

Participatory Irrigation Management in Katepurna Irrigation Project : A Success Story¹

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1. Location

Eastern Maharashtra (Vidarbha) is one of the four political regions of the state of Maharashtra, in India. Three out of nine agroclimatic zones of the state are in Vidarbha region viz. assured rainfall zone, moderate to moderately high and high rainfall zone with 600-900 mm, 900-1250mm and 1250-1700 mm rainfall respectively. The climate of the region is subtropical, semiarid monotonous type by three distinct seasons. Summer with hot and dry weather (March-May), Monsoon-warm and rainy (June-October) and winter dry mild cold (Nov.-Feb.)

Irrigation projects, in Eastern Maharashtra State, under assured rainfall zone, Precious resource of water was not used efficiently for the benefit of the society. Among all these project Katepurna Irrigation Project was the worst affected The main dam of Katepurna is situated in Tapi basin, across the river Katepurna in between latitudes 20°-28'-30"N and longitudes 77°-9'E. The water let out in river and diverted in to canal from pick up weir (Khambora) which is 19 Km. away from the dam. The discharge carrying capacity of the canal is 7.78 cumec and length of canal system is around 108 Km. The canal is unlined and passes through deep black cotton soil and there fore critical and timely maintenance is necessary. The live storage of the dam is 86.35 Mm³ and 8325 ha. area is under command.

2. Background

Katepurna irrigation project was completed in 1975, having the storage of 86.35Mm³. The project has designed irrigation potential of 8325 ha. and drinking and industrial water supply to Akola city and surrounding villages. Katepurna project completed its 25 years service in 2000, but the project could not provide the irrigation benefit as it envisaged. In last 25 years project could provide irrigation hardly to 2027 ha. averagely. Due to less utilization of water for irrigation, non irrigation reservations have increased from 25.20 to 46.82 Mm³, it amounts 54 % of the live storage and therefore the water available for irrigation is reduced from 49.45 Mm³ to 27.83 Mm³ as a result irrigation potential reduced to 5967 ha.

As project comes under assured rainfall zone, the farmers were not much enthusiastic towards irrigation, Secondly, reluctance among farmers was also due to non-assurance of getting right amount of water at right time. There was heavy wastage of water, which led to problem of drainage and transportation of produce in command. There were outstanding dues on farmers as a result the majority of farmers were not using the water. The department could not maintain the canal throughout the length due to less utilization and shortage of funds. Under such circumstances, there was no co-ordination among beneficiaries and Project authorities. Everyone was blaming each other for under utilization of water.

The author took charge as Executive Engineer, Akola Irrigation Division, Akola in May 1998, resuming responsibility of management of irrigation project in Akola district. With the poor water utilization scenario, efforts were made to identify and analyze the worst affected situation. Accordingly the strategies have been finalized to solve the problems and to improve, water utilization scenario step by step. The strategies and efforts made in the command are described below. The author has also taken case study of Katepurna project for Ph.D. research.

1. ICID Watsave Young Professionals Award (201) winning paper 2001

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3. Strategies adopted for the system Improvement.

- **Engineering Measures**
- **Agronomic Measures**
- **Management Measures**
- **Public Awareness and Involvement**
- **Engineering Measures**

i) Repairs of canal system

Canal system repairs were carried out systematically according to priority, availability of funds and beneficiaries requirement. Foremost bottlenecks were removed, important canal structure such as siphon, heavy leaking structure repaired, selective canal lining was carried out for short length, service road repaired for better transportation.



Repairs of Canal in deep cutting portion

ii) Irrigation scheduling

Earlier, there was no control on irrigation rotation, farmers at head, used to take water as and when required and tail enders had to suffer. This practice led to improper distribution, waste of water and disharmony among farmers. Irrigation scheduling, prepared with tail enders to receive water first and head reach farmer at the end. The scheduling has been followed strictly. Scheduling was prepared by considering water requirement and soil type. This practice enabled farmers to have assured, adequate and timely supply of water. Earlier, beneficiaries were not taking water in night, leading to heavy wastage of water. Now night irrigation is made compulsory and practiced strictly, due to which greater quantity of water is saved.

iii) Volumetric measurement of water

Earlier, water rates were charged on area basis, thus there was no tendency as well as no incentive on farmers side to use water efficiently. Now the flow measuring devices are installed at the head of canal for measurement of the canal discharge. The supply of water to water user association is being made on volumetric basis, with subsidised water rate structure, which resulted in efficient, effective and economic use of water. A two days training program



Training organized for measurement of water

organized during on 28th-29th January 2000 for irrigation officers and irrigators on flow measurement with the help of Water and Land Management Institute, Aurangabad.

iv) Improved surface irrigation methods

Considerable wastage of water occurs due to wild flooding and other uncontrolled surface methods. The on-farm irrigation efficiency could be as low as 40 to 50%. In such cases use of proper irrigation layouts is essential. The farmers are trained and encouraged by demonstrating the efficiency of such border, furrow, basin etc. layout to farmers by conducting on farm training. As a result now farmers in command are adopting improved surface irrigation methods properly and effectively.

v) Computerization

Computer laboratory established in division as well as sub-division office with 5 computers. In first stage, computerization of basic record, water account settlement invoicing etc. was undertaken to enable better system management. A software IMIS (Irrigation Management and Information System) developed by Akola irrigation division for complete processing of data from water demand, application to billing of water charges, for efficient and timely irrigation management.



Computerized Lab in Division Office

- **Agronomic Measures**

Integrated approach of irrigation and agricultural department at field and administrative level is adopted which helped in water saving.

i) Applying water at critical growth stages of crops.

With the support of agricultural department farmers were educated in the application of right amount of water at right time which has reduced the number of rotations and ultimately minimized over application of irrigation water which is further found useful to maintain the proper drainage of the land under command.

ii) Crop diversification

Katepurna command constitutes around 39% of cotton crop but farmers were reluctant to practice irrigation for cotton. With integrated efforts of Agricultural University, Agriculture and Irrigation department promoted farmers to take pre monsoon cotton. It has given 1.5 to 2 times higher yield than traditional cotton growing and now there is trend set for pre monsoon cotton growing among farmers. The demonstration and guidance is delivered to farmers through NGO and departmental meeting which resulted for better response for pre monsoon cotton. The area sown under pre monsoon cotton during 1998-99 was 352 ha. and during 1999-2000,2000-2001 was 474 ha. and 413 ha. respectively.

iii) Soil testing laboratory

The Akola irrigation division has a soil testing laboratory subdivision. The author has developed and modified laboratory working and obtained ISO-9002 certification for quality system. It was first and unique attempt in the state.

The laboratory provided soil-testing facility for farmers to know soil properties so as to plan the cropping system and water management practices scientifically.

- **Management Measures**

i) Promotion of Participatory Irrigation management (PIM) by formulating Water User's Association (WUA)

Maharashtra State has age-old traditions of operation and maintenance of irrigation system by farmers themselves. Phad system in North Maharashtra and Ex. Malgajari system in Eastern Maharashtra are still in vogue in some parts. It has been accepted all over the world that farmers manage and operate irrigation system, regulate and distribute water more efficiently among users.

Katepurna Project's beneficiaries were motivated, trained and convinced the importance of water user's associations. The special privileges given to form water user association, proper environment was created and it resulted in formation of water user's association covering 87 % of the command area. Table 1 shows progress of formation of water user association in the command of Katepurna project. The day is not far away when the complete command of project will be handed over to WUA.

Table 1. Formation of water users association (wua) in command area of katepurna project Revised ICA-5967 ha.

Sr. No.	Year	Formed WUA	WUA registered under co-op. Act	WUA actual working out of registered	Total area covered under WUA I.C.A. in ha.	No. of beneficiaries
1	Up to 1997	4	3	1	1192	758
2	1998	2	-	-	655	442
3	1999	4	3	-	1399	987
4	2000	7	4	4	1931	1261
5	Total up to date	17	10	5	5177	3448

The table shows that there is 87% of command area brought under water user association, with 68% of beneficiaries.

ii) Improved management and operation of irrigation systems.

Better and reliable, irrigation management and operation practice followed, considering limitations of the system, farmers' requirement and efficient use of water. Field level, minor & distributory level and project level co-ordination between project authorities and farmers strived to enable improved management. Project level co-ordination committee formed with representatives from WUA to plan, co-ordinate and monitor irrigation program. Beneficiaries were involved in decision making and real management of project.

iii) Involvement of Women in Irrigation

For sustainable agriculture, involvement of women farmer is essential. Various studies indicated that for promoting water savings on the farm, women involvement is must. Two days on farm women's training program. 3rd -4th January 2001 has been conducted on water application techniques, management of water distribution system, Water user's associations formulation and functioning etc. Women farmer has shown enthusiasm to hold the responsibility of the WUA.

iii) Training/Capacity building

Capacity building of project personnel as well as farmer is imperative for better co-ordination, implementation, operation and management of irrigation systems. Adequate training and motivation imparted to irrigation personnel and farmers representative with the help of Water and Land Management Institute, Aurangabad as well as Sinchan Sahyog, Akola. Incentives were given to Irrigation officers as well as to WUA's for their better contribution. On-farm training were conducted for both farmers and project personnel. Field Visit were organized to share experiences of successful WUA.

• Public Awareness and Involvement

Awareness regarding the need for water conservation/ saving should be promoted involving all stakeholders including community group, political leader and farmers, mass education through media, posters, Video tapes, public debater, T.V., Radio, New papers is found to be effective in motivating people to reduce water wastages.

An attempt has been made by conducting/performing following programs.

i) Awareness campaign

Formation of water user association and need of the efficient water utilization was propagated through newspaper, radio, exhibitions, pamphlets, posters to encourage farmers to participate in irrigation management Slogans on participatory irrigation management and efficient use of water were written out compound wall, canal structure, offices and public places, so as to promote collective action



Mobile Van equipped with audio/ video facility



Slogans to promote awareness about efficient use of water written on compound wall

ii) Katepurna Silver Jubilee function

A novel function was organized by beneficiaries of Katepurna project, on eve of silver jubilee of the project. The beneficiaries felicitated the project-affected people for their sacrifice, Engineers for their contributions. The project beneficiaries also felicitated the government, for giving the project, which had changed their lives, Indebtness ceremony on eve of Katepurna Silver Jubilee function was organized by beneficiaries to show sense of gratitude and attachment towards the project. It was unique gathering of society, government and media..Hon. Chief Minister of Maharashtra State chaired the function and congratulated for organizing a novel function. The Chief Minister also called for organizing such program at other project site to honour contribution of project in national development and to reiterate

sense of part of the project. This function was appreciated from all corners of state. The author has played key role in conceiving and arranging the novel function.

iii) Establishment of Non-government Organization “Sinchan Sahyog” to promote efficient use of water

‘Sinchan Sahyog’ is a non-Government organization established at Akola to promote efficient use of water. Sinchan Sahyog is established with inspiration and guidance from Dr. Madhavrao Chitale, Ex Secretary General, ICID. The author has taken lead in establishment of Sinchan sahyog, at Akola. The author shouldering responsibility of secretary of Sinchan Sahyog, Akola. Sinchan Sahyog working committee having representatives from agriculture, irrigation engineer, agricultural industrialist, seeds experts, economist, socialist, member of legislative assembly, media personnel and farmers. Broad objectives of the organization are to promote strategies of the efficient and effective use of available water resources, to undertake training program, to encourage people participation in irrigation management. The Akola center has contributed in educating training and providing solutions to farmers. Sinchan Sahyog has taken active participation in promoting farmers to form WUA and to adopt improved irrigation practices. Sinchan Sahyog, Akola had taken a drive in water literacy by organizing small workshop for farmers by demonstrating educating water measurement and water accounting.

To propagate Sinchan Sahyog mission on large scale, Sinchan Sahyog, Akola, a web site is hosted www.sinchansahyog.org .

iv) Cultural group

To motivate irrigators, cultural group formed from department staff members and cultural program (songs, drama etc.) arranged at village level.

v) Youth awareness

A four-day workshop was held under National social service program in command area to educate students towards water literacy, canal operation and maintenance, irrigation

Management etc. The awareness among youngsters could lead to better future in water saving.

vi) Maharashtra Irrigation Conference 2001

A two day state level conference was organized at Akola during 20th to 21st January 2001, with theme ‘Irrigation in 2000’. The conference was devoted to irrigation management, development in farming system, water literacy and women participation. The conference attended by Hon. Ministers, Vice Chancellor’s of Agriculture University, Secretaries, Policy makers, Scientist, Irrigation engineers, Agricultural officer and farmers. The attendance for conference was overwhelming with around 500 participants.

The message of water conservation was wide spread in region after conclusion of conference. It was for the first time such a large gathering was organized in region on issues of water conservation. The author has taken pains to organize the conference in vital capacity of organizing secretary.

vii) Website

To provide timely information on irrigation management and general awareness about water status, policy, act, everything about WUA, to receive water demand, seasonal irrigation message the web site www.irrigationaid.org hosted. It was for the first time in state to start such practice.

viii) Katepurna Tourism center

Katepurna tourism project started at project site to provide tourist facility as well as to increase awareness in people about irrigation practices, its management and need of saving of water.

ix) Audio Cassette/C.D.

Title as “Way to prosperity” the audiocassette comprising of song on efficient use of water, crop diversification, participatory irrigation management released on professional level. The song were written and sung by staff members themselves. The cassette has been proved very effective in propagating message among farmers, as it is prepared in local language and traditions. The cassette is conceived and accomplished by author.

x) Film on Success story of Katepurna

A film was made on “Success Story of Katepurna Irrigation Project”, highlighting participation of beneficiaries in irrigation management could lead to miracle. The film was conceived by the author. The film was displayed during village level meeting as well as through cable network and state television network.(The C.D. of film is enclosed h/w)This film proved to be very useful in convincing the beneficiaries of other project to form WUA to save water and earn more .

4. Summery

With persistent effort mentioned above, for participatory irrigation management during the year 1998-99 to 2000-2001, average irrigation in the command of Katepurna project raised from 2027 ha., to 3646 ha. with, yearly water saving of around 7.71 Mm³.(refer Table No.1) There is a record irrigation of 5909 ha with almost complete utilization of reservoir water. For the first time in history of Katepurna project, the project achieved irrigation equal to its present potential with 86 % live storage. The benefits were extended from 2000 to 3970 number of beneficiaries There is good yield of cotton and wheat in command to the tune of 1.2 billion rupees during 2000-2001.

Katepurna experiment was also tried, in other projects within Akola district under author jurisdiction. There are 25 projects having present potential of 21,530 ha., with live water storage of 199.25Mm³. The formation of 38 water user associations are under progress covering 9203ha., area (43 % of total command area). The actual irrigation increase from 6626 ha., to 12229 ha., with water saving of around 15.50 Mm³.

The water saving observed through efficient use of water in irrigation projects under author jurisdiction has been quantified to possible extent. But there is also possibility of larger amount of water saving by community due to water saving awareness program.

At present the movement of participation of beneficiaries in irrigation management is in full swing. In next year, it is expected to bring at least 60% command area under water user association management. The transfer of management to beneficiaries will result in to sustainable, efficient and economic water use. The Akola experiment could prove as a milestone in individual as well as collective effort in water saving.

Kharip	:	Monsoon season
Rabi	:	winter season
Hot weather	:	summer season

Table 2. Year wise irrigation and water used in Katepurna Project

Sr. No	Year	Season wise irrigation in ha.				Season wise water used for irrigation in Mm ³				Non irrigation water use Mm ³	Max. storage in project Mm ³	Water balance of the end of year, Mm ³
		Kharip	Rabi	Hot-weather	Total	Kharip	Rabi	Hot-weather	Total			
1	2	3				4				5	6	7
1	75-76	2	1485	2	1489	0	9	1	10	0.46	86.35	49.96
2	76-77	111	1745	267	2123	2.25	13.95	8.01	24.21	2.62	86.35	56.81
3	77-78	9	1213	289	1511	0.50	9.70	7.17	17.37	10.06	86.35	58.76
4	78-79	5	656	93	754	0.30	5.25	2.79	8.34	12.04	86.35	35.09
5	79-80	0	532	10	542	0	4.26	0.03	4.29	12.57	86.35	68.86
6	80-81	0	1209	9	1218	0	9.67	0.03	9.70	12.46	86.35	63.09
7	81-82	0	1624	40	1664	0	15.99	0.17	16.16	12.32	86.35	16.08
8	82-83	13	1677	347	2037	1.19	15.09	22.28	38.56	12.54	86.35	14.77
9	83-.84	0	954	387	1341	0	13.65	27.07	40.72	12.73	86.35	29.40
10	84-85	0	0	0	0	0	0	0	0	13.77	19.11	5.4
11	85-86	79	1515	355	2317	1-90	21-55	7.02	30.47	18.49	81.25	0.79
12	86-87	372	2936	1126	4434	4.76	38.05	25.03	67.84	15.97	79.50	13.22
13	87-88	175	3706	108	3989	5.00	30.00	1.00	36.00	21.06	62.34	11.94
14	88-89	0	1530	1313	2843	0	24.10	18.16	42.26	18.55	86.35	41.35
15	89-90	0	1150	764	1914	0	28.59	14.90	43.49	17.34	86.35	2.94
16	90-91	0	737	853	1765	0	11.43	17.99	29.42	15.19	86.35	14.5
17	91-92	2000	433	126	2559	10.77	1.39	4.00	16.16	19.55	41.50	16.05
18	92-93	0	999	1074	2073	0	22.08	22.41	44.49	15.19	86.35	6.27
19	93-94	0	1419	700	2119	0	20.66	20.85	41.51	14.35	78.78	28.88
20	94-95	0	2511	791	3302	0	30.27	14.54	44.81	15.71	86.35	17.22
21	95-96	70	1791	130	1991	0.50	12.71	2.47	15.68	17.51	34.34	1.09
22	96-97	0	1739	830	2569	0	14.83	16.50	31.33	16.68	84.89	22.99
23	97-98	142	1295	630	2067	0.47	9.18	13.05	22.70	18.56	59.27	22.63
24	98-99	0	1454	882	2336	0	10.17	21.53	31.70	21.93	81.99	43.90
25	99-00	0	2098	595	2693	0	13.83	12.83	26.66	20.26	86.35	31.75
26	2000-01	1501	4081	327	5909	5.75	23.44	5.77	34.96	24.00	74.26	2.15

Table No 2 shows improvement in the irrigated area, water use and average water saving achieved during the year 1998-2000.

	Average Irrigation	Average Duty
Scenario during 1976-1997	2027 ha.	75.20 ha./Mm ³
Scenario during 1998-2000	3646 ha.	117.20 ha./Mm ³
Net increase in average Irrigation .	3646-2027	= 1619 ha.
a) Water requirement with previous duty.	1619/75.20	= 21.53 Mm ³
b) Water requirement with improved duty.	1619/117.20	= 13.82 Mm ³
c) Yearly average saving of water (a-b)	21.53-13.82	= 7.71 Mm ³