20th WEDC Conference
Colombo, Sri Lanka, 1994
AFFORDABLE WATER SUPPLY AND SANITATION

What stopped distress migration?

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WATER IS THE most important replenishable natural resource for the survival of mankind. It is well known fact that standard of living of any society is measured by the rate of consumption of water. Needless to mention that insufficient and erratic water supply would cease regional development resulting in social, economical and political problems. Development of water resources is the surest and the shortest path towards poverty alleviation and improvement in quality of life. The present paper discusses the problem of availability and supply of water in Dhar and Jhabua districts of Madhya Pradesh (M.P.), a state of India and also deals with how water scarcity resulted in the deterioration of social conditions in the area. The later part of the paper presents the improvement in the situation due to timely actions taken by the Government of India as well as Govt. of M.P.

Overview of Jhabua and Dhar districts

Madhya Pradesh, the largest state in India covering an area of 4,43,000 Sq. km., is divided into 45 districts. Jhabua and Dhar are two predominantly tribal districts in the western M.P. They extend over an area of 6792 sq. km. and 8153 sq. km. respectively. A map showing these districts is presented in Fig.1. Demographic details of these two districts with respect to the State as a whole is presented in Table 1. The tribals living there depend on the forest wealth and some farming for their livelihood.

The general topography of the area is very undulating and highest and lowest loactions have an elevation of 777 m and 300 m respectively.

Table 1. Jhabua and Dhar at a glance
(Based on 1991 census)

Details	Jhabua	Dhar	M.P.
Total population	1.13m	1.36m	66m
Rural	0.98m	1.19m	50.82m
Density per sq. km	167	168	149
Sex ratio (females/10000males)	972	932	932
Literacy	14.5%	27.5%	43.5%
ST	85.66%	53.5%	23%
Women workforce	51.28%	40.08%	32.68%

Both these districts are adjoining to each other and share similar geological formations which are Archeans, Lametas, Bagh beds over laid by Deccan traps.

Water supply status of Jhabua and Dhar

About 1326 villages in Jhabua district depend on the 6767 handpumps, 55 PWS and 17,526 dug wells to meet their drinking water requirements. Irrigation water needs are met from the dug wells in addition to four major irrigation tanks and 400 minor irrigation tanks. Whereas 1484 villages in Dhar district are provided with 6560 handpumps and 107 protected water supply schems and 20,000 dug wells for irrigation in addition to 240 minor irrigation and six major irrigation tanks.

Problems

Jhabua and Dhar districts faced the severe drought conditions in the recent past and even the drinking water supply schemes were not dependable. The destruction of forests changed the rainfall cycle resulted in lower rainfall rates in these districts and that led to drought.

In Jhabua 1326 problem villages where as 1451 problem villages in Dhar. The definition of problem villages is no assured drinking water in these villages. The number of problem village increases each year due to depletion of ground water casued by over exploitation and destruction of forest cover in the name of development resulting in increased run off and soil erosion. This has reduced the natural recharge rate hardly to 10% of the total precipitation.

The population in both these districts are mainly tribals and their main occupation is rainfed farming and depends on forest produce. The average rainfall in Jhabua is 828.8 mm and of Dhar 833 mm. In 1985 rainfall recorded was 420.2 mm in Jhabua and 300 mm. Followed by over exploitation of ground water by indiscriminate sinking of deep tubewells caused drying up of perennial open wells, stepwells and created acute shortage of water for drinking as well as for irrigation. This reduced even the main crop yield and failure of agricultural produce During this period, only 0.182 MT / hectare was produced against normal production of 0.42 MT / hectare.

Social problem

Usually villagers, mainly male members, around 30,000 migrate to neighbouring towns or districts for a short

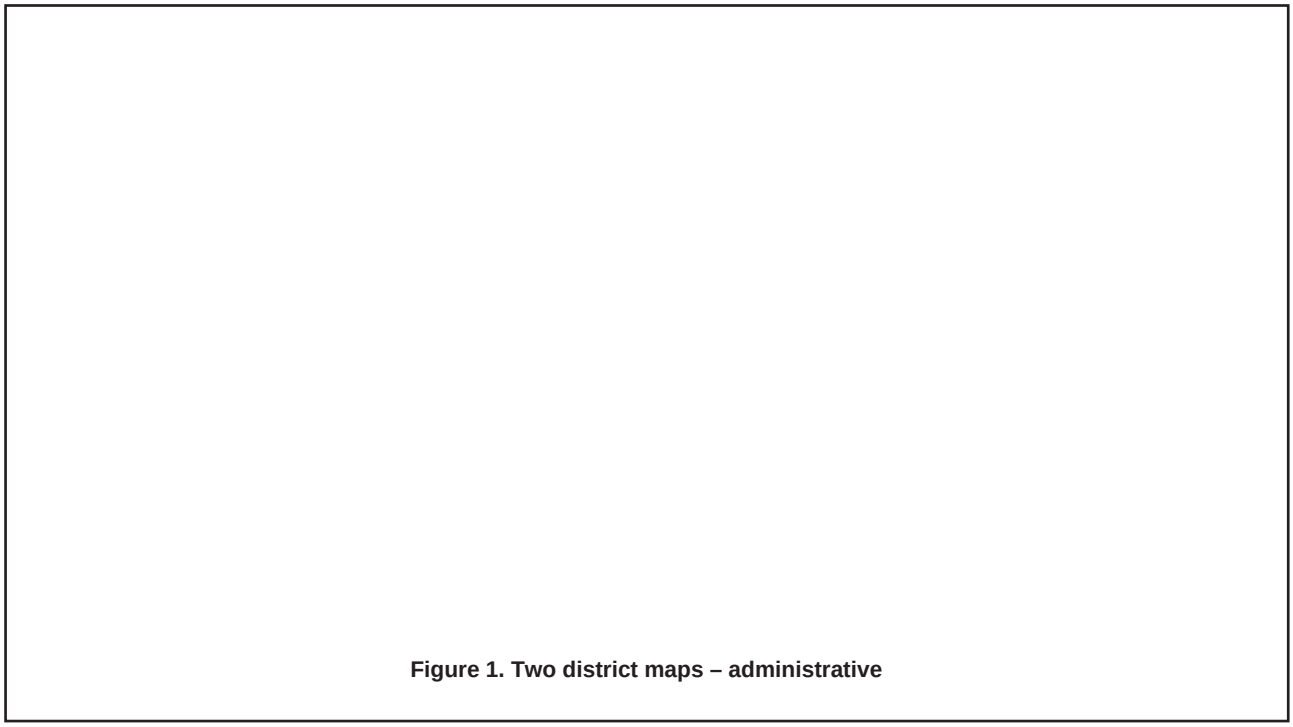

Figure 1. Two district maps – administrative

time, just after farming or harvesting for employment. This could be called as seasonal migration. During seasonal migration and during working in agricultural field away from their villages, they drink water from unsafe source and contract Guinea Worm infection and other water related diseases prevailing. Added to this problem of drought in 1985 through 1987 the period has witnessed sharp rise in number of thefts and violence in villages (4.2 / 1000 people). It is unusual for villagers to migrate in large numbers (over 90000) during farming season with their little belongings and live stock in search of water, food and fodder. This attracted the attention of district administration of Jhabua and Dhar. To address the situation, Government declared many alternative employment and supplied food and fodder wherever possible and transported water to the affected villages. Perhaps, it had limited effect to stop distress migration. Migration to other districts caused imbalance for food, employment and shelter, as a result petty theft of live stocks and other crimes increased. Out of three prominent tribal groups, the Bhil tribals are violent in nature. When their livelihood is threatened then they become more violent for their own existence. The migration was more acute in Jhabua than in Dhar.

Strategy to stop migration

The Government of India launched "Technology Mission on Drinking Water to villages and Related Water Management" to solve the drinking water problem in several districts in the country through scientific inputs for identifying the technological and management options available for developing water resources. Jhabua was identified as one of the districts under technology mission. Water conservation and augmentation of recharge through detention of water for longer times by stop and check

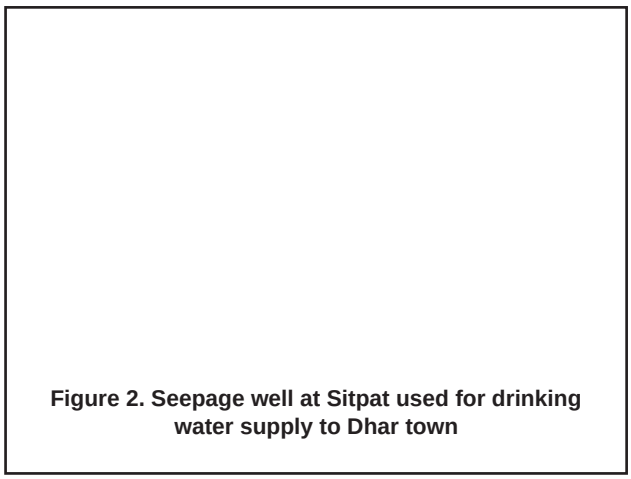

Figure 2. Seepage well at Sitpat used for drinking water supply to Dhar town

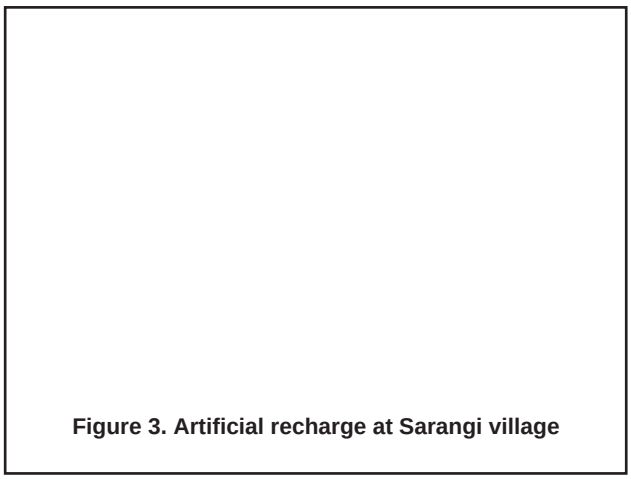

Figure 3. Artificial recharge at Sarangi village

Figure 4. Tubewell complex at Matalabpura area

dams were identified as the only options available for creating adequate water sources in these districts. These priority recharging activities were linked to the eradication of Guinea Worm to provide safe drinking water to the affected villages and hamlets. Under the aegis of Technology Mission, Public Health Engineering Dept, Govt. of M.P., the department responsible for providing safe drinking water, with the support from other agencies like Central Ground Water Board made a modest attempt for water conservation and artificial recharge to increase the spot sources.

The problem was attempted in two ways. The first include the tapping the seepage losses from minor irrigation tanks. In the second, water conservation and artificial recharge techniques were implemented at the sites selected on the basis of hydrogeologic favourability.

Artifical recharge activities

The difficult geographical terrain results in heavy run off and erodes the top soil. To meet the demand for drinking water and irrigation the only technical option is to conserve and collect rainwater. Various site specific schemes adopted may broadly be classified into:

- Collection of seepage from earthen dams of minor irrigation tanks
- Recharge through detention
- Collector wells

Collection of seepage

Dug wells located on the down stream of irrigation tanks could be used to collect the seepage losses through the dam for providing drinking water. In this technique, the dugwell is placed in the middle of the channel downstream of the dam and is packed with gravel and sand to increase the gradients and rapid filtering. The potential of this technique could be visualised since there are about 240 minor irrigation tanks and half a dozen major and medium tanks in Dhar, and 400 minor tanks and four medium tanks in Jhabua districts. This type of technique is adopted at Sitapat, near Dhar town to provide 50000 lpd for Dhar town water supply. Schematic diagram of the process is presented in Fig. 2. The approximate cost of the scheme in 1992 was US $3000. Similar type of the technique was adopted in village Tirla in Dhar and, villages Kalidevi, near Rama and Samalkheda, Talodi tanks in Jhabua. They cater to the population of 10000 and 5000 respectively.

Recharging through surface water impounding by check/stop dam

These site specific structures are constructed in the villages Sarangi Ummidpura, and Dhawrapada in Jhabua and Phoolgawdi and Amodiya in Dhar. In this technique, run-off is retained, by the construction of check dams and stop dams, to augment recharge into the low permeable vesicular / fractured basalt formations. Using low-cost technology, dykes are constructed with polyurethene lining with black cotton soil as core to prevent underground run off . This resulted in increasing the soil moisture of farm land and water could be used by lift irrigation method during summer months. A typical cross-section of the structure at Sarangi village in Jhabua is presented in Fig. 3. Similar type of structures were constructed at Ummidpura. This recharge increased the sustainability of the tubewells located in the upstream. of the dam from Dec / Jan to April / May. These tube wells are also being used for agricultural activities by lift irrigation.

Collector wells

These wells are basically large diameter dug wells are constructed to collect the runoff water. The walls of the wells are packed with gravel and sand and in some cases as in Kharudu Bari village run off is lead through a set of radial inlet pipes is packed with filter media. Similarly in some villages in Dhar a large dug well was constructed around a dried borewell complex of 16 tubewells at Matalabpura (Fig. 4). The casing was perforated and packed filter media around it. The run-off recharges the underground cavity through this collector well. This improved the yield of 16 tubewells considerbly, to provide drinking water to Dhar town having a population of 65,000, which stood for test during the drought year 1992-93.

Construction of stop dams and dykes in order to retain run-off as much as possible, resulted in improving the yeild of hand pumps and dry dug wells started recharging as soil moisture condition has improved. This encouraged government build more and more stop dams and dykes. At present 1200 stop dams and dykes have been constructed in both the districts to cater 1300 villages.

Water conservation activities were undertaken in 1986-87 to 1993-94 has lead to creation of 705 lift Irrigation schemes.

Return of migrants

Improvement in drinking water supply drastically brought down Guinea worm cases since 1987 in both these districts as well as in other endemic districts.

705 lift irrigation system irrigating more than 18,000 hectares has encouraged the villagers to return to their own villages and continued their farming and their agricultural produce increased from 0.336 MT/hectare to 0.719 MT/hectare as they are now able to take two crops in a year. The Government improved the forest cover through the participation of the people and shared the forest produce with them. This resulted in increased in production of agricultural produce, fodder for animals. This has considerably improved the socio-economic status of people in Jhabua and no more distress migration and also considerably reduced the seasonal migration. Now the district has a capcity to export its grains to other places. In summer months the District administration of Jhabua generates more than 50,000 persons per day labour intensive development programmes. Same is the case with Dhar.

The people who left their agriculture land returned as the situation is improving and they joined hands with the Government administration. They are activily participating in the afforestation activities also. This convinced the government, that to improve the vegetative cover in any hilly barren area like Machiliya Ghat, only could be achieved with the participation of beneficiaries in conjunction with water conservation activities which brought recognition to Jhabua. The barren areas converted into pasture land are being protected by beneficiaries from animal grazing and from other destruction. Now both thses districts are emerging as most successful districts in Madhya Pradesh.

Acknowledgement

The author acknowledges informations, data, suggestions provided by Mr.V.G.Dharmadhikari, Mr.K.P.Singh district collectors, Mr.Swagat Das, Mr.Anil Kumar Supd. of Police, Mr.K.C.Parval, Mr.G.S.Damor Ex. Engrs of districts Jhabua and Dhar respectively, also Dr. R.N. Yadava, Dr.M.V.R.L.Murthy and Mr.B.Tirupathi of RRL, and UNICEF colleagues of Bhopal. The author reflects only his views.