CHAPTER - I

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Irrigation is a basic input for agricultural development. It is being used as a means for exploiting water potential which is restored by nature underneath the earth. It is generally estimated that about 80% of the annual rainfall is recorded in the four months from June to September and 20% during the winter months. Mansoon in India is very uncertainly and unevenly distributed. This causes risk and uncertainty. The irrigation department removes risk and uncertainty and provides assured water supply for agricultural development.

Wells, Tubewells, Tanks, Canals:these are main sources of irrigation. The Canal water is being made available through irrigation projects broadly classified into major, medium and minor irrigation projects. Irrigation projects having a culturable command Area (CCA) of more than 10,000 hectares each are classified as major projects. Those having a culturable command Area (CCA) between 2,000 hectares and 10,000 hectares fall under the category of medium irrigation projects. And the projects which have a culturable command Area (CCA) of less than 2,000 hectares are classified as minor irrigation Schemes. For the purpose of analysis, the major and the medium irrigation projects

are generally grouped together. These projects comprise a network of dams, bund, canals and other such Schemes. Such projects require substntial Financial outlay and are therefore constructed by the government or any other agency which may draw financial assistance from the government and financial institutions.

The minor irrigation projects on the other hand comprise all the ground water development Schemes such as dug wells, private shallow tubwells, deep public tubewells, boring and deepening dugwells and small surface water development work such as storage tanks, lift irrigation projects, etc. Minor irrigation projects or the ground water development schemes are essentially peopel's programmes implemented primarily through individual and co-operative efforts with finances obtained mainly through institutional sources. As such these projects impose no burden on public authorities. These projects provide an instant and a reliable source of irrigation and do not cause problems as waterlogging and salinity which are the associated with the major irrigation projects offer substantial employment opportunities to the rural people. Since these projects have a wide geographical distribution they are not concerntrated in

any specific region as the case with the bigger irrigation projects they help to reduce regional imblance in agricultural output and thus assure a better income and living standard to rural people over a wider area.

1.1 IRRIGATION DEVELOPMENT IN INDIA :

Before 1951, the total irrigated area in India was only 22.6 million hectares of which 9.7 million hectares was irrigated through major and medium irrigation projects and 12.9 million hectares through minor irrigation potential, increased to 71.94 million hectares of which 31.18 million hectares was under the major and medium projects and 40.76 million hectares under minor schemes. The utilisation of the irrigation potential was only 64.17 million hectares, thus leaving a gap of about 8 million hectares of unutilised irrigation facilities. The Seventh Five year plan envisages to expand the irrigation potential to 80.80 million hectares of which 34.80 million hectares will be covered by the major and medium projects and 46.0 million hectares by minor schemes.

The following table I-1 show the increasing irrigation potential which were made available through major, medium and minor irrigation projects in India during the planned period from 1950-51 to the targeted area of seventh five year plan of 1989-90.

TABLE NO. I-1 : Irrigation potential created by Major Medium and Minor Irrigation projects in India.

(Million Hectares)

Five year plans	Major and Medium irrigation projects	Minor Irrigation Projects	Total Irrigation Potential
First Plan (1951 to 56)	12.20	14.06	26.26
Second Plan (1956 to 60)	14.30	14.79	29.09
Third Plan (1961 to 65)	16.60	17.01	33.61
Annual Plan (1966 to 69)	18.10	19.00	37.10
Fourth Plan (1969 to 74)	20.70	23.50	44.20
Fifth Plan (1974 to 78)	24.82	27.30	52.12
Annual Plan (1978 to 79)	25.86	28.60	54.46
Annual Plan (1979 to 80)	20.60	30.00	50.60
Sixth Plan (1980 to 85)	56.00	80.00	136.00
1989-90[a]	34.08	46.00	80.08

a) Targets for Seventh five year plan.

Source : A Study Of Rural Economics by Vasant Desai.

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It is observed from the above table that total irrigation potential from both the sources of major/medium and minor Schemes has been increasing through out the planned period. But contribution of major and medium irrigation projects is in less proporation than that of minor schemes. For example irrigation potential created by major/medium projects was only 12.20 million hectares in First Plan period, whereas irrigation potential of the minor schemes had created 14.06 million hectares in the same period of First Five years plan. The same trend is being observed even during the successive period from Second to Sixth five years plan.

1.2 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 Hyderbad.
	2) Pochampad	Across Godawari River.
Joint Project of Andhra Pradesh and Karnataka	3) Tungabhadra	On the Tungabhadra river.

Name of the State	Name of major project	Details
Bihar	1) Kosi	A multipurpose prouect, which serves Bihar and Nepal.
	2) Sone High Levels Cana,	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 and the other across Mahi river near Kadana river.

Name of the State	Name of major project	Details
	4) Sabarmati	A storage dam across Sabaramati 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 and a dam at Almatti.

Name of the State	Name of major Project	Details
Karnataka	3) Ghataprabha	A project across Ghataprabha in Belgaum and Bijapur Districts.
	4) Malaprabha	A dam across the Malaprabha 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 Village. 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) Baraci Project	It is multipurpose project consisting of a masonary dam across Barci river in the Jabalpur District and a left bank 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 Pencanga river at Laspur in Yawatmal District and the other on Rayadhu river at Sapli in Parbhani District.
Orisa	1) Hirakud	Workd's longest dam is located on the Mahanandi river.
	2) Mahanandi Delta Scheme	The irrigation scheme will utilise releases from the Hirakud reservoir.
Punjab	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 Bhakra, 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 Beas Sutlaj link and Beas Dam at Pong.
Rajashtan	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 Hariyan and the remaining 37 K.M. in

Name of the State	Name of major project	Details
		Rajasthan and 445 K.M. Rajasthan main canal entirly in Rajasthan.
Joint venture to Tamil Nadu and Kerala.	Parambikulam Aliyar	The project envisages the integrated 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.

Name of the State	Name of major Project	Details
Uttar Pradesh	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 Ghagra river of Girja barrage and joining with Sarju river. Also a barrage across Sarju.
	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

Name of the State	Name of major project	Details
		Port and for improving the navigability of the Hooghly. It comprises a barrage across the Ganga at Farakka a barrage at Jangipur across the Bhagirathi and a feeder cannel taking off the Bhagirathi 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,

Name of the State	Name of major Project	Details
		Tilaiya, Maithon and Panchat, Hydel Power Stations at Tilaiya, Konar Mainthon and Panchat, Barrage at Durgapur and thermal Power houses at Bokaro, Chandrpur and Durgapur. The project is administrated by the Damodar valley corporation.

Construction of any irrigation projects major, medium and minor needs huge capital investment by the government. The following table No. I-2 will give the trand of public sector investment in irrigation projects during the planned period.

Moreover the act of construction of irrigation project implies many socio-economic, geographic, political enviornmental, administrative and even psychological consideration at all levels i.e. national, State, inter state inter region, intraregion, inter district, taluka, village and even family level. Thus whole phenomenon becomes complicated.

TABLE NO. I-2 : Investment in Irrigation Projects during plans:

Rs. in Crores

Five year Plans	Major and Medium irrigation projects	Minor Irrigation Projects (b)	Total Investment
First Plan (1951 to 56)	380 (a)	76	456
Second Plan (1956 to 60)	380	142	522
Third Plan (1961 to 65)	581	328	909
Annual Plan 1966 to 69)	434	326	760
Fourth Plan (1969 to 74)	237(c)	513	1750
Fifth Plan (1974 to 78)	2442(d)	631	3073
Annual Plan (1978 to 79)	977	237	1214
Annual Plan (1979 to 80)	1079	260	1339
Sixth Plan (1980 to 85)	8448	1810	10258

a) Includes Rs. 80 crores incurred during the pre plan period.

b) Government outlay 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 Project.

Source : A Study of Rural Economics by Vasant Desai.
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1.3 IRRIGATION DEVELOPMENT IN MAHARASHTRA :

At all India level the Maharasthra Contributes hardly more than 12% irrigation potential. This is due to the fact that there is not a single big river like Ganga, Brahmaputra as in other states. The rivers in Maharashtra are not flowing throughout the year. As a result of this gegraphical constrainst of the rivers in Maharashtra, the number of major irrigation projects is very small in comparision with all India level.

According to the Barve commission report of irrigation potential in Maharashtra 30% of the total irrigation potential could be created by the major and medium irrigation projects. This commission had tried to measure the irrigation potential in Maharashtra. Accrordingly Maharashtra has 71 lakhs of hectares of total irrigation potential. But according to World Bank Report, Maharashtra State is having the total irrigation potential not more than 62 laksh hectares.

There are following 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 Bank. It is estimated that Rs. 1335 crores were spent to bring 5.5 lakhs of hectares 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 untaped and even under utilise irrigation potential in Maharashtra study of causes for this under utilisation of irrigaion potential are technological, financial, social political in character.

Though number of major irrigation projects in Maharashtra in comparatively small the study of these projects from political, social and economic points of view has its own importance to both economicsts policy maker and planners.

The following table No. I-3 and I-4 shows 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 2322.38 thousand hectares at the end of June 1986, in which contribution of major and mediume schemes 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

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 and Medium	1730.86	655.97
Minor	479.24	122.49
Lift Irrigation	112.28	17.16
Total :	2322.38	795.62

Source : Irrigation Department Government of Maharashtra.

Name of Report or Office records.

1.4 THE PRESENT STUDY :

The economic benefit of irrigation development has to pay two types of costs economic cost in term of huge public expenditure and social cost of disruption of hundereds of families, cultivable land and the villages comming in the construction area of irrigation project.

Naturally rehabilitation of the project affected areas becomes tremendous task for the government. It involves social political, economic implications which needs systematic study from acadamic research point of view. The present research work is a study of the rehabilitation of dam affected villages due to major irrigation project i.e. Bhima (Ujjani) Dam in Solapur District of Maharashtra State.

The Bhima (Ujjani) is one of the major irrigation project which was started in 1965 and completed on 31st March 1987. Theexpected irrigable area of is 1,24,500 hectares. This dam is constructed on the river of Bhima with the approximate initial expenditure of Rs. 315 crores. The benefit area of this dam covers 165 villages in Solapur District with its Talukawise breakup Pandharpur(69),Madha (10), Malshiras (9) Mohol (42), Mangalwedha (22) North Solapur (13) villages. The project was completed on 31-3-87 with the right canal of 112 Km. and the left canal 236 Km. length.

The economic benefit of the major irrigation project has some social costs in terms of rehabilitation of dam affected villages. There are 51 villages in Solapur District (23), Pune District (25), Ahmednagar District (3) which are affected with the land under submergence. Moreover there are 31 villages in which only land was submerted.

1.5 THE OBJECTIVES OF THE PRESENT STUDY :

1) To study the irrigation development in India and Maharashtra with particular reference to major irrigation project of Bhima (Ujjani) project.

2) To study the development administration of rehabilitation of the dam affected villages.

3) To evaluate the infrastructure facilities and other amenities provided in the rehabilitated villages.

4) To study the Scio-economic problems involved in the process of rehabilitation work.

1.6 METHODOLOGY :

1) In order to study the development administration of the rehabilitation process we have considered all the

villages which are to be rehabilitated by the government.

2) In order to study the economic aspect of rehabilitation we have selected Karmala Taluka only.

3) All the data was collected from office of the Executive Engineer, Bhimanagar and its Sub-divisional Offices Bhima Project Circle, Solapur, Bhima Canal Circle, Solapur, District Rehabilitation Office Solapur, Rehabilitation Sub-division, Karmala.

1.7 LIMITATIONS OF STUDY :

This is first small effort on the subject of rehabilitation of the Bhima (Ujjani) Irrigation Project. The analysis is made on the basis of statistical information supplied by the office of Bhima (Ujjani) Project and its branches and particularly Sub-division of rehabilitation office, Karmala. The findings regarding Socio-economic problems in rehabilitation cannot be generalised because these findings are based on the informal opinion survey of the households in the rehabilitated villages in Karmala Taluka only.