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"A Economic Study of Katepurna Project In Akola District "

Submitted By

Prof. D. R. Khirade
Department of Economics
Ghulam Nabi Azad Arts, Commerce & Science
College Barshitakli, Dist. Akola

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Chapter 1

Introduction

There are innumerable references and studies in India and abroad to show that irrigation a necessary and sufficient condition, improves the yields to two or three times over the dry farming, in judicious combination with other inputs; irrigation assures water, certainty of outcome, reduces the instability of outcome, reduces the instability of yields, shift in crop pattern from coarse grains to commercial crops, multiple cropping, increases the effective area under cultivation, whereby the regional disparities in development could be removed lessened.Thus agriculture development, coupled with assured water would go a long way to open new vistas of development in rural areas. Though agriculture is a component of complex, multifaceted and multi dimensional rural development, its importance and or role is most prominent, needs no gain saying. This study aims at studying the role of Katepurna project, its overall impact and effect of improving irrigation in Akola district.

Aggregate rainfall in the Maharashtra State is 1200 m.m., After 7th Five Year Plan, 26 lakh hectare land brought under irrigation sector in the State. In the Vidarbha region of the state there are 11 districts and 116 talukas. The geographical area of Vidarbha is 97200 hectare i.e 31.65 % of the entire state.there are 14 big, 53 medium and 641 small size projects. 997000 hectare irrigation capacity has been created from these projects till 2nd June, 2002.

The then Madhya Pradesh Government in the year 1955, Constructed a dam 45 km Southward from Akola near Dhotarkhed which provided irrigation facilities to 50,000 hectare land. In Its survey Government estimated the cost of 180 Crore and recognized it in 1956. After

the survey Government finalize the place of dam on Katepurnariver at Mahan Village (Bashitaklitaluka) 33 km from Akola Taluka.

The Project was completed in 1974-75 and irrigation capacity of irrigating 8325 hectare land was generated. While sanctioning the project the irrigating capacity was of irrigating 10490 hectare.The decrease was mainly due to Government reservation of 25.20 for industrial, urban and rural water supply.

The length of dam situated on KatepurnaRiver inTapi valley is 2000 metre and Height 39.50 metre. The catchments area is 514.11 sq.k.m.. Dam consists of doors of 12 metre into 5.20 metre size. The six villages were affected due to construction of the said dam, namely Satli, Kothli, Jambhrun, Varkhed, Wagha(Buz.) Wagha (Khu.) .Unnei weir is constructed near Khambora village 16 k.m. downward from Katepurna project. The main canal of the project also passes through Unnei weir.

Katepurnariver is originated from southern kotha village (Washim District). According to reliable sources 75 % available water reservoir is created 68.97 m3 and after/post Manson 86.35 m3 is including created for generating 16.99 m^3. Akola urban 21.20 m3 and Akola rural 0.79 m3i.e total 21.99 m3 has excluded from main 8325 hectare irrigation for public use from the Katepurna Project.

After completion of the project, the water was reserved for industrial, rural as well as urban areas in Akola and Murtizapur. This resulted in reservation of water up to 45.65 m^3 which lead to re-establish irrigation capacity to 5964 hectare.

Chapter 2

Available Water Resources and Irrigation

In Maharashtra state agriculture provides employment for 75% of the total population and it contributes 46.4% to the state income (Economic Survey, 1980, Bureau of Economics & Statistics, Govt. of Maharashtra, Bombay). Maharashtra state has got only 33 lakhs hectare of the net area cultivated under irrigation as against the country's 17% the main / major source of irrigation being canal (40%). The state has been afood deficit state, with frequent, recurrent and chronic famine districts.One such district is Akola where the local resource is the rivers like Katepurna ,WanPurna , Man, Nirguna etc.

The geographical area of Akola district encompasses 5.417 Lac hectares .Out of the total land 4.99 Lac hectares (91.50%) land is cultivable. Ultimately 1.61 (32.45%) Lac hectares land can be facilitated with irrigation in Akola. By the end of June 2010, all irrigation projects have created irrigation facility of 66.792 (13.46%) hectares. 1.930 Lac hectares area of the district fall under the saline belt. In the district there are 347 villages under the saline belt area.The work of 4 medium and 13 small projects are underway in the district. After completion of these projects, it is assumed that the 1, 03,915 hectares land will be facilitated with irrigation facility.

Completed Projects in Akola District (2011-2012)

Following table illustrates the irrigation facility created after the completion of the projects.

Akola District: Completed Irrigation Projects and Irrigation Capability

Sr.no	Project	Number	Irrigation capability (hectares)
01	Big Projects: Katepurna and Wan	02	22,790
02	Medium Projects: Morna,Nirguna,Mas,Man,Utawali	06	21,824
03	Small Projects: State Level	16	8,838
04	Small Projects: Local Level	204	13,340
	Total	228	66,792

In the above table the number of small, medium and big irrigation projects in Akola district and their capability to irrigate is studied. As mentioned in the table, there are 228 projects of irrigation. Out of those projects, two are big, six are of medium size and sixteen State-level and two hundred four local level small projects are there in the Akola district. The capability of irrigation in the district extends to 66,792 hectares. Out of which the capability of irrigation of big projects is 22,790 hectares, the capability of irrigation of Medium projects is 21,824 hectares and the capability of Small State Level is 8,838 and Local Level project is13, 340 hectares respectively.

Created Irrigation Capacity (harvest-wise 2011-12)

There are total thirty five: one big, three medium and thirty one small-size irrigation projects come under Akola Irrigation Department. By the end of June 2010 the irrigation capacity of the said projects was 30,351 hectares. The harvest-wise status of the irrigation is as follows:

Akola District: Irrigation Capacity Created under Irrigation Department (By the end of June2010)

Sr.No	Harvest-time	Irrigation capacity (hectares)
01	Kharip	7,184 (23.67)
02	Rabbi	11,941 (39.34)
03	Summer	940 (3.10)
04	Both Kharip and Rabbi	9,650 (31.79)
05	Throughout Year	636 (2.10)
	Total	**30,351 (100%)**

Reference: 2011-12 note of Akola Irrigation Dept., Akola.

(figures in the bracket indicate percentage)

In the above table the harvest-wise condition of the crop has been analysed. The table shows that by the end of the June 2010, the capacity for irrigation of Kharip crops was 7, 184 hectares (23.67%), for the Rabbi crops it was11, 941 hectares (39.34%), for the crops taken in during summer it was 940 hectares (3.10%), while for the crops taken during both seasons i.e. Kharip and Rabbi it was 9,650 hectares (31.79%) and the same capacity for the crops taken throughout the year it was 636 hectares (2.10%).

It is clear that from the available quantity of the water for irrigation, the percentage of utilization is more (39.34%) during the season of Rabbi, while it is utilized in less quantity (2.10%) for the crops taken throughout the year.

The taluka-wise study of irrigation facility reveal that there are two big irrigation projects in the Akola district. These projects are chiefly in the Telhara and Barshitaklitaluka respectively. As per the medium size projects are concerned, they are three in number , one in Murtizapurtaluka while remaining two are located in Paturtaluka. The survey of irrigation projects reveals that there are 16 small projects of State level in the different talukas in the district. The three small projects in Akola taluka, one in Murtizapurtaluka, three in Akot ,three

small projects in Patur and there are eight small projects in Barshitaklitaluka. The survey of Local-level small irrigation projects reveals that there are 16 small projects. Taluka-wise number of small local-level projects: Akottaluka -01, Murtizapur taluka-01, Patur taluka-06, and Barshitaklitaluka 08.

The number of seepage lakes in the district is 32. These dams are located in all talukas of the district. In Telharataluka- 03 , Akot taluka-07, Balapurtaluka -03, Akola taluka - 11 and remaining 03 seepage lakes are in the Barshitaklitaluka.

There are 39 Kolhapuri dams in the District. Taluka wise study of the Kolhapuri dams shows the following status:

In Akottaluka- 03, Balapurtaluka -08, Akola taluka – 04, Patur taluka-14 and remaining 14 Kolhapuri dams are in the Barshitaklitaluka.

The facility of lift-irrigation is not available in the District. The tunnel- storage dams in the District are 11 in number. In the Akottaluka there are 02 tunnel-storage dams, in Akola taluka 04, in Murtizapurtaluka 02 and remaining 03 dams are there in the Barshitaklitaluka.

The number of wells for irrigation is 13,106 in the District. The taluka-wise status of the wells is as follows:

Telhara taluka-1752, Akot taluka-3959, Balapurtaluka -735, Akola taluka – 879, Murtizapur taluka-1631, Patur taluka-2600 and remaining 1550 wells are in the Barshitaklitaluka.

The study of information of pumps in the Akola district shows that in the district, diesel pumps and the electric pumps are being used in agriculture sector. The total number of diesel pumps in the district is 384. Their taluka-wise number is as follows:

Telhara taluka-29, Balapurtaluka -52, Akola taluka – 88, Murtizapur taluka-42, Patur taluka-74 and remaining 49 diesel pumps are being used in the Barshitaklitaluka.

The study of use of pumps running on electricity in the Akola district shows that 36,092 electric pumps are being used. Their taluka-wise number is as follows:

Telhara taluka-7,378, Akottaluka- 6,884, Balapurtaluka -3390, Akola taluka – 3,489, Murtizapur taluka-3,995, Patur taluka-5,190 and remaining 5,799 electric pumps are being used in the Barshitaklitaluka.

It is surmised from the above information that the irrigation facility is sufficiently available in the district, still in the taluka-wise use differs. Water irrigation is mostly used where the natural resource i.e. water is available in sufficient quantity. This becomes the reason why there is taluka-wise difference in irrigation. The prominent difference is as follows:

- There are two big projects of irrigation in the Akola district.
- The number of medium-size projects is 03.
- The number of small Local and State- level projects is 16.
- Maximum numbers of seepage lakes found in Paturtaluka, while the minimum seepage lakes are found in Akola taluka.
- Maximum number of Kolhapuri dams is found in Paturtaluka, while the minimum Kolhapuri dams are found in Akottaluka. Also, in Telhara and Murtizapurtaluka no Kolhapuri dam is found.
- Maximum tunnel-storage dams in the District are in Akola taluka , whereas minimum number of tunnel-storage dams are in the Akot and Murtizapurtaluka. In Telhara and Balapurtaluka there is not a single tunnel-storage dam.

- Maximum irrigation wells in the District are in Akottaluka , whereas minimum of such wells are in the Balapurtaluka.
- Maximum use of diesel pumps for irrigation is in the Akola taluka and its minimum use is found in Akottaluka.
- Maximum use of electric pumps for irrigation is in the Telharataluka and its minimum use is found in Balpurtaluka.

In the Telharetaluka of Akola district there are 03 small dams and the beneficiary area of those dams is 117 hectares, while the ultimate beneficiary area is 110 hectares at District council level. There are 13 small dams in Akottaluka and the beneficiary area of those dams is 682 hectares, while the ultimate beneficiary area is 255 hectares. There are 11 small dams in the Balapurtaluka and the beneficiary area of those dams is 682 hectares, while the ultimate beneficiary area is 100 hectares. In the Akola taluka there are 09 small dams and the beneficiary area of those dams is 307 hectares, while the ultimate beneficiary area is 50 hectares. There are 13 small projects of irrigation in the Murtizapurtaluka and the beneficiary area of those projects is 907 hectares, while the ultimate beneficiary area is 155 hectares. In the Barshitaklitaluka there are 47 small dams and the beneficiary area of those dams is 2030 hectares, while the ultimate beneficiary area is found 900 hectares. In Akola district there are total 141 small dams and the beneficiary area of irrigation by those dams is 5857 hectaress, while the ultimate beneficiary area is 1970 hectares.

The number of small dams at local-level is 17. There are 06 such dams in Patur and Barshitaklitaluka, while 03 in Akola and 02 small dams are found in Akottaluka. Taking into

consideration, the total beneficiary area of irrigation i.e. 3041 hectares; reveals that the beneficiary area in Akottaluka is 299 hectares, in Akola it is 447 hectares, in Paturtaluka it is 983 hectares and in Barshitakalitaluka the area of irrigation is 1312 hectares. The ultimate beneficiary area in the District is 1001 hectares. Ultimate beneficiary area in the Akottaluka is 101 hectares, in Akola it is 200 hectares, in Paturtakuka it is 300 hectare and in Barshitakalitaluka ultimate beneficiary area is found 400 hectares.

Chapter 3

Co-operative - Water users Institutes

Effective water management is the need of the day as has been pointed earlier supplying only the required quantity of water to crop means the water management. In other words awareness about the required quantity of water to a particular crop, the scientific method etc. involves the effective water management.

While studying the irrigation and its management on KatepurnaProject, the water operating institutes in the Akola district are also have been studied. Out of total 98 institutes operating in the district 96 institutes fall in the category of canal-irrigation while the remaining 02 come under the water lift- irrigation. Out of these institutes 39 institutes come under the project of Maharashtra Irrigation Development while the 39 institutes have been established under the law of co-operative institutes. Project-wise 10 water-operating institutes were selected as a sample for the study. The following things have come to fore after the analysis about the states of the institutions and water management by the list prepared on the basis of interviews of authorities:

- 80% officials agreed to the significance of the water-operating institutes in the growth of irrigation.
- 90% officials agreed that through water-operating bodies the district has found the way to economical progress. The mathematical value of X^2 test is more than the tabular /tabulation value. It means the analysis of opinions officials of surveyed water institutes is statistically

important. Therefore the zero- concept must be rejected. In other words, due to the irrigation projects the economical progress of Akola district has been enhanced. The irrigation projects have aided in the overall yield and consequently in the economic progress of the farmers. Hence the hypothesis that "**Irrigation projects helped to improve the economic progress of the Akola district**" should be accepted.

- 80% officials of the water-operating institutes opine that the taxes for water are not recovered.
- Out of the total surveyed officers, maximum i.e. three (40%) officers held the inconstancy in water supply as the reason why the tax is not recovered. While the minimum of them i.e. one (10%) officer held that the other reasons like addiction, degraded economic condition etc why the tax is not recovered.
- While Out of the total surveyed officials , percentage of those who opined that the class C is subject to audit is maximum i.e. 50%; whereas 20% officials are of the opinion that class B officials are subject to the audit.
- The percentage of officials who held that water-operating institutes have been given the training of water-supply amounts maximum i.e.70%.
- The percentage of officials who held that water-operating institutes do not run the taxes recovered is 80%.
- 60% officials held that water-operating institutes are not competent enough to provide water from tail to head.
- 70% officials registered their opinion that the water-operating institutes measure the amount of supplied water.
- The percentage of officials who gave negative response to the exploitation of micro methods of water-supply, amounts maximum i.e.80%.

- The percentage of officials who gave positive response to statement that most of the water-operating institutes are in debt, amounts maximum i.e.70%.
- The percentage of officials who held that due to water-operating institutes the changes occurred in the structures of crops, is maximum i.e. 90%. The mathematical value of X^2 test is more than the tabular /tabulation value. It means the analysis of opinions of officials of surveyed water institutes is statistically important. Therefore the zero- concept must be rejected. In other words, due to the irrigation projects the traditional structure/ set up of the crops has been changed. Hence the hypothesis that "**Irrigation projects caused the change in traditional structure of the crops in Akola district**" has to be accepted.
- 70% of the officials held the opinion that the wastage of water is greatly avoided owing to the water-operating institutes. Here the mathematical value of X^2 test is less than the tabular /tabulation value. It means the analysis of opinions of officials of surveyed water institutes is statistically important. Therefore the zero- concept must have to be accepted. It means wastage of water has beendecreased owing to the water-operating institutes. Hence the hypothesis that "**Due to co-operative water- operating institutes the wastage of water has been decreased**" has to be rejected.
- The percentage of officials who gave positive response that those water-operating institutes brought awareness about the use of water among the people; amounts maximum i.e.80%. Here the mathematical value of X^2 test is less than the tabular /tabulation value. It means the analysis of opinions of officials of surveyed water institutes is statistically important. Therefore the zero-concept must have to be accepted. It means the water-operating institutes did not bring awareness about the use of water among the people. Hence the hypothesis that **"Due to co-**

operative water-operating institutes the awareness about the proper utilization of water has been generated among the people" has to be accepted.

- 90% of the total officials registered their opinion that owing the water-operating institutes the economic income of the farmers has been increased. Here the mathematical value of X^2 test is less than the tabular /tabulation value. It means the analysis of the opinions of officials of surveyed water operating institutes is statistically important. Therefore the zero- concept must have to be rejected. It means the water-operating institutes did not bring awareness about the use of water among the people. Hence the hypothesis that **"Due to irrigation projects the income of farmers has been increased"** has to be accepted.
- The percentage of officials who held due to water-operating institutes the facility of irrigation is completely exploited, amounts maximum i.e.70%.
- While out of the total surveyed officials, percentage of those who opined that irrigation facility is not fully utilized, is 30%; whereas the least number of officials i.e.10% officials were of the opinion that the irrigation facility is not completely exploited due to traditional methods of farming and insufficient knowledge.

The actual participation of people is essential in proper utilization of water along with its management. The examples of participation or co-operation of people in the process are very rare in our history. It is only during modern times we find deliberate attempts of people in water management owing to the awareness about the need and benefits of it. The definite steps are being taken in this regard only after 1990. The water management is handed over to the institutions of people who actually participate instead of established public-cooperative committee. In 1992 the directive principles are published in this regard. As per Maharashtra Irrigation Act 1976 (Section 60), Co-operative water users' society is formed for projects on

dams in the state. The responsibility of water irrigation has been handed over to co-operative water user society. Therefore in the utilization of water irrigation, co-operative water usersinstitutions held very important role. These societies have performed very major role performing an ideal and democratic need of an institution for irrigation management through public-participation

There are various benefits of establishing co-operative water users' institutions. Firstly the institution can get water supply from irrigation department through cubic method. Secondly, a kind of ownership of water can be obtained. Thirdly, there can be definite and sufficient water supply as well as utilization of canal and well water. Fourthly, there can be freedom of selecting the structure of crop. Fifthly the dispute over the water supply can be solved through the institutions.In general water users' institution can be exploited as effective platform for agricultural development.

The researcher has studied project-wise and taluka / tahsil wise water users' institution as well as the number of the members and analyzed the information gathered from the officials of the institutions.

There are 98 water users' institutions (as per 2011-2012) in Akola district- Their project-wise study is as follows.

Project wise study of water user Institution in Akola District

Sr. No	Project	The no. of Water User institutes	Members
01	Big Project (Katepurna& Wan)	32 (32.65)	7104 (44.74%)
02	Medium-Project (Morna,Nirguna,UmaMas,Man,Utiawali)	40 (40.82 %)	5044 (32.65%)
03	Small Project (state-level)	26 (26.53%)	3729 (22.61 %)
	Total	**98 (100%)**	**1587 (100%)**

. The above table indicates that there are 32 institutes in operation on big projects and their average is 32.65% in total number of institutions where as the water user institutions operating on medium size projects are 40 which in an average is 40.82%. The average of water user institutions operating on small size projects is 26.53%.. The number of members on big-size project is 7014 (44.74%).

As the researcher confines his study on Katepurna project only which falls under the category of big-size projects the study intended the water user Institutes operating on the said project.

The project is in operation in Akola district and its area of operation spread in two tahsils (talukas) Akola and Murtizapur respectively. The following table demonstrate the water user bodies and the number of beneficiaries in the Akola and Murtizapurtahsils.

Tahsil-wise water user institutes and beneficiaries

Sr.No.	Taluka	Water User Institute	Beneficieries
01	Akola	27 (84.36 %)	5043(70.99 %)
02	Murtizapur	05 (15.64 %)	2061 (29.01 %)
	Total	32 (100%)	7104 (100%)

This project is divided between two tahsils (talukas). There are 27 (84.36%) water user bodies in Akola tahsil and 05 (15.64%) Water user institutes in Murtizapurtahsil. The figure shown in the above table indicate that there are 84.36% water user bodies while the less number of (15.34) bodies are in operation in Murtizapurtahsil

While studyding the condition of water user bodies in Akola District we come to know that out of 98 bodies, 96 falls in the category of canal and remaining 02 are lift-irrigation.Owing to the big small and medium projects in the district the irrigation sector has been developed. Due to the institutes farmers got the facility of irrigation and got an opportunity of their economic progress. They can yield more than one crop and have change in the pattern of the crops.

As the water user bodies bear the responsibility to have planned use, much of the wastage of water can be avoided. The farmers became aware about the utilization of water and its benefit. Moreover, due to establishment of these bodies on the project the irrigation capacity can be fully exploited.

Chapter 4
Problems and Remedies

Thirty two villages are enjoying the irrigation benefits from Katepurna project. Thirty five and odd years have passed and such long period has been supposed to have developed the progress level of beneficiary villages. Unfortunately the beneficiaries of the project are not as much progressed as compared to those areas which are not utilizing the irrigation facility from the project. We may conclude that the economical and social progress of beneficiaries has not been achieved to desirable or expected extent. As there has been considerable growth in productivity and income as compare to earlier times, still the project could not aided dairy business, employment and allied opportunities to expect level. Therefore we find very small difference in condition of the beneficiary and non beneficiary villages. It seems that the available recourses are not exploited satisfactorily by the project and as a result of which all the beneficiary could not benefited from it.

The Problem

There is only 25% of utilization of irrigation capacity from the project.The average irrigation under the project is of 2027 hector also the use of water from the project is 45% . When we consider the average irrigation and actual use of water we understand that the percentage of irrigation is less in relation to total use of water. This surelydemonstrate that the waste, lack of proper planning on the part of beneficiaries.

The beneficiary areas of the project falls under 100 to 900 m.m. definite rainfall due to which natural water resource become easily and freely available.

Due to definite rainfall during kharip season the irrigation facility is used only for the survival purposes therefore the proper utilization of planned water for kharip season is not done.Due to black and productive soil, the productivity of dry land crops level is good. Therefore the spontaneous leaning to irrigate crops is not seen. The water supply system of the project has completed 35 years.The supply system gets grant in accordance with the set norms of the Government for its renovation and care. But non- stratification,canal-supply system get troubled every year during rainy season as compared to other type of land, canal supply here is done through black soil due to which there is lot of wastage and loss.

One of the important impediments in over all irrigation is the defaulter beneficiaries. The beneficiaries prove defeaters when they do not pay irrigation tax every year and they are imposed with fine too which increases in arrears. The tendency towards not paying outstanding payment comes with the hope of getting irrigation arrears waived by the Government.

The lack of awareness about irrigation, irrigation literary and lack of experimentation are also major reasons of obstacles in irrigation system. Many of the beneficiary farmers consider that availing irrigation involves heavy investment. Due to lack of irrigation literacy the involvement of farmers in preservation and proper utilization of water have not been done.

Remedies

The supply system needs proper care and management. This comprises canal repairing and clearing the rudiment. There needs to be improvements in irrigation method. In order to improve irrigation methods the experts in both irrigation and agriculture ought to organize training and demonstration programmes on the farm itself. The farmers need to be informed

about the matters such as scientific method of irrigating, making proper soil-bed for crop etc. This definitely results in irrigation in less quantity of water as well as less possibility of unpredictably of land

Due to leakages in irrigation system the roads in the beneficiary areas get impaired which causes obstacles in carrying goods. This further result in that the goods from the farm do not reach to market on proper time. Therefore the problem of leakages ought to be resolved.

Water distribution should be done by cubic method. The farmer or beneficiaries should be encouraged to avail the cubic method.

Most of the times only the farmers at the first end/sources use water whenever they want it while at the other end the farmers remain deprived of it. Therefore there should strict time-table for irrigation.

The farmers should have awareness want the programmer. The farmers should be trained by the scientist and experts in agriculture. They should be trained water harvesting at proper/right time. Most of the time there is tendency to irrigate the land even if there is no need of it. The training to be given about the critical stages of crop and required amount of water during the particular stage of the crop.

Akola district is known as cotton belt.Earlier times the sowing of cotton was done by traditional methods. There is considerable increase in cultivating the crop after the experiment of Israel technique availed by Dr. P.D.K.V Akola. The farmers needs to be encourage in changing the crops as well as the there is need in changing the mind set of employees in irrigation department in order to generate positive attitude among them. Occasionally the employees work

need to be encouraged and there should be punctuality and responsibility on the part of employees. Moreover there should have routine pledge at the work place so as to help in generating collective consciousness about the work. The efficient workers should be given certificate and duly appreciated by their superiors. The reports and pamphlets issued by the office are also helpful in appealing the workers towards the work.In this way the publishing board directly and indirectly convey the programmes, schedules etc to the beneficiaries.

Chapter- 5

Conclusion

The construction of the Katepurna Project started in 1956 and the project was ready for public use in 1976. The project has the capacity of irrigating 8325 hectare land. Thirty two villages get the facility of irrigating the agricultural land from the project and six villages were rehabilitated. The study made in the previous chapters demonstrates that the irrigating capacity of the project has not been completely exploited. The study also reveal that even after the irrigation facility made available by the project the expected level of social and economical progress of farmers has not been attained .

With the efforts taken by the experts in irrigation sector and agricultural scientists there has been considerable growth in irrigation as compared to the beginning years of the project. The awareness about water-harvesting and avoiding wastage of water has been created.

As the farmer began to realise the importance of water in irrigating their land they are inclining to pay the water taxes. Still many of them disincline to pay the taxes in hope that the taxes will be waived. The recovery of the taxes may be increased if the farmers are duly informed and instructed.

The establishment of co-operative bodies proved to be great achievement in water-irrigation. Due to these institutes there has been remarkable growth in the number of beneficiaries availing the facility of irrigation from the project.

Katepurna project has played major role in changing the mindset of farmers in changing the traditional crops and to cultivate variety of crops for their economical progress. The farmers

are cultivating the crops which yield more income within less duration. Hence the cultivation of crops like cotton, sugar cane, vegetable fruits etc have greatly increased. The farmers are sowing cotton before monsoon which results in more yields and consequently more income to the farmers

The need of water for crop is fulfilled by dampness of the soil. Therefore the water which is used for farming should be conserved and supplied with proper examination of the soil and the particular crop.

Reference

Indian Agriculture Research Institute "Water Requirement and irrigation managementof crops in India" New Delhi ,ICAR 1977.

"KrishiPatrika'' Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra.December 2002.

Level S. N. and R. K. Patil (1994), Participationin Irrigation Management : A Case Study of Maharastra, Horizon:India, New Delhi.

Michel A.M. Irrigation: Theory and practice New Delhi :Vikas Publishing, 1978.

Mohmad Yousuf "Utilization of Irrigation potential analysis distributiries under Shriram Nagar Project, Andhra Pradesh economy in transation." CESS Hydrabad. 1990

Patil A. K., A Study of Agricultural Diversification in the Kasari Irrigation Command M. A. Shivaji University, Kolhapur.2013

Pillai K.M. "Water Management and Planning. 2nd Ed," Nagpur: Himalaya Publishing House, 1992.

Reddy Gopal "Impact of Irrigation on income generation savings and investment in a command area', A Case Study of NSLC command area, Hyderabad.1988

Saleth, Maria R. Water Institutions in India : Economics, Law and Policy.Commonwealth Publishers, New Delhi.1996