CHAPTER - I

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The availability of assured water supply, adequately and timely is an important condition for modernisation of agriculture. In a country like India where annual rainfall is scanty and uncertain irrigation is the only input which makes possible use of other inputs such as seeds, fertilizers, pesticides, and insecticides through which agricultural production increases. So the development of irrigation potential through the construction of major, medium and minor schemes becomes the main aspect of the strategy of agricultural development.

The irrigation water is made available by exploiting water potential underneath the earth. So it becomes highly capital intensive as well as, labour intensive work which needs huge capital investment of the public sector.

While considering agrarian nature and over population in our country, self sufficiency in foodgrain production was given top priority in the First, Third, Fifth and Sixth Five Year Plans. After thirty five years of planned efforts of green revolution and new strategy of agricultural development in our country, has become self sufficient in foodgrains production.

?, be created by the major and medium the irrigation Schemes. Accordingly Maharashtra has 71 lakhs of hectares of total irrigation poetential. But according to World Bank Report, Maharashtra State is having the total irrigation potential of not more than 62 lakhs hectors.

There are follwoing major irrigation projects, in maharashtra.

1) Bhima (Ujjani) irrigation project.
2) Jaykwadi Irrigation Project.
3) Kukadi Irrigation Project.
4) Krishna Irrigation Project.
5) Upper Penganga Project.

All these projects are getting finance from World Bnak. It is estimated that Rs. 1335 Crores were spent to bring 5.5 lakhs of hectars of land under irrigation in Maharashtra through major and minor irrigation schemes during the period of six five year plan. Though the irrigation potential in Maharashtra is slowely increasing, there is still untapped and even under utilised irrigation potential in Maharashtra. There causes for this under utilisation of irrigation potential are technological, financial, social political in character.

Though number of major irrigation projects in Maharashtra in comparatively small the study of these ?

incomplet sentence.

TABLE NO. I-1 : Investment and Development of Irrigation in India :

	Public Sector outlay/ Expenditure (Rs. crores)			Irrigation Potential Cumulative (Million Hectares)		
	Major & Medium Irriga-tion	Minor Irriga-tion(b)	Total	Major & Medium Irriga-tion	Minor Irriga-tion (b)	Total
Pre-plan benefits	-	-	-	9.07	12.09	22.06
First Plan	380(a)	76	456	12.20	14.06	26.26
Second Plan	380	142	522	14.30	14.79	29.09
Third Plan	581	328	909	16.60	17.01	33.61
Annual Plans (1966-69)	434	326	760	18.10	19.00	37.10
Fourth Plan (1969-74)	237(c)	513	1,750	20.70	23.50	44.20
Fifth Plan (1974-78)	2,442(d)	631	3,073	24.82	27.30	52.12
Annual Plan (1978-79)	977	237	1,214	25.86	28.60	54.46
Annual Plan (1979-80)	1,079	260	1,339	20.60	30.00	56.60
Sixth Plan (1980-85)	8,448	1,810	10,258	56.00	80.00	136.00

a) Includs Rs. 80 Crores incurred during the Pre-Plan Perios.

b) Government outlays only. c) Excludes Plan outlay of Rs. 50.54 crores on Cauvery Basin project.

d) Excludes non-plan outlay of Rs. 52.24 crores on Cauvery Basin Projects.

Source : 'A Study Of Rural Economics : Vasant Desai.

Among many factors such as HYV seeds, chemical fertilizers, and other experiments of agricultural scientists, the development of irrigation is the most important factor contributing today's agricultural development in our country.

The following table I-1 will give progress and performance of development of irrigation in India through major/medium and minor irrigation schemes in our country. This table also gives information about irrigation potential created by these schemes during the plan period.

The following observations could be made from the table No. I-1.

1) Before independance period, no systematic efforts were made for irrigation development.

2) The public sector investments in construction of major and minor irrigation schemes was Rs. 1750 Crores in the 4th Plan (1969 to 1974) which increased Rs. 10258 Crores in the 6th Plan period (1980 to 1985).

3) Naturally the government expenditure in major, medium irrigation schemes was greater than that of minor irrigation schemes. The 4th Plan and 6th five year plan has recorded the highest Government expenditure.

4) The irrigation potential created has been continuously increasing during the plan period from 26.26 million hectares from 1st Five Year Plan to 44.20 million hectares in the 4th Plan period to 136.00 million hectares during the 6th Plan period.

Inspite of this performance of minor, medium and major irrigation schemes in India, National Commission on Agriculture (1976) has pointed out that, the irrigation potential is not been fully utilised. The untapped or under utilised irrigation potential was 2.1 million hectares at the end of 4th Five Year Plan, which increased to 4 million hectares at the end of 1979-80. Thus the under utilisation of the irrigation potential is very basic problem of irrigation development in India.

1.1 THE MAJOR IRRIGATION PROJECTS IN INDIA:

As our study is mainly related to major irrigation project, the following is the brief account of the irrigation projects in India.

Name of the State	Name of major project	Details
Andhra Pradesh	1) Nagarjun Sagar	On the Krishna river near Nandikona Village about 44 K.M. from Hyderabad.

Name of the State	Name of major project	Details
Andhra Pradesh	2) Pochampad	Across Godawari River.
Joint project of Andhara Pradesh and Karnataka	3) Tungbhadra	On the Tungabhadra River.
Bihar	1) Kosi	A multipurpose project, which serves Bihar and Nepal.
	2) Sone High Levels Canal	An extension on Sone barrage project.
Joint project of Bihar and Uttar Pradesh	3) Gandak	Nepal also derives irrigation and power benefits from this project.
Gujrat	1) Kakrapara	On the Tapi river near Kakrapara in Surat District.
	2) Ukai	A multipurpose project across Tapi river near Ukai Village.
	3) Mahi	A two phase project, one across the Mahi river near Wanakabori village

Name of the State	Name of major project	Details
		and the othe across Mahi river near Kadana river.
Gujrat	4) Sabarmati	A storage dam across Sabarmati River near Dhari Village in Mehsana District and Wasna barrage near Ahmedabad.
	5) Panama	A gravity masonary dam across Panama river near Keldezar Village in Panchmahals District.
	6) Karjan	A Masonary dam across Karjan river near Jitgarh Village in Nandoo Taluka of Bharuch District.
Karnataka	1) Bhadra	A multipurpose project across the river Bhadra.
	2) Upper Krishna	A project consisting of Narayanpur dam across Krishna river & a dam at Almatti.

Name of the State	Name of major project	Details
Karnataka	3) Ghataprabha	A project across Ghataprabha in Belgaum and Bijapur District.
	4) Malaprabha	A dam across the Malaprabh in Belgaum District.
Madhya Pradesh	1) Tawa Project	A Project across the Tawa river, a tributary of the Narmada in Hoshangabad District.
	2) Mahanadi Reservior project	It has three phases - 1) Ravishankar Sagar Project and feeder canal system for supply of water to Bhilai steel plant and Dandur dam across Sandur Villace. 2) Extension of Mahanadi feeder canal. 3) Pairi Dam.

Name of the State	Name of major project	Details
Madhya Pradesh	3) Hasdeo Bango Project	It is third phase of Hasdeo Bango Project complex and envisages construction of a masonary dam across Hasdeo river. The first and second phases have been substantially completed.
	4) Baragi Project	It is multipurpose project consisting of a masonary dam across Bar river in the Jabalpur District and a left ban canal.
Joint project of Madhya Pradesh and Rajasthan	5) Chambal Project	The project comperises Gandhi Sagar Dam, Rana Pratap Sagar dam and Jawahar Sagar dam.
Maharashtra	1) Bhima Project	Comprises two dams one on Pawana river near Phagne in Pune District

Name of the State	Name of major project	Details
		and the other across the Krishna river near Ujjani in Solapur District.
Maharashtra	2) Jayakwadi project	A masonary spillway across the river Godavari.
	3) Kukadi Project	Five independent storage dams i.e. Yodgaon, Manikolohi, Dimbha, Wadaj and Pimpalgaon Jog. The canal system comprises i) Kukadi left bank canal. ii) Dimbha left bank canal. iii) Dimbha right bank canal iv) Meena Feeder and v) Meena branch.
	4) Krishna Project	Dhom dam near Dhom village on Krishna and Kanhar dam near Kanhar village on Varana river in Satara District.

Name of the State	Name of Major project	Details
Maharashtra	5) Upper Penganga	Two reservoir's on Penganga river at Laspur in Yawatmal District and the other on Rayadhu river at Sapli in Parbhan: District.
Orisa	1) Hirakud	World's longest dam is located on the Mahanandi river.
	2) Mahanandi Delta scheme	The irrigation scheme will utilise releases from the Hirakud reservoir
Punjab	1) Thien Dam	The project envisiges construction of a dam across river Ravi and a power plant on its left bank.
Joint project of Hariyana Punjab and Rajasthan	1) Bhakra Nangal	India's biggest multi-purpose river valley project comprises a straight gravity dam

Name of the State	Name of major project	Details
		across the Satlaj at Bhkra, the Nangal dam the Nangal hydel channel, two power houses at Bhakra dam and two power stations at Ganguwal and Kotla.
Joint Venture of Hariyana, Punjab and Rajasthan	2) Beas	It is consist of Bees Sutlaj link and Beas Dam at Pong.
Rajasthan	1) Rajasthan Canal	The project will use water released from Pang dam and will provide irrigation facilities to the north Western region of Rajasthan i.e. a part of the Thar desert. It consist of Rajasthan feeder canal (with the first 167 K.M. in Punjab and Hariyana and the remaining 37 K.M. in Rajasthan and 445 K.M. Rajasthan main canal entirly in Rajasthan.

Name of the State	Name of major project	Details
Joint venture to Tamil Nadu and Kerala.	Parambikulam Aliyar	The project envisanges the intégrated harnessing of eight rivers, six in Annamalai Hills and two in plains.
Uttar Pradesh	1) Tehri Dam	Earth and rock fill dam on Bhagirathi river in Tehri District.
	2) Sarda Sahayak	The project envisages construction of a barrage across the river Ghagra, a link channel a barrage across river Sarda and a feeder channel involving construction of two major aqueducts over Gomati and Sai.
	3) Madhya Ganga Canal	A barrage across Ganga in Bijnor district.
	4) Left bank Ghagra Canal	A link Channel taking off from the left bank of

Name of the State	Name of major project	Details
		Ghagra river of Girja barrage and joining with Sarju river. Also a barrage across Sarju.
Uttar Pradesh	5) Ramganga	A dam across Ramganga, a tributary of the Ganga river located in Garhwal District. The project has besides reducing the intensity of floods in central and Western Uttar Pradesh, provided water for the Delhi water Supply Scheme.
West Bangal	1) Farakka	The project was taken up for preservation and maintenance of Calcutta Port and for improving the navigability of the Hooghly. It comprises a barrage across the Ganga at Farakka a barrage

Name of the State	Name of major project	Details
		at Jangipur across the Bhagirathi and a feeder canal taking off the Bhagarathi below the Jangipur barrage.
West Bengal	2) Mayurakshi	An irrigation and Hydro-electric project comprises Canada dam.
	3) Kangsabati	The project envisages construction of dams on the Kangsabati and Kumari river.
West Bengal and Bihar	4) Damodar Valley Project	A multipurpose project for the unified development of irrigation, flood control and power generation in West Bengal and Bihar. It is comprise multipurpose dam at Konar, Tilaiya, Maithon and Panchat, Hydel Power Stations at Tilaiya,

Name of the State	Name of major project	Details
		Konar Mainthon and Panchat, Barrage at Durgapur and thermal Power houses at Bokaro, Chandrapur and Durgapur. The project is adminstrated by the Damodar valley corporation.

1.2 IRRIGATION DEVELOPMENT IN MAHARASHTRA :

The State of Maharashtra is having more than 12% of irrigation potential at all India level. This is due to the fact that there is not a single big river in Maharashtra like Ganga, Brahmaputra as in other States. The rivers in Maharashtra are not flowing throughout the year. As a result of this geographical constraints of the rivers in Maharashtra, the number of major irrigation projects is very few in comparision with all India level.

According to the Barve Commission Report in Maharashtra 30% of the total irrigation potential could

TABLE NO. I-2 : AREA IRRIGATED BY SOURCES IN MAHARASHTRA STATE

(In thousand hectares)

Sr. No.	Year	Area irrigated							Intensity of irrigated cropping (per cent)	No.of irrigated wells (in'000)	Net area irrigated per well (in hect.)	Gross cropped area	Percentage of gross irrigated area to gross cropped area
		Govt. canals	Private canals	Tanks	Wells	Other sources	Net area	Gross area					
1.	1960-61	213	31	193	595	41	1,072	1,220	13.8	542	1.10	18,823	6.48
2.	1965-66	219	30	190	711	57	1,206	1,388	15.1	620	1.15	18,972	7,32
3.	1970-71	267	19	205	768	86	1,347	1,570	16.6	694	1.11	18,737	8,38
4.	1974-75	319	20	232	936	105	1,612	1,933	19.9	764	1.23	19,506	9,90
5.	1975-76	-	-	-	1,084	717	1,802	2,171	20.5	779	1,39	19,664	11.04
6.	1980-81	-	-	-	1,055	780	1,835	2,415	27.1	826	1.26	20,133	12.50
7.	1983-84	-	-	-	1,162	913	2,075	2,733	31.6	-	-	20,788	13.15
8.	1984-85	-	-	-	1,057	819	1,876	2,518	34.2	-	-	20.470	12.30
9.	1985-86	-	-	-	1,063	818	1,881	2,461	30.8	-	-	20.266	12.14
10.	1986-87	-	-	-	992	812	1,804	2,343	29.9	-	-	19,920	11.76
11.	1987-88	-	-	-	1,021	808	1,829	2,381	30.2	-	-	20,131	11.82

Source : Director of Agriculture, Maharashtra State, Pune.

projects from political, social and economic points of view has its own importance to both economists, policy makers and planners.

Table No. I-2 gives idea about the area irrigated by different sources in Maharashtra States. Thenet area irrigated was increased from 1072 thousand hectares in 1960-61 to 1347 thousand hectares in 1970-71 and 1897 thousand hectares in 1984-85. Very surprisingly there has not been even marginal increase in net irrigated area from 1983-84 to 1987-88.

However as stated in the following Table-I-3 and I-4 there are 1916 total No. of irrigation projects as on June 1986, which includes 16 major irrigation projects. The irrigation potential created by all types of irrigation projects was 2322-38 thousand hectares at the end of June 1986, in which contribution of major & medium schemes was 74.53%.

TABLE NO. I-3 : Number of Irrigation Projects completed in Maharashtra.

Irrigation Projects	No. of Projects completed as on 30th June 1986
Major ..	16
Medium ..	146
Minor ..	1400
Lift ..	354
TOTAL:	1916

Source : Irrigation Department, Govt. of Maharahstra.

TABLE NO. I-4 : Irrigation Potential Created and Actual Irrigated Area.

(In Thousand Hectares)

Projects	Irrigation Potential created at the end of June 1986	Actual Irrigated Area 1986-87
Major & Medium	1730.86 (74.53%)	655.97 (82.44%)
Minor	479.24 (20.64%)	122.49 (15.40%)
Lift Irrigation	112.28 (4.83%)	17.16 (2.16%)
	2322.38	795.62

Source : Irrigation Department, Govt. of Maharashtra.

It is disheartening fact that out of total irrigation potential created (2322.38) thousand hectares, only (800) thousand hectares is being actually utilised at the end of 1986-87. Thus the under utilisation of irrigation potential in Maharashtra is serious problem. However as clearly stated in Table I-4 more than 82% of the actual irrigated area is contributed by major and medium irrigation projects.

1.3 OBJECTIVES OF THE STUDY :

The present research work is a small effort to study the impact of Bhima (Ujjani) major irrigation projects on agricultural charge in Solapur District.

The objectives are as follows :

1) To study the development of irrigation projects in India in general and in Maharashtra, in particular.

2) To study the salient features of Bhima (Ujjani) irrigation (dam) project with particular reference to Solapur District only.

3) To analyse the impact of Bhima (Ujjani) irrigation project on cropping pattern in the command area of the project.

4) To undertake a small case study of Ranjani Village with view to studying the change in the croping patern due to Bhima (Ujjani) Project.

1.4 METHODOLOGY :

1) The secondary data of published materials was used to study irrigation development in India and Maharashtra.

2) The statistical information was provided by the office of the Bhima (Ujjani) Circle Office, Solapur. Bhima (Ujjani) Irrigation Project. CADA Office, Pandharpur, Sub-division Office Tembhurni and its branch Ranjani, and other branches etc.

3) While undertaking a case study of Ranjani Village, primary data was collected from the village level and circle offices of the dam. An informal opinion survey of the benefisiries in Ranjani Village was conducted and a observation note was prepared.

1.5 LIMITATIONS :

As we could not get the sufficient data regarding the change in cropping pattern of all the villages of the project, we have taken only one small village of Ranjani in Madha taluka. The conclusions can't be generalised and applicable to all the villages.