Annual Report on IWP sponsored Project

Integrated Development and Management Plan

for Water Resources of the

Wainganga Sub- Basin (Godavari), Maharashtra

Submitted to
India Water Partnership

2011

ACKNOWLEDGEMENTS

The work being undertaken for Preparing a Master Plan for the Integrated Development and Management of Water Resources in the Wainganga River Bain is supported by the several workshops and consultations with local communities, researchers, government officials and representative NGOs in the districts of Bhandara, Gondia, Gadchiroli, Nagpur and Chandrapur in Maharashtra State. The consultations and data collection was funded by the India Water Partnership, New Delhi, which is a constituent of Global Water Partnership, Stockholm. Gmoukh Environmental Trust for Sustainable Development (Convenor, West Zone Water Partnership) acknowledges with thanks the contribution of the India Water Partnerships for making possible preparation of this document through the financial assistance. We are grateful also to the timely support provided by Prof. S R Hashim, President and Dr. Veena Khanduri, Executive Secretary, India Water Partnership.

We would like to acknowledge the participants from the scientific community, and government and non government organizations for actively participating in the deliberations, and providing their valuable suggestions in the planning process. We are especially grateful to the local communities who have not only shared their traditional knowledge and understanding with us, but also gave a new perspective to the work that we have undertaken.

We would like to take this opportunity to thank the various organizations in the Wainganga Region, especially Bhandara Nisarga Va Sanskruti Abhyas Mandal for providing us support during the extensive consultation work which involved traveling to remote areas and villages.

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Gomukh Environmental Trust for Sustainable Development

Convenor, West Zone Partner Partnership

INDIA WATER PARTNERSHIP (IWP)

Annual Report 2011

Gomukh Trust submitted an Inception Report for undertaking the Integrated Water Resources Development and Management Planning Project in October 2010 which was reviewed and accepted by the Water Resources Department, Government of Maharashtra in January 2011. As the second phase of the Project, efforts were directed in preparing the 'Project Identification Report' (PIR) for the Wainganga Basin. The PIR was aimed at identifying and prioritizing the key projects that could be implemented by the State Government in order to resolve the pressing developmental problems in the Wainganga Basin. During the year we tried to maintain two distinct tracks in order to complete the Project Identification Report, which were supported by the India Water Partnership.

The two tracks included:

1. Collection and Analysis of base data for planning purposes:

In order to estimate the availability of water resources and in order to study and anticipate the current and future water requirements for developing and maintaining sustainable livelihoods in the Project region, we collected and analyzed secondary data available on the region. The domains on which data was collected include;

a. **Hydrology data:** Twenty year data on rainfall, river gauges, full climate data (temperature, evaporation, humidity, wind direction and velocity) was collected and analyzed to derive water availability in the Project Area.

b. **Geographical data:** 72 topological maps, with 1:50,000 scale that cover the project area were digitized with 37 layers with details such as administrative boundaries, towns and villages, historical sites, tourist places, rivers, streams, dams and reservoirs, canals, traditional water tanks and structures, watersheds, agricultural areas, forests, etc. Further, a map showing the flood-prone areas in the Project Area was also prepared. Through ground-truthing and stakeholder participation we have identified villages dependent on fisheries, forests, etc.

c. **Population data:** The 1991, 2001 and provisional 2011 Census data was used to estimate the current and future demand for water. The water demand was classified and prioritized based

on demand for domestic water supply, agriculture, industries and elements such as demand for forests and fisheries were added.

d. **Infrastructural and Institutional Data:** Water resources are linked with development of various domains including agriculture and industries. As per our assessment, agriculture is the primary source of livelihood in the region. Therefore, data on agriculture related infrastructural facilities such as markets and warehouse facilities, transport facilities, availability of irrigation pumps, drip irrigation facilities, etc. was collected and analyzed for sufficiency and distribution. Other water based infrastructural requirements such as hydropower, navigation etc. was also studied.

e. **Livelihood Data:** Data was collected on the various livelihoods in the region including on agriculture, fisheries, forests and forest use rights, agro-industries, etc. In-depth stakeholder meetings were conducted to find ways for infrastructural and institutional support required for sustaining livelihoods.

Although the aim was to complete data collection during the first quarter of the year, it was found that the estimated time was not enough to access Governmental documents and reports being made at regional levels. Therefore, the data collection was spread out to cover the entire year. We are still awaiting data on Groundwater, which forms a very important piece of our studies on water balance. The lack of data reduced the pace of work significantly; however we continued to conduct stakeholder consultations at various locations in the Project Area.

2. Establishing stakeholder network on various levels and ensuring participation in planning

When we first began the Wainganga Planning Project, we had envisaged organizing three stakeholder meetings focused on certain issues such as Participatory Irrigation Management (or now on the law 'Maharashtra Management of Irrigation Systems by Farmers Act, 2005), consultation of stakeholders with members of the Maharashtra Water Resources Regulatory Authority, and workshops for the formation of a River Basin Organization.

However on holding discussions with local civil society organizations and community representatives, we found that participation in the planning process would be more efficient if there were several small consultations with various stakeholder groups. Further based on the advice received from local CSOs, we realized that it would be important to form a strong community network prior to the formal establishment of a community based river basin organization or an area water partnership. Such a network formation would entail the identification of common grounds, priorities and action plans for establishing and directing an

area water partnership. During the year a network of CSOs and individuals was formed in the Kathani river basin (a tributary of Wainganga) and it would be formalized in January 2011.

Figure 1: Meeting of Stakeholders in Bhandara

Several small and large stakeholder consultations and discussion were held at local levels by our field staff, and many of these ideas were incorporated in the Project Identification Report. Ideas especially related to fisheries development such as maintenance of *dohas* (small water bodies formed in the river course during the lean months which support fisheries), recognizing riverine fisheries through formation of institutions and allocation of water, etc. were incorporated in the PIR.

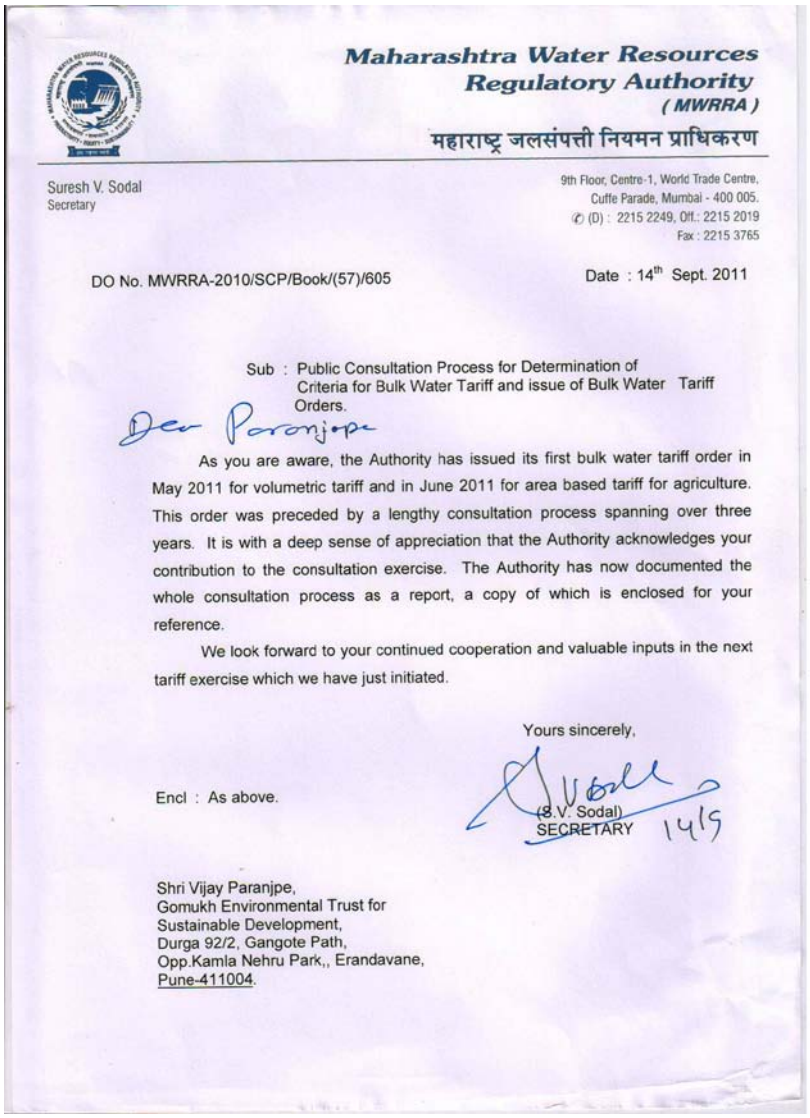
Figure 2 Stakeholder meeting 13th June 2011

An important process has been initiated in the Wainganga basin due to the stakeholder consultation in December 2011. Mr. Ullhas Phadke, a member of the *Abhyas Gats*, has been asked to prepare a water literacy syllabus for the proposed University at Gadchiroli. The syllabus will cover not only under-graduate but also post-graduate and doctoral studies. The stakeholders have suggested that Wainganga River would become the focus of these studies and many activities were brainstormed for being included in the curricula. Some of them include principles of Integrated Water Resource Management, Integrated River Basin Management, household and institutional water audit and interrelationship between irrigation, fisheries, tourism and urban water supply. As part of 'work experience' it has been recommended that students would be taken to the river front tours from Seoni to Balaghat and then from Tumsar to Bhandara. Boats will be used wherever possible in order to expose the students to various aspects of water. A full-fledged course will eventually be developed for the proposed University.

Figure 3: Meeting with fisherman in Rengepar Village

Apart from this, Gomukh as a representative of the West Zone Water Partnership continuously corresponded with the Mr. Suresh Sodal (Member Secretary, MWRRA) in order to strengthen the aspect of stakeholder participation in the 'Guidelines' for implementing the River Basin Organization concept in Maharashtra. We were informed that appropriate changes have been made by the MWRRA. Similarly, we have actively engaged with the MWRRA and sent oral and written comments related to determination of bulk water tariffs and smoother functioning of the activities of Water Users' Associations.

The Wainganga River Basin has no major dam, and most irrigation canals are incomplete. Water Users' Associations have as yet not been established in the region and we have urged the Water Resource Department that the processes should be accelerated in the region.



Maharashtra Water Resources Regulatory Authority
(MWRRA)
महाराष्ट्र जलसंपत्ती नियमन प्राधिकरण

Suresh V. Sodal
Secretary

9th Floor, Centre-1, World Trade Centre,
Cuffe Parade, Mumbai - 400 005.
(D) : 2215 2249, Off.: 2215 2019
Fax : 2215 3765

DO No. MWRRA-2010/SCP/Book/(57)/605

Date : 14th Sept. 2011

Sub : Public Consultation Process for Determination of Criteria for Bulk Water Tariff and issue of Bulk Water Tariff Orders.

Dear Paranjape

As you are aware, the Authority has issued its first bulk water tariff order in May 2011 for volumetric tariff and in June 2011 for area based tariff for agriculture. This order was preceded by a lengthy consultation process spanning over three years. It is with a deep sense of appreciation that the Authority acknowledges your contribution to the consultation exercise. The Authority has now documented the whole consultation process as a report, a copy of which is enclosed for your reference.

We look forward to your continued cooperation and valuable inputs in the next tariff exercise which we have just initiated.

Yours sincerely,

(S.V. Sodal)
SECRETARY
14/9

Encl : As above.

Shri Vijay Paranjpe,
Gomukh Environmental Trust for
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Opp.Kamla Nehru Park,, Erandavane,
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3. Development of materials on Climate change adaptation

A comprehensive document on flood preparedness was prepared in order to adapt to Climate Change. Through the document we have identified 180 flood prone villages. Apart from this, zonal classification based on high flood line, dam break line, etc. has been prepared. Traditional strategies inclusive of efficient and integrated land and water use for sustainable use of water in agriculture with almost zero effluent discharge into rivers are currently being documented. We have ensured through the Project Identification Report that due emphasis is given for the development of community led forestry, pastures, etc. through water resource projects so that alternative livelihoods are available in case of untimely monsoons. Provisions

for village level power security in place of thermal and hydropower have been created so as to promote carbon efficient power generation.

We developed a proposal for an in depth, three-year study on climate change impact and adaptation strategies in the Wainganga basin and submitted to the India Water Partnership as a part of the Regional Proposal for South Asian on Climate Change. It covered range of issues such as documentation of traditional climate change resilient agricultural strategies; suggest changes in reservoir operation schedules of large dams, etc.

On the 26th November 2011, Prof. Vijay Paranjpye of the West Zone Water Partnership made a presentation in the National Round Table Conference on Climate Change and Disaster Management, organized by the India Water Partnership in New Delhi and spoke on activities related to Climate Change Adaptation and increasing resilience to Climate Change.

OUTCOMES OF THE PROJECT:

1. Assessment of the current Water Availability, and the current and future Water requirement and Water Supply of the Wainganga River Basin
2. Project Identification Report
3. Extensive network of community representatives for further consultation
4. Advocacy of the Wainganga Plan with the MWRRA

Summary of the Project Identification Report

Hydrology:

Water availability in the basin was calculated by doing extensive analysis of hydrology data from 1988 to 2007 (i.e. based on 20 year data). Through the analysis the following conclusions were derived regarding the Project Area -

1. The annual average rainfall is **1300 mm** on the Project Area
2. The annual average yield of the Project Area is **11307 Mm^3**

This confirms that the Wainganga Project Area has abundant water in the basin, and achieving water resource development targets such as 100% drinking water supply, 100% irrigation to cultivated lands, waste lands development, and ensuring environmental flows of not only the Wainganga River but also contributing to the Godavari river basin, as identified through the Project Identification Report would be possible within the plan period of thirty years.

Large & Medium Projects with the Total benefitted area and Area under irrigation in 2008-2009

	District	Taluka	Scale of the project	Name of Project	Irrigation Potential (Hectares)	Area under irrigation till 2008-2009 (Hectares)
1	Bhandara	Pauni	Large	Gosi Khurd [1]	1,90,000	Nil
2	Nagpur	Ramtek	Large	Khindsi[2]	Included in the Pench Project	Included in the Pench Project
	District	**Taluka**	**Scale of the project**	**Name of Project**	**Irrigation Potential (Hectares)**	**Area under irrigation till 2008-2009 (Hectares)**
1	Bhandara	Mohadi	Medium	Sorna	1702	1553
2	Bhandara	Mohadi	Medium	Betekar Bothli	1853	1266
3	Bhandara	Tumsar	Medium	Chandpur	14938	10117
4	Bhandara	Tumsar	Medium	Bagheda	2696	1149
5	Gondia	Sadak-Arjuni	Medium	Rengepar	3500	945
6	Gondia	Tiroda	Medium	Sangrampur	2979	792
7	Gondia	Tirora	Medium	Bodalkasa	13138	4023
8	Gondia	Goregaon	Medium	Chulband	18718	3010
9	Gondia	Tirora	Medium	Chorakhmara	24556	3649
10	Gondia	Tirora	Medium	Khairbanda	12446	5045
11	Gadchiroli	Dhanora	Medium	Karvafa	13942	----
12	Gadchiroli	Gadchiroli	Medium	Pohar	20442	-----
					1,30,910 ha	**31,549 Ha (24%)**

Source : District Statistical Abstracts for the Districts of Nagpur, Bhandara, Gondia and Gadchiroli (March 2009)

Note: If the Gosi-Khurd irrigation potential is included, then the total irrigation potential will be (1,30,900 + 1,90,000) 3,20,910.

[1] As Gosi Khurd Project is under construction and incomplete, there is no data available on the area under irrigation and hence is excluded from the calculation pertaining to irrigation potential and actual area under irrigation

[2] Khindsi-Ramtek is an old tank constructed in 1913 and is now a part of the Pench complex. Separate tank data for Khindsi-Ramtex is not available and is not considered for calculating the area under irrigation in 2009.

Minor Irrigation Tanks in Project as of April 2009

District	Maalguzari Taalav		Total Minor Irrigation Structures	
	No.	Irrigation Potential (hectares)	No.	Irrigation Potential (hectares)
Bhandara	1434	14564	1770	33099
Gondia	219	5202	499	18755
Gadchiroli	381	4715	477	7330
Chandrapur	285	5177	393	11026
Nagpur	30	6150	156	5161
Total	2349	35808	**3295**	**75371**

Source: Government of Maharashtra, Water Resources Department, Nagpur Division
Chief Engineer, Minor Irrigation Department, Regional Division: Pune (2008 Abstracts

Geographical Studies:

Area and % of the districts within the Project Area

Sr.no	District	Area of the district within the project area (sq.kms)	% of the total project area	% of the area of district
1	Bhandara	3908.75	28.56	100
2	Gadchiroli	3443.17	25.16	23
3	Nagpur	2424.71	17.54	24
4	Gondia	2279.79	16.65	42
5	Chandrapur	1654.73	12.90	14
	Total Area	**13711.15**	100	

Source: Based on Survey of India Topographical sheets

Number of land holdings, area in hectares and Avg. size per holding in the Project area.

District	Total No. of Land Holding	Area in Hectares	Average size / holding (in ha)
Bhandara	1,89,913	2,04,845.6	1.08
Nagpur	39,927	85,044.51	2.13
Gadchiroli	50,333	83,552.78	1.66
Gondia	89,373	96,522.84	1.08
Chandrapur	33,985	71,708.35	2.11
Total for the Project area	**4,03,531**	**5,41,674.08 (5416.74 sq.km)**	**1.34**
Total project area : 13711.15 sq.km		**Proportion of cultivated area to total project area : 39.51%**	

Source: (Agriculture census 2001)

Population Studies:

Population of Districts in Wainganga Basin (Maharashtra) and Project Area

Sr. No.	District	Total Population of District 2001	Decadal Growth Rate (2001-2011)	Projected population 2011	Density (Persons /Sq.km)	project area (sq.km.)	Estimated Population in the project area in 2011
1.	Bhandara	1136146	5.52	1198810	293	3908.75	11,45,264
2.	Gondia	1200707	10.13	1322331	253	2279.79	5,76,787
3.	Gadchiroli	970294	10.46	1071795	74	3443.17	2,54,795
4.	Chandrapur	2071101	5.95	2194262	192	1654.73	3,17,706
5.	Nagpur	4067637	14.39	4653171	470	2424.71	11,28,000
					TOTAL	**13711.15**	**34,22,552**

Source: Census of India (1991-2001 and 2011)

Livelihood Studies:

Distribution of Population in urban, rural, agriculture, fisheries and forestry categories in 2011

District	Total	Urban	Rural	Population Dependent on agriculture	% of forest in the region	People Dependent on Forests for Livelihoods (includes shepherds)	Population dependent on riverine fisheries (estimation based on ground surveys)	Remaining population (in household industries, small traders, handicrafts, services, etc.)
Bhandara	1145264	211874	933390	376792	31.28%	174104		
Nagpur	1128000	759144	368856	175967	23.97%	46235		
Gadchiroli	254795	27773	227022	106554	78.61%	94700		
Gondia	576787	85941	490846	188263	44.55%	134801		
Chandrapur	317706	111515	206191	92928	35.52%	40231		
Total	3422552	1196247	2226305	940504		490071	470604	325126
% to the total population		34.95%	65.05%	27.48%		14.32%	13.75%	9.50%
		Avg Tribal Population in Project Area :18.37%						
		Estimated forest dependent population based on livelihood dependency : 28.07%						
		Tribal population in Maharashtra : 8%						

Estimation of Water Demand:

Gross Annual Water Demand from 2011 to 2031

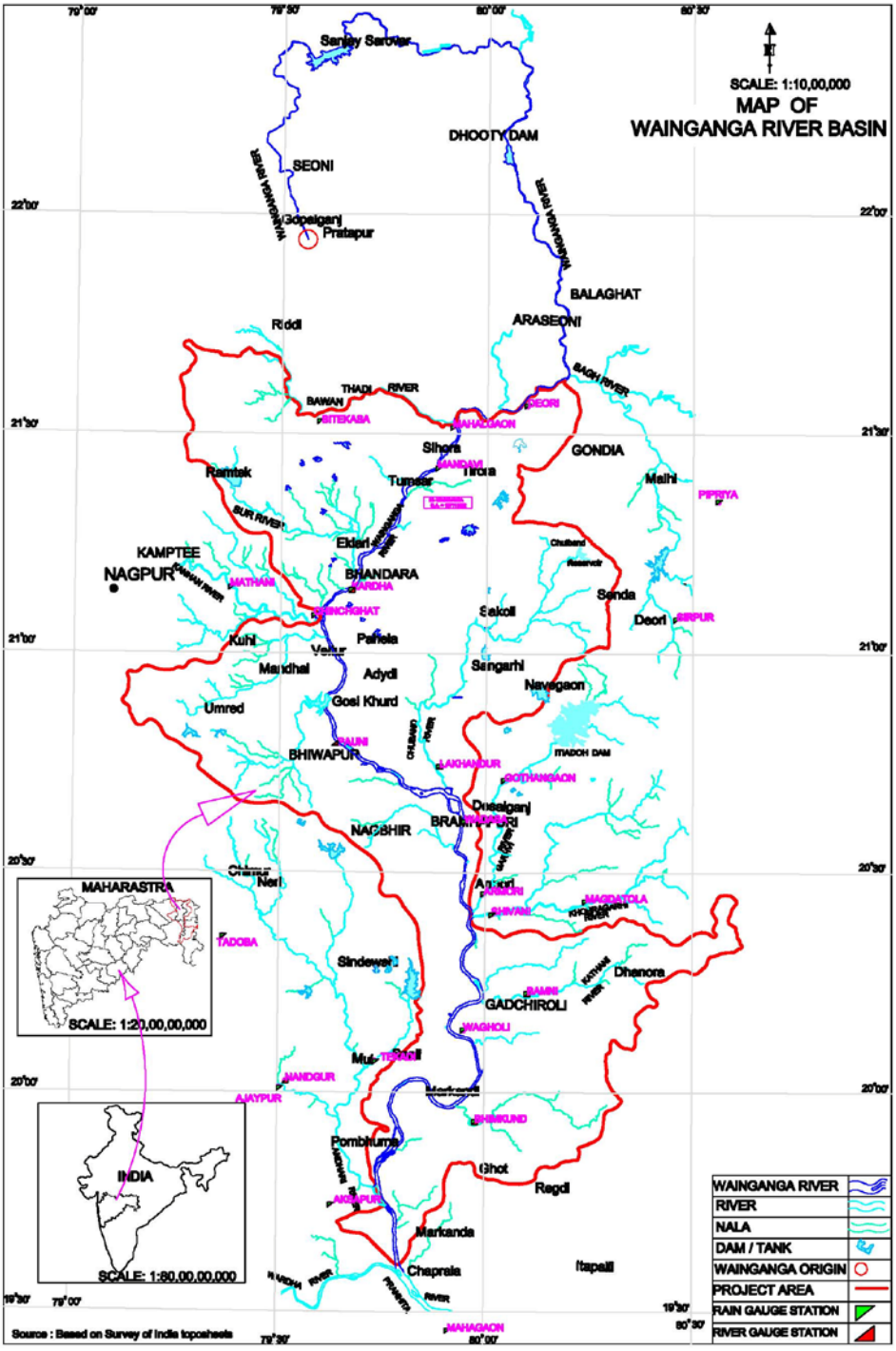
Sr. No.	Water Use	Annual Water Demand in cubic metres in 2011	Annual Water Demand in cubic meters by 2021	Annual Water Demand in cubic meters by 2031
1	Domestic Supply	186 million cubic meters	205 million cubic meters	225 million cubic meters
2	Agriculture	1105 million cubic meters	1300 million cubic meters	3250 million cubic meters.
3	Forest	96 million cubic meters	249 million cubic meters	249 million cubic meters
4	Fisheries	-----	-------	-------
5	Industries	78 million cubic meters	209 million cubic meters	485 million cubic meters
	Total Water Demand	**1465 million cubic meters**	**1963 million cubic meters**	**4209 million cubic meters**

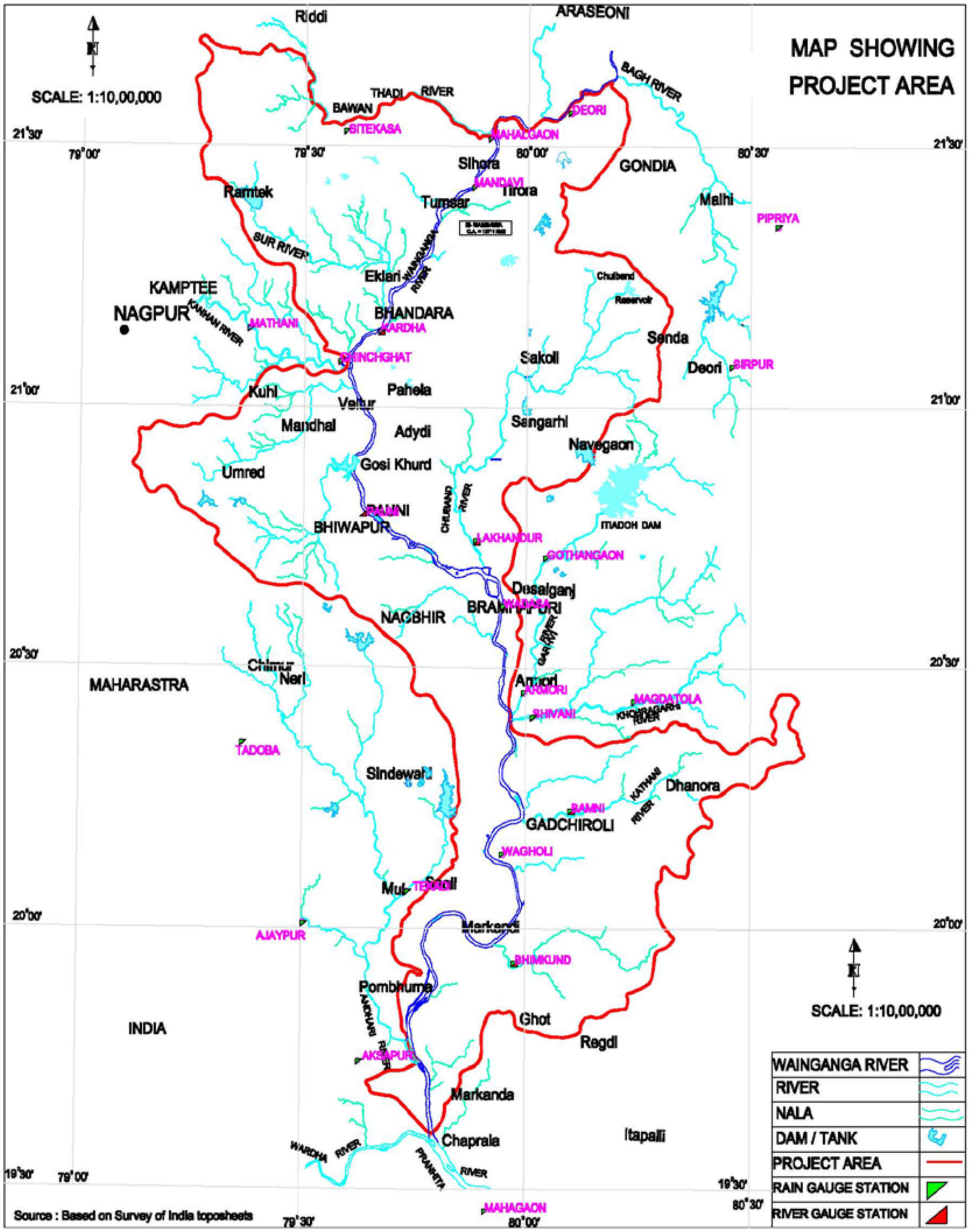
Based on this information projects were identified and prioritized as given below,

Category	Sub-category	Name of Project	No. of projects Identified
A.		**Water Resources Development**	
A. 1.		**Barrages on the mainstream**	**35**
A.2		**Barrages on the major tributaries**	**55**
A.3		**Renovation of existing Irrigation structures**	
	A.3.1.	**Desiltation, repair and maintenance of Minor Tanks**	**7**
	A.3.2.	**Desiltation, repair and maintenance of Malguzari Tanks**	**7**
	A. 4.	**Alternatives for the Gosekhurd Dam Lift Irrigation Schemes**	**1**
	A. 5.	**Rehabilitation & Resettlement Schemes**	**1**

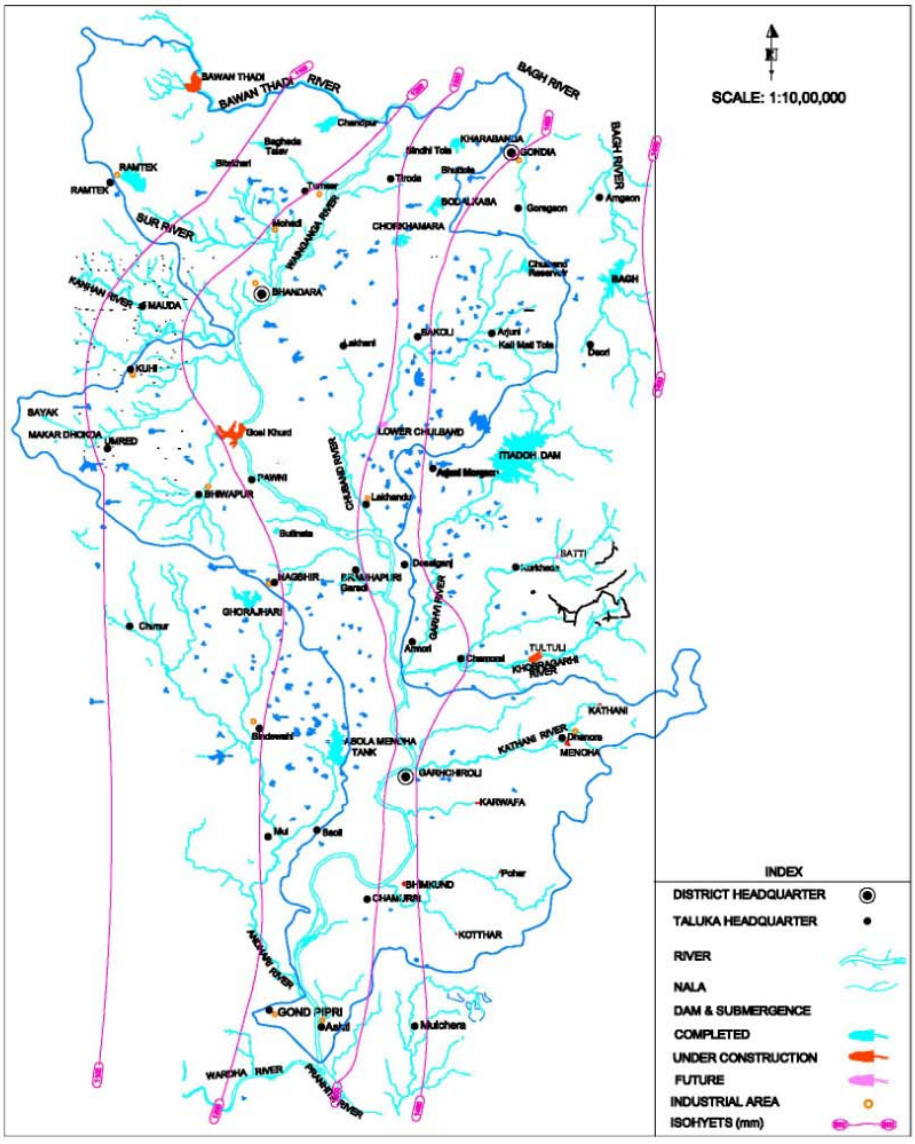
	A. 6.	Prevention of evaporation and other water losses	1
	A. 6.	Groundwater Resource Development	1
A. 7.		Watershed Development	
	A.7.1	Eco Development	8
	A.7.2	Watershed Development and Catchment Area Treatment	10
B.		Water Resources Management	
	B.1.	Development in Agriculture	
	B.1.1.	*Gal-per* Lands	7
	B.1.1.b.	Establishment of Water Users Associations	1
	B. 1.2.	Development of Fisheries (Cold storages and piers)	3
	B.2.	Water Supply and Sanitation schemes	
	B.2.1.	Water Supply and Sanitation to Urban areas	90
	B.2.2	Water Supply and Sanitation to Rural Areas	300
	B.3.	Flood Prevention and Mitigation	17
	B.4.	Intra and Inter Basin transfer	0
C.		Water For Energy	315
D.		Water for Tourism	
	D.1.	Navigation upstream of Gosekhurd Dam	28
	D.2.	Tourism Projects	
E.		Research, Investigation and Data Collection Projects	9
		Total projects identified	896

Maps of the Project Area




MAP SHOWING
PROJECT AREA
SCALE: 1:10,00,000
Riddi
ARASEONI
BAGH RIVER
THADI RIVER
BAWAN
SITEKASA
MAHALGAON
DEORI
GONDIA
Sihora
MANDAVI
Tirora
Tumsar
Ramtek
Malhi
PIPRIYA
SUR RIVER
WAINGANGA RIVER
Eklari
Chulband
Reservoir
KAMPTEE
NAGPUR
KANHAN RIVER
MATHANI
BHANDARA
KARDHA
Sonda
PINCHGHAT
Sakoli
Deori
SIRPUR
Kuhi
Pahela
Veltur
Mandhal
Adydi
Sangarhi
Navegaon
Umred
Gosi Khurd
CHULBAND RIVER
PAUNI
BHIWAPUR
ITIADOH DAM
LAKHANDUR
GOTHANGAON
Desaiganj
NAGBHIR
BRAMHAPURI
GARHVI RIVER
Chimur
Neri
MAHARASTRA
Armori
ARMORI
MAGDATOLA
SHIVANI
KHOBRAGARHI RIVER
TADOBA
Sindewahi
Dhanora
KATHANI RIVER
GADCHIROLI
WAGHOLI
Mul
Saoli
Markandi
AJAYPUR
BHIMKUND
Pombhurna
ANDHARI RIVER
Ghot
INDIA
Regdi
AKSAPUR
Markanda
Itapalli
Chaprala
WARDHA RIVER
PRANHITA RIVER
MAHAGAON
21°30'
21°00'
20°30'
20°00'
19°30'
79°00'
79°30'
80°00'
80°30'
WAINGANGA RIVER
RIVER
NALA
DAM / TANK
PROJECT AREA
RAIN GAUGE STATION
RIVER GAUGE STATION
Source : Based on Survey of India toposheets

Isohyetal Map of the Wainganga sub-basin



LIST OF PARTICIPANTS AT VARIOUS MEETINGS

The list provides details of participants of various meetings and consultations held during the year. Since people from various communities and smaller habitations were consulted during the year; the list is not exhaustive but only indicative and includes the names of key contact persons in various villages.

Sr.No.	Name	Organization (if any)	Contact Details
1.	Mr. Manish Rajankar	BNVSAM	9423118307
2.	Mr. Ijamsai Katenge	Amhi Amchya Arogyasathi, Gadchiroli	9422728937
3.	Mr. Dileep Pandhere	BNVSAM	9403906703
4.	Mrs. Rekha Panke		07184-254328, Pauni, Bhandara
5.	Mr. Keshav Gurnule	Shrishti	9420144035
6.	Mr. Manohar Bhrushundi		0712-2750511 Nagpur
7.	Mr. Patiram Tumsare	Fisheries Self Help Group Co-ordinator at Nawegaon Bandh (Jambhli Village)	Nawegaon Bandh, Gondia
8.	Mr. Mahendra Raut	Researcher, BNVSAM	
9.	Mr. Harishchandra Borkar	Jhadiboli, Jhadipatti (Linguist and Researcher on Tribal Arts)	Rengepar, Bhandara
10.	Dr. Manohar Naranje	Archeologist	Wardha
11.	Mr.Pramod Kalbande	Vidarbha Regional Editor, Sakal Daily	Hingna, Nagpur
12.	Mr. Vilas Bhongade	Gosekhurd Project Affected Peoples' Committee	Nagpur
13.	Mr. Gajanan Bagde	Jhadiboli, Jhadipatti (Linguist and Researcher on Tribal Arts)	Arjuni Morgaon, Bhandara
14.	Mr. Uttam Gharat		Nawegaon Bandh, Gondia
15.	Ms. Rashmi Mahajan	Gomukh, Field Co-ordinator	

16.	Ms. Pushpalata Turkar	Sewing Classes in Village for women	Biloria, Gondia
17.	Mr. Uttam Nagpure		Biloria, Gondia
18.	Dr. Pradeep Rokade	Sarpanch, Dhapewada	Dhapewada, Bhandara
19.	Mr. Shivlalji Parihar	Farmer	Kawlewada, Bhandara
20.	Ms. Savitri Damhaye	Sarpanch, Kawlewada	Kawlewada, Bhandara
21.	Ms. Tijyabai Barve		Roha, Bhandara
22.	Mr. Suresh Ishwarkar	Fisherman	Roha, Bhandara
23.	Mr. Rajhans Bhute	Fisherman	Soundad, Bhandara
24.	Mr. Tukaram Khangal	Fisherman	Mendha, Bhandara
25.	Ms. Kashibai Patre	Sarpanch, Shivni Gadchiroli	Sarpanch, Shivni Gadchiroli
26.	Dr. Aparna Margunwar	Botanist, Shri Sai Baba Shaikshanik Vidyalaya, Armori, Gadchiroli	Armori, Gadchiroli
27.	Mr. Margunwar	Poet, and farmer	Armori, Gadchiroli