ROLE OF WASHI IRRIGATION PROJECT IN AGRICULTURAL DEVELOPMENT OF WALWA TALUKA

Chapter - I

INTRODUCTION AND RESEARCH METHODOLOGY

1.1 INTRODUCTION

1.2 ROLE OF IRRIGATION IN INDIA'S AGRICULTURAL DEVELOPMENT

1.3 GROWTH OF IRRIGATION IN MAHARASHTRA

1.4 REVIEW OF LITERATURE

1.5 OBJECTIVES OF THE STUDY

1.6 RESEARCH METHODOLOGY

Chapter - I

INTRODUCTION AND RESEARCH METHODOLOGY

INTRODUCTION :

1.1 Irrigation & Agricultural Development :

Agricultural development plays vital role in economic development of an undeveloped economy. Agricultural development implies increase in productivity and production of agricultural sector. Productivity of agricultural sector depends on so many factors, such as irrigation facilities, fertilizers, pesticides improved seeds, applications of modern techniques of cultivation etc. of these, supply of irrigation facilities assumes greater importance because without sufficient water supply, other inputs cannot be fully utilized. Hence, in agricultural development, irrigation is the most vital element.

Irrigation may be defined as the process of artificially supplying water to soil for raising crops. In irrigation system, collecting water and planning of water supply are the two important aspects. Water is the evidently the most vital element in the plant life. If there is scarcity of water, plant cannot be grown up and we cannot get fruits of plant. Here following points throw light on the necessity of water supply or irrigation in agricultural development. Water is normally supply to the plant by nature through rains. However, total water supply may be at times insufficient and irregular. Also, the rainfall may not be uniform in a particular area over the crop period. No water may be available either at the beginning or at the maturity stage or at the end period of the crop, causing severe damage to the crop. In this case, irrigation alone can save the crop. There is need to collect water during the excess rainfall and provide it to the crop when it is needed.

More water may be necessary for raising commercial and cash crops like sugarcane, banana etc. Their requirement of water is periodical in the course of their production. Only monsoon water is not enough for them. Thus, existence of water reservoirs is a must for reaping a beautiful crop in such cases provided other factors remain favourable. Irrigation adds water to soil to supply the moisture essential for the plant growth. It saves the crops from

drying during short duration droughts. It washes out or dilutes salts in the soil and reduces the Hazard of soil piping.

Thus, irrigation helps in intensive cultivation of land and it is one of the key elements in boosting and stablising agricultural production. Expansion of irrigation leads to expansion of plantations. The stripped area along the canal is always damp. Therefore, trees are planted along the canal boundaries. Such plantations check the soil erosion. Irrigation is one of the crucial factors in the process of modernizing agriculture. Sustained high rate of agricultural growth requires increasing does of fertilizers, improved seeds, use of pesticides; which is possible if water is available.

Prices of agricultural commodities exercise a dominant influence of general price level. Infact prices of food grains acts as a pacesetter in the bahaviour of general prices. The output of agricultural commodities changes from year to year due to seasonal nature of agriculture. Hence there is a price instability. Introduction of irrigation provides guarantee to agricultural production. It reduces fluctuations in prices of goods. Price stability is importance to agricultural development. It provides full confidence that the additional effort and investment would be beneficial to farmers.

Irrigation is very good means to get production from famine. A systematically developed irrigation system collects water during the periods of excess rainfall and stores it. This water stock is life-saving during the famine and drought period. Major River valley projects are usually planned to provide hydro-electric power together with irrigation. Irrigation channels can be utilized to generate electricity. It helps to adopt new machinery in agricultural work. In this way, irrigation helps the development of agricultural sector.

1.2 Role of Irrigation in India's Agricultural Development :

Before planning era in India, Agricultural was stagnant over a long period. It was subsistence farming hence the productivity was very low. Many factors were responsible for its backwardness. These factors were of two

types. 1) Agricultural structure was defective and 2) Agricultural technology was traditional in nature.

During planning era, on the institutional front, the government has been tacking the agricultural problems through land reforms. But it is not enough for increasing productivity per hectare of land. Technological factors such as the use of improved implements, seeds, chemical fertilizers and irrigation should also be adopted. Irrigation development as an instrument of agricultural growth assumes much greater significance in this context.

In India, rainfall is inadequate and unequally, distributed through the seasons. The available moisture in winter and summer months is not adequate to support multiple cropping. This deficiency has to be overcome through development of small and big irrigation schemes wherever possible.

1.2.1 Classification of irrigation :

There are three important sources of irrigation in India, namely wells, tanks and canals.

a) Well Irrigation :

Wells are an important and dependable source of irrigation, and are second largest source of irrigation. Which provides 58.7% (1944-200) of the water to the total irrigated land. Wells are mostly private but the govt. also helps in their construction by providing financial assistance. In India there are 3 million wells which about half in U.P. alone. This source has been utilized successfully in Punjab, Western Bengal, Rajastan, Gujrat & Maharashtra etc.

On an average, a well can irrigates 2 hectare of land and enhance extra yield of crops.

Tube Wells :

Tube wells are considered to be an important aspect of Green Revolution which provides assured irrigation. As to compare to surface wells, tube wells, are not only cheaper also provide more irrigation facilities.

b) Tank Irrigation :

Tanks are also important sources of irrigation. Tanks provides nearly 4.7% irrigation (1999-2000) to the total irrigation. They are found in almost all states except Punjab, Bihar Orissa & Madhya Pradesh. In rocky areas the availability of underground water is poor as rocks do not suck water, neither wells can be dug out nor canals be constructed. But water can easily stored in tanks which may either be naturally available or suitable constructed.

c) Canal Irrigation :

Canal irrigation is the most important source of irrigation in India. It accounts for about 30.5% (1999-2000) of the irrigated area. In the indogenetic plains it is fundamental importance. The total work of canals in the area is really unique.

Table 1 : Area irrigated by sources in India

(Million hectares)

Sr. No.	**Sources of Irrigation**	**1950-51**		**1999-2000**	
		Area (MH)	**(%)**	**Area** (MH)	**(%)**
1	Canal	8.3	40	18.0	30.5
2	Wells & Tube wells	6.0	29	33.6	58.7
3	Tanks	3.6	17	2.7	4.7
4	Other sources	3.0	14	2.9	6.1
	Total	**20.9**	**100**	**57.02**	**100**

Source : i) Statistical Abstract G.O.I. 2004

ii) Datt & Sundaram, Indian Economy 2006

Progress of irrigation, over a period of time shows that canal irrigated area increased from 8.3 MH to 18 MH during 1950-51 and 1999-2000. Even then its relative importance has come down from 40% to 30.5%. Well irrigated

area has increased from 6MH to 34MH during the last 50 years. Well irrigation in 1999-2000 account for nearly 59% of the total irrigated area as compared to only 29% in 1950-51. During this period it is well irrigation particularly tube well irrigation which has made the most spectacular progress. In 1960-61 only 0.1 MH were irrigated by tube wells, but by 1999-2000 over 16MH were served by tube wells irrigation area. In case of other sources irrigated area has come down from 3MH to 2.9 MH during the 1950-51 to 1999-2000.

1.3 Growth of Irrigation in Maharashtra :

Agriculture is an important sector in the state economy as about 65% of the population in the state dependent on Agriculture for livelihood. Agriculture in Maharashtra depends mainly on the arrival of Monsoon. The agriculture is the backbone of state economy. It is the main occupation of rural Maharashtra. Therefore, in Maharashtra more water resources are required. According to the state statics merely 16% of the cultivate land area is under irrigation.

Agriculture in Maharashtra suffers with a natural problem of uncertain rainfall. The level of rainfall varies from place to place. Some parts of the state go frequently dry while other parts under heavy rains. Many times the state has witnessed periods of scarcity & droughts. Therefore, tapping new sources of water for multiuse's is necessary. The rainfall in Maharashtra arrives generally between June & September. Remaining period of eight months remains usually dry. Of the geographical of the state nearly 36% in area receives hardly 75 cm rainfall and hence requires other source of water. To harpen the agriculture yield, more irrigation is required.

Rivers in Maharashtra do not flow round the year. During the rabbi period, it is observed, the rivers drain less amount of water. The drain flow of water changes frequently of the yearly available water 80 to 90% of its flows down during the monsoon wind period of four months. By constructing dams and wares this water can control droughts for the irrigation purpose. The Govt. has constructed with the help of central Govt. many small, medium and large projects in Maharashtra. These new projects and dams have brought about 71 lakh hectare under irrigation. Besides these, projects & dams fulfill the

need of drinking water for Urban as well as rural, people. The surface water contributes 53 lakh hectare, while ground water irrigates 18 lakh hectare of the 3.07 crore hectare are of Maharashtra. It is estimated that nearly 2.11 crores hectors possibly can be brought under cultivation.

During 1956-59, 10.7 lakh hectares areas was under irrigation. During 1965-66 it raised to 13.8 lakh hectares. In 1973-74 it came up to 17.8 lakh hectares. Conclusion is that merely 7 lakh hectare area was brought under irrigation during 14 years after 1960. This was definitely not much a satisfactory growth. However at the end of 1980, 31.2 lakh hectare are under irrigation and at the end of 1995, 33 lakh hectares area was under irrigation.

1.3.1 Source of Irrigation in Maharashtra :

Sources of water resources are 1) wells 2) Tank 3) Canal and others like lift irrigation in the state

1. Wells irrigation :

With reference to the information given by the ground water survey and development agency there were 11 lakh 43 thousand wells in Maharashtra, in 1995. There was 2547 x 103 hectares water from these wells was available for utilization. Considering bottom ground water about 15 lakh more wells can be constructed. Of the total irrigated land 56% is under the well irrigation in Maharashtra.

2. Tank irrigation :

The percentage of tank irrigation in Maharashtra is 15%. The tank irrigation in used predominantly in Bhandara, Chandrapur, and Gadchiroli districts of Vidharbha accounted for 60% since 1972 Govt. has been implementing. The scheme of percolation tanks onwards percolation tanks are quite helpful in storing water underground and increasing water level. At present there are about 1400 percolation tanks in use ; about 1800 are under construction and in future 3000 percolation tanks have been planned to be completed.

3. Lift Irrigation :

By 'Lift Irrigation' water from lower region is supplied to the land upper heights. Of the region for this purpose, oil engines and electric motor pumps are used. About 8% of the irrigated land in Maharashtra is under 'Lift irrigation'. In southern Maharashtra particularly in Kolhapur, Ratnagiri and Sindhudurg districts of Konkan, lift irrigation is predominately used.

4. Drip Irrigation :

The quality of soil, variety of crop, age of the crop and evaporation process determine the required quality of water. By using tubes of pletheme with fixed taps of smaller size the water drops are directly elevated at the roots of the crops. This method is very useful in dry areas with merge water availability. By using 'drip system' 60 to 80% water can be saved and more 60 to 70% land can be brought under this facility.

5. Sprinkle Irrigation :

Sprinkle irrigation system is becoming popular in Maharashtra sprinkle can save 35% of water and promotes 15% increase in yield. Except konkan all over Maharashtra sprinkle system is being used.

6. Canal irrigation :

Next to 'Well Irrigation' the canals have brought 23% land under irrigation. The major, medium and minor projects, have been constructed across the Godavari the Bhima, the Krishna and their tributaries.

1.3.2 Irrigation Projects in Maharashtra :

1. There were 8 major irrigation projects and 18 medium projects were completed before 1995 in the state. These are Bhandara, Bhatghar, Khadakwasala etc. The medium projects and Krishna, Ramtek etc.
2. During the planning period, 12 major and 10 medium projects have been completed. These are Vaitarna, Girna, Ghod, Veer, Purna, Sidheshwar, Poos, Itiadoh etc.

3. There are 34 major projects and about 100 medium projects schemes at various stages of their completion. These include Surya, Tillari, Nandur, Madhameshwar, Upper Godavari, Upper Tapi, Jaykewadi. Manjara, Kukadi, Ugani Dhom etc.

1.3.3 Estimates of surface water resources :

Beginning with the Maharashtra Irrigation commission of 1962, different commissions and committees have estimated the surface water quantities in Maharashtra. Most accepted, among these, are the estimates of the National Irrigation Commission 1972, as under.

1. Godavari Valley (Ind. Pranhita, sub-valley)	37,800 Million cm mt.
2. Krishna Valley (Bhima sub valley)	27,920 Million cm mt.
3. Tapi Valley	7250 Million cm mt.
4. Narmada Valley	620 Million cm mt.
5. Konkan Valley	42,480 Million cm mt.

1.3.4 Development of Irrigation Potential in Maharashtra :

It can be observed from table that In the era of Pre-plan, there was merely 2.74 lakh hectare land developed irrigation potential, during 1951. Then, in the first, second, third plan it was 3.14, 3.98 and 5.70 lakh hectare, and respectively. In term of percentage it was 1.22% in pre-plan period and 1.39%, 1.77%, and 2.53% respectively.

Table -1.2 Development of Irrigation Potential in Maharashtra (1951-1997)

Sr. No.	Year	Irrigation Potential Developed (lakh hectares)	% of developed Potential to cultivate Area
1.	1951- (pre-plan)	2.74	1.22
2.	1956 – First	3.14	1.39
3.	1961 - Second	3.98	1.77
4.	1966 – Third	5.70	2.53
5.	1990	26.31	11.67
6.	1995	29.42	13.05
7.	1996	31.20	13.84
8.	1997	32.30	14.32
9.	2002	-	-
10.	2005	-	-

Source : Report of Maharashtra Water & Irrigation Commission, 1999 Vol. I, Page No. 203.

It shows that, between the periods of 1966-1990 there were increased irrigation potential about 26.3 lakh hectares from 5.70 lakh hectares. And in term of percentage it was increased to 11.67% from 2.53%. Till end of the 1997 it increased to 14.32%.

(Million hectares)

Sr. No.	Source of Irrigation	1950-51		1999-2000	
		Area (MH)	(%)	Area (MH)	(%)
1	Canal	8.3	40	18.0	30.5
2	Wells & Tube wells	6.0	29	33.6	58.7
3	Tanks	3.6	17	2.7	4.7
4	Other sources	3.0	14	2.9	6.1
	Total	**20.9**	**100**	**57.02**	**100**

Table No. 1.3 shows that district wise position of irrigation in the state. It was observed that Ahmadnagar district is foremost in the cultivable land among the other districts of state. It's cultivable area is 1160 thousand hectares out of its total land. Like this, it is also foremost in irrigated land among the other districts of Maharashtra State. It's irrigated area is 272 thousand hectare. But in case of percent of irrigated to cultivated areas. Bhandara District has highest percentage irrigation (47.4%)area.

1.4 District wise irrigation position of Maharashtra.

Sr. No.	District	Cultivable Area (000 Ha)	Irrigated Area (000 Ha)	% of Irrigated to cultivated Area
1	Ahamadnagar	1160	272	23.5
2	Solapur	1125	190	16.9
3	Pune	994	189	19.0
4	Beed	812	174	21.4
5	Bhandara	355	168	47.4
6	Jalgon	814	133	16.3
7	Nashik	900	133	14.8
8	Satara	570	132	23.1
9	Usmanabad	570	119	20.9
10	Parbhani	839	104	12.4
11	Aurangabad	739	98	13.2

12	**Sangli**	**599**	**94**	**15.7**
13	Chandrapur	488	92	18.8
14	Dhule	739	76	10.3
15	Kolhapur	413	74	17.8
16	Nagpur	553	65	11.7
17	Nanded	733	56	7.7
18	Latur	543	56	10.4
19	Jalna	584	50	8.5
20	Gadchiroli	199	49	24.5
21	Amaravati	723	45	6.2
22	Buldhana	686	42	6.2
23	Yavatmal	863	34	3.9
24	Akola	800	26	3.2
25	Sindhudurg	106	20	18.5
26	Vardha	441	14	3.2
27	Raigad	184	10	5.3
28	Thane	268	7	2.4
29	Ratnagiri	235	2	0.8
30	Mumbai & suburbs	0	0	-

Source : Report of Maharashtra water & irrigation commission (1999)

In the Sangli District there was 739 thousand hectares land of cultivation and it is 94 thousand irrigated area till end of the 1999. In case of percentage to cultivable area it was merely 15.7%. It is very small percentage to cultivable land. Sangli District has got twelth rank in irrigated area in state.

Table No. 1.4 District wise Co-operative Lift Irrigation Societies in Maharashtra (1998-99)

Division	No. of Society
Mumbai	75
Thane	08
Ratnagiri	07

Sidhudurg	-
Mumbai	-
Nashik	982
Ahmadnagar	664
Nashik	166
Dhule	113
Jalgaon	39
Pune	2881
Pune	1392
Kolhapur	535
Sangli	234
Satara	467
Solapur	253
Aurangabad	313
Beed	100
Aurangabad	48
Parbhani	41
Usmanabad	37
Nanded	32
Jalna	31
Nagpur	115
Nagpur	40
Bhandara	30
Gadchiroli	26
Chandrapur	19
Vardha	-
Amaravati	67
Akola	21
Buldhana	19
Yavatmal	14
Total	**4433**

Source : Co. op. Movement at a glance in Maharashtra, 35th issue, March 2000

Moreover the position of cooperative lift irrigation societies show that (table1.4) Pune district has recognized for the large number of cooperative lift irrigation societies. There were 1392 societies, followed by Kolhapur district (535 co-op. irrigation societies,) Satara 467, Solapur – 253 and Sangli 234.

Likewise in Nashik division, there were 982, societies of which Ahmadnagar contributed more as 664 were in Ahmadnagar district. Aurangabad division has 313 societies, Nagpur 115, Mumbai 75, and Amaravati has 67 societies. At the state level there are 4433 Co.op. lift irrigation societies

Sangli District :

Since present study is confined to Sangli district, some characteristics of the district of are given. Sangli District is located in South region of Maharashtra. It has the area of 8601 sq. K.M. Sangli District has got 21st rank in the total Geographical area in the Maharashtra. Its East-West length is 205 k.m. an south-north lenth is 96 k.m. It has four borders as below.

At North - Satara & Solapur District.

At South - Kolhapur District & Belgaum, Bijapur District of Karnataka state.

At East - Bijapur District of Karnataka state

At West - Ratnagiri District

By the 1995-96 out of 86% lakh hectare land of Sangli District 5.53% land was under forest, 4.53% under non agricultural use, 4.44% under culturable waste land, 2.34% for pasture & others, 1.89% Barren & uncultured land, 11.55% current follows an 2.90% other follows so as total 33.18% land was uncultivable and 67.38% land was cultivable. The percentage of cultivated area to total cultivable area 80.36%.

The talukawise breakup show that Walwa takula has brough maximum area under cultivation after Tasgaon taluka. In fact all other talukas also showed that maximum area brough under cultivation.

Table 5 : Percentage of Gross cropped area of the total Geographical area.

1.	Miraj	92.29%
2.	Tasgaon	96.71%
3.	Khanapur	84.15%
4.	Atpadi	58.57%
5.	Jat	66.79%
6.	Kavathe Mahakal	82.88%
7.	**Walwa**	**94.10%**
8.	Shirala	90.70%

Talukawise irrigation position of Sangli District. It could be observed from 1.6 that Walwa taluka has broughout maximum area under irrigation 54.17% followed by Miraj taluka (3143%), Atpadi taluka (26.16) Belgaum taluka (22.57) other taluka have irrigation less than 12%.

Table No. 6 Talukawise Irrigation position of Sangli District :

Sr. No.	Tahsils	Area of under Irrigation		Net irrigated Area	Total Irrigated Area	Total cultivated Area	% of irrigation to Total Irrigated Area
		Surface	Well				
1	Miraj	7116	12761	19877	24315	77363	31.43
2	Tasgaon	6976	11165	18141	20194	89476	22.57
3	Khanapur	1176	9309	10485	13083	106629	12.27
4	Atpadi	933	14344	15277	18685	71428	26.16
5	Jat	1452	13805	15257	18707	202898	9.22
6	Kavathe Mahakal	-	4468	4468	6107	55584	10.99
7	Walwa	14930	16123	31053	36196	66820	54.17
8	Shirala	2614	14204	4034	5188	45787	11.33
	Total	**35197**	**83395**	**118592**	**142475**	**715985**	**19.90**

Source : Socio-Economic Survey of Sangli District - 2005

In term of absolute term net irrigated area was Sangli District was 118592 hectares Walwa taluka has maximum irrigated area as 31053 hectares and at the bottom has Shirala taluka 4034 hectare. Total irrigated area of Sangli district was 142475 hectares. Accounted for percentage of under irrigated area to is 19.90% to the total cultivated areas.

1.4 Review of literature :

An Exhaustive literature on the impact of irrigation on agricultural development is available in Economics. Such studies can be categorized based on the sources of irrigation an their impact on agriculture e.g. river water, lifts, wells, tubewells, canals, talukas, ponds etc. Most of such studies focus on, the changes in agricultural pattern, and degree of diversification, brought out by the irrigation source in selected areas. Agricultural Universities and Department of Geography of formal universities are going to ahead in carrying out such studies.

Following are some of the studies which we have referred and reviewed for our study.

B.D. Dhawan (1987)[1] has assessed the impact of canal water with reference to Mula command area. This study observed that, 60% of the irrigation potentials of the Mula project were unutilized. Such under utilization of irrigation capacities has been observed in many irrigation projects. Similarly, huge amount of the losses of irrigation water takes lace even at the farmer level. He identified the need for conjunctive use of surface and ground water. He also feels that, the recommendation of the Eight monthly committee (Athmari Samittee) would go a long way in encouraging the development of well irrigation in Maharashtra. The controversial issues of efficiency of water use of sugarcane and the crops is discussed at length.

[1]Dhawan B.D., (1988), Irrigation for Agricultural Modernization, SAGE Publishing, New Delhi.

Acharya's[2] (1991) study is the most important one. He has studied the importance of cooperative lift irrigation schemes, impact of lift irrigation schemes on village economy an history of cooperative lift irrigation society. It was found that scheme has played important role in raising agricultural production.

Dr. V.B.Jugle[3] (1978) article "Impact of lift irrigation shemes on General landuse, cropping pattern and small farmers : A case study of Village Alas" is a micro-level empirical investigation, based on the Hypothesis that, irrigation has a direct impact on the economic condition of the agriculturists, agricultural technology and the land development activities. The focus of the study was on cooperative lift irrigation schemes (CLIS) operating on the river Krishna in Alas village of Kolhapur district in Maharashtra state. It was observed that about the irrigation impact on the land pattern, the author reports that, it is only due to the irrigation, that an area of around 63 acres which earlier was not cultivated has been brought under cultivation by repairing it through tractor ploughing an bulldozer leveling. However, at the same time, the total cropped area has decreased by 5.54% on account of residential settlements in the farm area, increase in the number of trees, irrigation chamber and form roads. Also, some area is lost to water logging and salanity due to heavy use of water and fertilizers. Also, there has been a tremendous shift in the agriculture from substance to cashcrops.

WALMI[4], Aurangabad, Maharashtra has developed methodology of economic evolution of irrigation projects. It has suggested to test the following feasibility tests 1) Engineering & Technical Feasibility 2) Economic Feasibility 3) Financial feasibility 4) Environment feasibility 5) Social feasibility 6) Political feasibility It has also stated that in 1951 India has commenced its economic planning for irrigation, which has been assigned a high priority in investment designs, because investment has to be gainfully

---

[2]Acharya V.V.,(1991), "Prosperity through Lift Irrigation", Himalaya Publishing House, Mumbai.

[3]Jugale, V. B. (1978) : Impact of Lift Irrigation Scheme of general land use , cropping pattern and small farmers : A Case Study of Village Alas ' Journal of Shivaji University, Kolhapur.

[4]Walmi , (2006), 'Study material of workshop on Socio-Economic Impact of Irrigation Projects, Nov. 2006 water and land management Institute Aurangabad.

spent. An alternative irrigation project can be developed with a small amount of scares capital. Therefore, economic analysis becomes obligated. WALMI has systematically developed economic evaluation technique. Before and after method has been used to estimated the benefit costs-ratio with discounted cash flood technique for evaluating the economics feasibilities. Farm budgets, cropping pattern, average annual water supply, cost and transition benefits, discounts, return etc. are the other yard sticks for compacting the economic rational of the irrigation projects.

A. Naryanmoorthy[5] (2001) "Irrigation and Rural poverty Nexus : A State wise Analysis" is an outcome of a survey conducted with the main objectives of :

1) To demonstrate the importance of irrigation as an impacting policy intervention on other variables which were used by earlier-studies for analyzing the incidence of rural poverty. 2) To analyze the changing scenario of rural poverty at the state level. 3) To analyze the relationship between the level of rural poverty and irrigation across the states. The study attempted to understand the role of irrigation in the reduction of the level of rural poverty in India taking cross section data of 14 major-states at four points of time.

While analyzing the importance of irrigation empirically, the study shows, through correlation and regression analysis, that there is a clear and significant inverse relationship between the incidences of rural population at all four points of time. However the relationship between these two variables was weak over times, which could be possibly due to relatively faster growth of rural non-agricultural income than that of agricultural income during the last two decades. The massive steps taken by the govt. in the eighties combact rural poverty through various programmes could also have weakened the relationship. Although well established antipoverty alteration programmes such as IRDP have conferred some benefits on the poor sections of the rural society, the

[5]Narayanmurthy, A (2001), 'Irrigation and Rural Poverty Nexus: A State wise Analysis, in India Journal of agricultural Economics k, 56.1 Januray –March, pp 40-56.

survey conducted by govt. and other agencies show that not even 15% of the beneficiaries have been able to rise above poverty even after spending huge amount of money on these programmes.

Thus it was emphasized that most important task would be to extend irrigation in farming areas. In most states, where today the incidence of poverty is high, irrigation is on the low side, with significantly potentiality for its extension". The author, therefore, recommends that as the development of irrigation not only increases the production and productivity of agricultural commodities but also helps to reduce the level of poverty through percolation effect, a long term judicious policy should be formulated to utilized untapped irrigation potential wherever possible on priority basis.

A. Naryanmoorthy[6] and R. S. Deshpande[11] observes that ultimate potential of the state, as worked out by the Central Water Commission (1996) was about 89.5 lakh ha. out of which 41 lakh ha. (45.8%) is to be realized through major medium irrigation projects and the remaining 48.52 lakh ha. (54.2%) is to be realize through minor irrigation works. In reality, upto 1992-93 only 35.18 lakh ha. were brought under irrigation, 13.07 lakh ha. under major and medium projects and 22.11 lakh ha. under minor works. The author maintains that the shortfall is in some way clear reflection of the failure of efforts to tap the available potential as well as the difficult topography of the state.

1.5 Objectives of the Study :

1) To examine the impact of Washi irrigation projects on Agricultural area, production, productivity and yield of crops in the command areas.
2) To measure cropwise agricultural income of farmers through change the cropping pattern.
3) To study the impact of irrigation on cropping pattern.
4) To examine the nature of improvement in the social life of beneficiaries.
5) To suggest appropriate measures to improve the operational efficiency of the project.

---

[6]Deshpande R. S. & Narayanmurthy A. (2001) : 'Issues before second Irrigation Commission of Maharashtra in Economic & Political Weekly' vol. XXXVI, No.12 P.1034.

Research Methodology :

Keeping in view the objectives of the study, an appropriate research methodology has been used.

1.6.1 Area of the study :

The study is undertaken in the command area of Washi irrigation project located in the Walwa taluka of Sangli District. The command area of project has covered 3 villages, namely 1) Washi, 2) Ladegaon 3) Jakraiwadi. Out of 1139 member farmers 150 are selected. The proportion of sample is 13.16% of the total.

1.6.2 Sources of Data collection :

A) Primary data : Primary data was collected from various sources. These are as below:

1) Survey of sample households.

2) Special interviews of office bearer & chairman.

3) Discussion with leading farmers.

4) Field work.

B) Secondary data : Secondary data on various relevant variables were collected from the following documents/ reports.

1) Departmental publication.

2) Annual reports of the project.

3) Data from Rajarambapu sugar factory irrigation office.

4) Gazetteers of District.

1.6.3 Statistical techniques : Simple statistical techniques like percentage changes frequency distribution and Mean are used. Moreover, some other tools are used to data analysis.

References

Isralen O.W. and Hansen V.E., (1962), Irrigation Principles and Practices, Third edition, John Willy and Sons, New York,

Dhawan B.D., (1988), Irrigation for Agricultural Modernization, SAGE Publishing, New Delhi.

Acharya V.V.,(1991), "Prosperity through Lift Irrigation", Himalaya Publishing House, Mumbai.

Narayanmurthy, A (2001), 'Irrigation and Rural Poverty Nexus: A State wise Analysis, in India Journal of agricultural Economics k, 56.1 Januray –March, pp 40-56.

Deshpande R. S. & Narayanmurthy A. (2001) : 'Issues before second Irrigation Commission of Maharashtra in Economic & Political Weekly' vol. XXXVI, No.12 P.1034.

Jugale, V. B. (1978) : Impact of Lift Irrigation Scheme of general land use , cropping pattern and small farmers : A Case Study of Village Alas ' Journal of Shivaji University, Kolhapur.

Gurjar R.K., (1987), Irrigation in India's Agricultural Development, Scientific Publication, Jodhpur

Sundaram K.P.M. and Datta R., (2006), Indian Economy, S.Chand & Company Ltd.,Ramnagar, New Delhi

Kothari C. R. (1985) The Research Methodology – methods and Techniques, (2nd Reprint, 1991), Hilly Eastern Limited, New Delhi.

Mitra Asok K. (1997) ' Irrigation Management and Pricing of Irrigation Water ' Mumbai. (NABARAD)

Walmi , (2006), 'Study material of workshop on Socio-Economic Impact of Irrigation Projects, water and land management Institute Aurangabad.

Jadhav N.B.,(2001), An Appraisal of Functioning and performance of Co-operative Lift Irrigation: A case Study of Co-operative Lift irrigation Societies in Kolhapur District of Maharashtra State' Ph. D. thesis submitted to Shivaji University, Kolhapur.

Shide, P.B.(1990), ' Study of Rehabilitation of the Dam Affected Villages under Bhima Irrigation Project,' M. Phil. dissertation submitted to Shivaji University, Kolhapur.

Ambawade, R. V. (1990), 'Study of Tulshi Irrigation Project,' M. Phil. dissertation submitted to Shivaji University, Kolhapur.

Patil, D. K. (2000), 'A Study of Economics of Percolation Tanks and Their Impact on Agricultural Development,' Ph. D. thesis submitted to Shivaji University, Kolhapur.

Mamoria C.B., (1979), Agricultural Problems of India, Kitab mahal Publication, New Del