each group will laid a common PVC Pipe line to carry the discharge form the distribution chamber to the secondary distribution chamber. And every individual will laid a separate pipe line from the secondary distribution chamber to their own field, at their own cost.

They united to gather and formed a WUA named as “Jai Malhar Lift irrigation co operative society, Indore village, Nasik district, Maharashtra state (India). It is worth to know their equitable and sustainable water distribution techniques. The details are given below.

			
<p>Indore MI Tank</p>	<p>Main Distribution Chamber</p>	<p>Peripheral Compartment On Main Distribution Chamber</p>	<p>Secondary Distribution chamber</p>

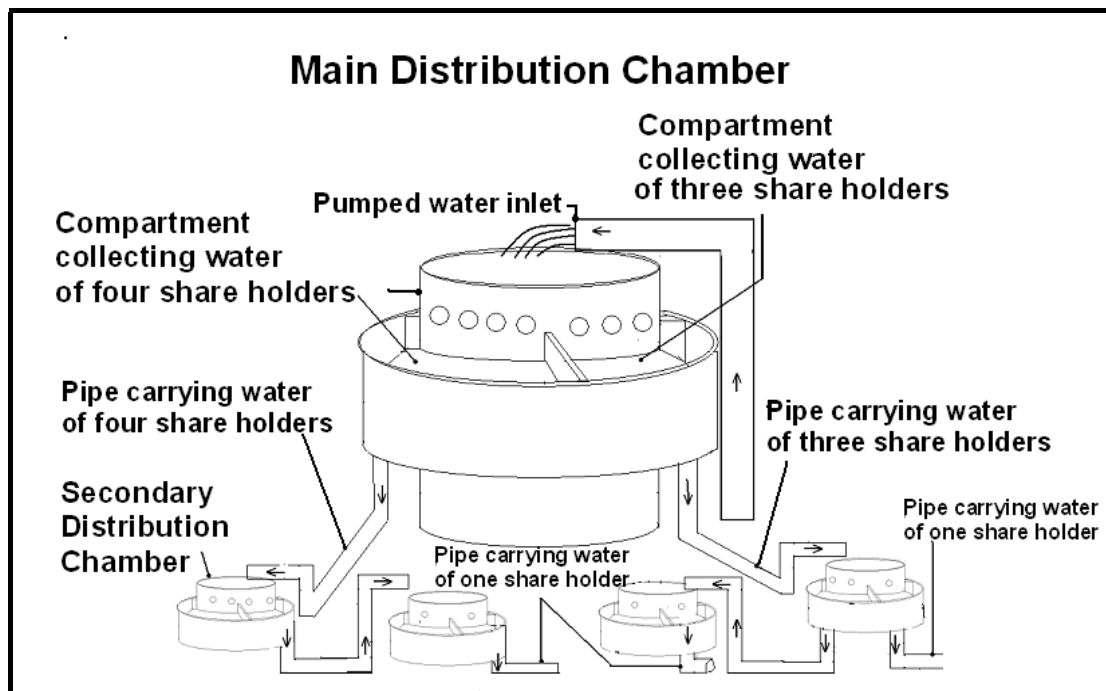


Fig 1

EQUITABLE DISTRIBUTION OF AVAILABLE WATER IN THE RESERVOIR

Total 115 no share holders are registered. A jack well of three meter diameter is constructed inside the reservoir. As shown in the figure 1, a main distribution chamber is constructed on a higher ground near the dam. Two submersible pumps of 25 HP each are installed on the jack well. The discharging capacity of each pump is 50 lps. A rising main pipe of 315 mm diameter is laid. It carries the water lifted by the two pumps, and delivers inside the main distribution chamber. The diameter of the distribution chamber is 3 meter and the depth is kept as 2 meter. 115 PVC pipe pieces of 63 mm dia and 300 mm in length are fixed over the vertical wall of the chamber. They are fixed exactly at one level. They work as out lets. There number is equal to the number of share holders.

The water delivered inside the chamber is divided equally among the all 115 pipes and flows out. Group of three to seven farmers are formed

1. When the power is on the pumps will run and the water will get collected in the main distribution chamber. From this chamber it gets distribute equally from the outlets fixed on the peripheral vertical wall. The water from the out lets fall in to peripheral chambers. The number of outlets letting water in to a peripheral compartment is dependent upon the number of farmers in that group. All peripheral compartments receive water at the same time. The water collected in the compartment is then carried through a pipe line of that group, up to the secondary chamber constructed at the common point; this chamber has one common compartment, where the water coming through the pipe line gets collected first. The vertical wall has pipe out lets of equal diameter. The number of pipe out lets is equal to the members in that group. The water coming out from each out let is then collected in individual or compartment/chamber. From this chamber the water is conveyed to the individual's field. Thus all the share holders will get equal quantum of water at the same time. As the total discharge of the two pumps is 100 lps, then it is equally divided in to 115 members, and each of them will get nearly one lps discharge over the running period. If one of the pumps is shut down, then the discharge of one pump will be equally divided among them as said above. In the existing flow irrigation systems lot of conflicts arise. But theses are avoided in this system as there are no head, middle and tail enders.
2. The maintenance of rising main and the pumps is the responsibility of the WUA.
3. The maintenance of the pipe lines is not the responsibility of the WUA. It is the common responsibility of the farmers in that group.
4. Collection of the water charges and paying it to the Government is the responsibility of the WUA.
5. As the command area of the tank is small i.e.100 hectare, only one WUA is formed on this tank.
6. Government staff of irrigation department is measuring the water level in the tank at the start and end of a cropping season. Accordingly Volume of water utilized by the Association as a whole is calculated and water charges are levied. Thus the government will get revenue on the basis of volumetric basis.
7. All the beneficiaries contributed in the cost of Construction of the rising main, pumps, elevated distribution chamber etc. Every group had made their own financial arrangements for their common conveyance. The WUA has purchased and fixed one Electric transformer of 160 KV to get continuous electric supply of required voltage. The WUA is also responsible to collect the electricity charges and pay to the respective office. It is important to note that they do not relay on the Government for the cost of the above said components.

RESULTS

After the implementation of the scheme following changes are observed.

1. The conveyance water losses are reduced to zero, thus saving in large amount of water.
2. Equitable distribution of water
3. Water is delivered to the farmers in command as well as non command area of the tank. Thus extending the irrigation benefits to the villagers.
4. Cost of pipe line is saved due to group formation.
5. Every group has a group head. He is authorized to solve the dispute among them if arises.
6. Due to involvement of people's participation, the scheme runs smoothly as the powers and responsibility are decentralized.
7. The youngsters turn to wards the farming instead of wondering for searching jobs in the Cities.
8. It becomes possible to produce export quality grapes and vegetables.
9. Able to adopt advance irrigation techniques such as Drip and Sprinkler irrigation.
10. The area under Grape is increased from 2 hectare to 60 hectare.
11. The irrigation potential is increased from 100 hectare to 200 hectare.
12. Income from the farm is increased from Rs12000 to Rs125000 per hectare.

CALCULATION OF WATER ALLOCATION

Discharge of each pipe out let	1 liter per second
Average working ours of pumps	10 hours per day
Average working days	200 days per annum
Total annual water supply to each share holder $9 \times 12 \times 3600 \times 200 \times 0.001$	8640 Cubic meter per share holder
Total volume of water allocation 8640×115 (no of share holder) $\times 0.000001$	0.99 Mm ³

CONCLUSION

8640 Cubic meter water is sufficient to irrigate 2 hectares of land with advance irrigation techniques.

It is concluded that peoples participation play a very key role in sustainable development. When the beneficiaries get the feeling that the irrigation system is their ownership, they do very well. This will help in following ways.

1. They will have affection to the water resources.
2. They will maintain the system in a good condition.
3. They will use the available water very efficiently.
4. The expenditure of the Government will save
5. 100 % of the potential created will be utilized.
6. Alleviate the rural poverty.
7. Achieve efficient and optimum water use with easy management.

REFERENCE:

1. Report of Maharashtra water and Irrigation Commission, June, 2005.
 2. Field visit and Discussion with the beneficiaries of Indore MIT.
-